



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

CMM Calibration and Services
5608 International Drive, Rockford, IL 61109

(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:

ISO/IEC 17025:2005

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 January 2009):

***Calibration of Dimensional, Electrical, Mechanical,
Mass, Force & Weighing Devices***
(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/Operations Manager

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

<i>Initial Accreditation Date:</i>	<i>Issue Date:</i>	<i>Expiration Date:</i>
October 27, 2002	June 6, 2017	June 6, 2019

<i>Accreditation No:</i>	<i>Certificate No:</i>
59085	L17-260

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.pjllabs.com



Certificate of Accreditation: Supplement

CMM Calibration and Services
 5608 International Drive, Rockford, IL 61109
 Contact: Kim Kirkpatrick Phone: 815-227-4266

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

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
1, 2, 3 Blocks ^F	1 in to 3 in	(40 + 2.7L) μ m	Grade 2 Gage Blocks, Electronic Amp, and Surface Plate
Angle Gage Blocks ^F	1° to 45°	0.008°	Sine Plate, Grade 2 Gage Blocks, Electronic Amp, and Surface Plate
Calipers ^{FO}	0.1 in to 72 in	(397.8 + 30.2L) μ m	Grade 2 Gage Blocks and Cylindrical Rings
Caliper Checker ^{FO}	1 in to 72 in	(14 + 6L) μ m	Grade 2 Gage Blocks, Electronic Amp, and Surface Plate
CMM Calibration and Inspection Volumetric Performance ^{FO}	(16 in to 40 in) 80 % of CMM Shortest Axis for Ball Bar Length	150 μ m	Ball Bar and Step Gage, Gage Blocks, Laser, ASME B89.4.1 ISO10360
(CNC) CMM Linear Displacement Accuracy ^O	X: 0.001 m to 80 m Y: 0.001 m to 80 m Z: 0.001 m to 80 m	(1 + 1.9L) μ m	Laser, Gage Blocks, Step Gage, ASME B89.4.1, ISO10360
Dial Bore Gage ^F	1 in to 10 in	(103 + 35L) μ m	Grade 2 Gage Blocks and Supermic
Dial Indicator Calibrator ^F	0.1 in to 1 in	(40 + 2L) μ m	
Dial Sink/Counterbore Gage ^{FO}	0.1 in to 1 in	180 μ m	
Gage Ball ^F	0.05 in to 1 in	22 μ m	Super Micrometer
Gage Blocks, Steel Gage Blocks, TC/CC/Ceramic ^F	0.005 in to 4 in	(4.4 + 1L) μ m	Labmaster Model U3062070 and Calibration Grade K Croblox Mahr ULM 828NES
	5 in to 10 in	(9 + 5L) μ m	
	12 in to 20 in	(17 + 5L) μ m	
Granite Surface Plates Flatness ^{FO}	12 in to 36 in Diagonal	47 μ m	Planekator & MahrSupramess Comparator
	36 in to 54 in Diagonal	55 μ m	
Height Gage ^{FO}	0.05 in to 4 in	580 μ m	Grade 2 Gage Blocks, Test Indicator, and Surface Plate
	4 in to 24 in	610 μ m	
Height Master ^F	0.5 in to 48 in	(86 + 5L) μ m	Grade 2 Gage Blocks, Electronic Amp, and Surface Plate
Indicator ^{FO}	0.001 in to 1 in	70 μ m	Grade 2 Gage Blocks and Indicator Stand
	0.000 1 in to 4 in	590 μ m	Indicator Calibrator
Inside Micrometer ^F	8 in to 60 in	(110 + 21L) μ m	Grade AS1 Long Gage Blocks
Intramric/Bore Mic ^{FO}	0.2 in to 6 in	(95 + 5L) μ m	Cylindrical Rings



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Kalmaster ^F	0.3 in to 12 in	(42 + 5L) μ in	Labmaster and Grade 2 Gage Block Set
Length Standards ^F	1 in to 60 in	(33 + 2.2L) μ in	Mahr ULM 828NES
Levels ^F	14 in Maximum	150 μ in	Grade 2 Gage Blocks, Surface Plate, and Master Level
Mic Master, OD ^F	0.5 in to 10 in	(28 + 5L) μ in	Super Micrometer and Grade 2 Gage Blocks
Micrometer Head ^F	0.05 in to 1 in	(57 + 9L) μ in	Grade 2 Gage Blocks and Electronic Amp
Micrometer, OD ^{FO}	0.05 in to 24 in	(57 + 5.3L) μ in	Grade 2 Gage Blocks
Optical Comparators Linear ^{FO}	12 in Maximum	350 μ in	Glass Artifact
Optical Comparators Angular ^{FO}	1° to 360°	0.1°	Steel Square/Glass Artifact
Optical Comparators Magnification ^{FO}	10X	0.04 %	Magnification Checker
	20X	0.025 %	
	50X	0.015 %	
Parallels ^F	1 in to 48 in	(35 + 4L) μ in	Grade 2 Gage Blocks, Electronic Amp, and Surface Plate
Plain Plug Gages ^O	0.011 in to 14 in	(28 + 5L) μ in	Grade 2 Gage Blocks and Super Micrometer
	0.25 in to 10 in	(3.3 + 6.4L) μ in	Calibration Grade K Croblox Class XXX Cylindrical Rings Labmaster Model U3062070
Plain Taper Plug ^F	2 in to 10 in	310 μ in	CMM
Protractor ^F	1° to 90°	0.1°	Angle Blocks
Radius Gages ^F	0.01 in to 1 in	750 μ in	Optical Comparator
Repeat-o-Meter ^F	0.002 in	33 μ in	Grade 2 Gage Blocks and Surface Plate
Sine Bar/Plate ^F	2 in to 10 in	230 μ in	Grade 2 Gage Blocks, Electronic Amp, Angle Blocks, and Surface Plate
Steel Rule ^F	72 in	0.027 in	Gage Blocks and Surface Plate
Supermic ^{FO}	0.01 in to 10 in	(29 + 4.7L) μ in	Gage Blocks Force Gage Optical Parallel



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Surface Finish R_a^{FO}	16 μ in to 118 μ in	2.9 μ in	Profilometer
Squares ^{FO}	12 in Maximum	470 μ in	Indy Square, Surface Plate, and Electronic Amp
	12 in to 24 in	860 μ in	
Taper Thread Ring Pitch Diameter ^F	1/8-27 to 2 1/2-11	380 μ in	Taper Plug, Electronic Amplifier, Surface Plate
	1/8-27 to 4-8	240 μ in	Grade 2 gage Block, Taper Block, Supermic Thread Wires
Thickness /Feeler Gages ^{FO}	0.001 in to 1 in	(62 + 28L) μ in	Grade 2 Gage Blocks and Super Micrometer
Thread Measuring Wires ^{FO}	0.005 in to 0.25 in	(19 + 8D) μ in	
Thread Plug Gages Pitch Diameter ^F	0-80 to 6 1/4-16	(95.82 + 7.42L) μ in	Grade 2 Gage Blocks, Super Micrometer And Thread Wires
Thread Ring Gages ^{FO}	0-80 to 2 1/2-12	670 μ in	Comparison to Master Plugs
V Blocks ^{FO}	1 in to 8 in	(46 + 6L) μ in	Grade 2 Gage Blocks, Electronic Amp, Surface Plate, and Plug Gage

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5520A/SC600
10 Hz to 45 Hz	1 mV to 32.999 mV	6 μ V + 0.08 % of reading	
45 Hz to 10 kHz	1 mV to 32.999 mV	6 μ V + 0.015 % of reading	
10 kHz to 20 kHz	1 mV to 32.999 mV	6 μ V + 0.02 % of reading	
20 kHz to 50 kHz	1 mV to 32.999 mV	6 μ V + 0.1 % of reading	
50 kHz to 100 kHz	1 mV to 32.999 mV	12 μ V + 0.35 % of reading	
100 kHz to 500 kHz	1 mV to 32.999 mV	50 μ V + 0.8 % of reading	



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Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5520A/SC600
10 Hz to 45 Hz	33 mV to 329.999 mV	8 μ V + 0.03 % of reading	
45 Hz to 10 kHz	33 mV to 329.999 mV	8 μ V + 0.014 5 % of reading	
10 kHz to 20 kHz	33 mV to 329.999 mV	8 μ V + 0.016 % of reading	
20 kHz to 50 kHz	33 mV to 329.999 mV	8 μ V + 0.035 % of reading	
50 kHz to 100 kHz	33 mV to 329.999 mV	32 μ V + 0.08 % of reading	
100 kHz to 500 kHz	33 mV to 329.999 mV	70 μ V + 0.2 % of reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5520A/SC600 With Dual Output
10 Hz to 45 Hz	0.33 V to 3.299 V	50 μ V + 0.03 % of reading	
45 Hz to 10 kHz	0.33 V to 3.299 V	60 μ V + 0.015 % of reading	
10 kHz to 20 kHz	0.33 V to 3.299 V	60 μ V + 0.019 % of reading	
20 kHz to 50 kHz	0.33 V to 3.299 V	50 μ V + 0.03 % of reading	
50 kHz to 100 kHz	0.33 V to 3.299 V	125 μ V + 0.07 % of reading	
100 kHz to 500 kHz	0.33 V to 3.299 V	600 μ V + 0.24 % of reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			
10 Hz to 45 Hz	3.3 V to 32.999 V	650 μ V + 0.03 % of reading	
45 Hz to 10 kHz	3.3 V to 32.999 V	650 μ V + 0.015 % of reading	
10 kHz to 20 kHz	3.3 V to 32.999 V	650 μ V + 0.024 % of reading	
20 kHz to 50 kHz	3.3 V to 32.999 V	650 μ V + 0.035 % of reading	
50 kHz to 100 kHz	3.3 V to 32.999 V	1 600 μ V + 0.09 % of reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			
45 Hz to 1 kHz	33 V to 329.999 V	2 000 mV + 0.015 % of reading	
1 kHz to 10 kHz	33 V to 329.999 V	6 000 mV + 0.02 % of reading	
10 kHz to 20 kHz	33 V to 329.999 V	6 000 mV + 0.025 % of reading	
20 kHz to 50 kHz	33 V to 329.999 V	6 000 mV + 0.03 % of reading	
50 kHz to 100 kHz	33 V to 329.999 V	50 000 mV + 0.2 % of reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			
45 Hz to 1 kHz	300 V to 1 020 V	10 000 μ V + 0.03 % of reading	
1 kHz to 5 kHz	300 V to 1 020 V	10 000 μ V + 0.025 % of reading	
5 kHz to 10 kHz	300 V to 1 020 V	10 000 μ V + 0.03 % of reading	



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Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5520A/SC600 Auxiliary Output
10 Hz to 20 Hz	10 mV to 329.999 mV	370 μ V + 0.2 % of reading	
20 Hz to 45 Hz	10 mV to 329.999 mV	370 μ V + 0.1 % of reading	
45 Hz to 1 kHz	10 mV to 329.999 mV	370 μ V + 0.1 % of reading	
1 kHz to 5 kHz	10 mV to 329.999 mV	450 μ V + 0.2 % of reading	
5 kHz to 10 kHz	10 mV to 329.999 mV	450 μ V + 0.4 % of reading	
10 kHz to 30 kHz	10 mV to 329.999 mV	900 μ V + 5 % of reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	330 mV to 3.299 99 V	450 μ V + 0.2 % of reading	
20 Hz to 45 Hz	330 mV to 3.299 99 V	450 μ V + 0.1 % of reading	
45 Hz to 1 kHz	330 mV to 3.299 99 V	450 μ V + 0.09 % of reading	
1 kHz to 5 kHz	330 mV to 3.299 99 V	1 400 μ V + 0.2 % of reading	
5 kHz to 10 kHz	330 mV to 3.299 99 V	1 400 μ V + 0.4 % of reading	
10 kHz to 30 kHz	330 mV to 3.299 99 V	2 800 μ V + 5 % of reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	3.3 V to 5 V	450 μ V + 0.2 % of reading	
20 Hz to 45 Hz	3.3 V to 5 V	450 μ V + 0.1 % of reading	
45 Hz to 1 kHz	3.3 V to 5 V	450 μ V + 0.09 % of reading	
1 kHz to 5 kHz	3.3 V to 5 V	1 400 μ V + 0.2 % of reading	
5 kHz to 10 kHz	3.3 V to 5 V	1 400 μ V + 0.4 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5520A/SC600
10 Hz to 20 Hz	29 μ A to 329.99 μ A	0.1 μ A + 0.2 % of reading	
20 Hz to 45 Hz	29 μ A to 329.99 μ A	0.1 μ A + 0.15 % of reading	
45 Hz to 1 kHz	29 μ A to 329.99 μ A	0.1 μ A + 0.125 % of reading	
1 kHz to 5 kHz	29 μ A to 329.99 μ A	0.15 μ A + 0.3 % of reading	
5 kHz to 10 kHz	29 μ A to 329.99 μ A	0.2 μ A + 0.8 % of reading	
10 kHz to 30 kHz	29 μ A to 329.99 μ A	0.4 μ A + 1.6 % of reading	



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Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5520A/SC600
10 Hz to 20 Hz	0.33 A to 3.299 A	0.15 μ A + 0.2 % of reading	
20 Hz to 45 Hz	0.33 A to 3.299 A	0.15 μ A + 0.125 % of reading	
45 Hz to 1 kHz	0.33 A to 3.299 A	0.15 μ A + 0.1 % of reading	
1 kHz to 5 kHz	0.33 A to 3.299 A	0.2 μ A + 0.2 % of reading	
5 kHz to 10 kHz	0.33 A to 3.299 A	0.3 μ A + 0.5 % of reading	
10 kHz to 30 kHz	0.33 A to 3.299 A	0.6 μ A + 1 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	3.3 mA to 32.999 mA	2 μ A + 0.18 % of reading	
20 Hz to 45 Hz	3.3 mA to 32.999 mA	2 μ A + 0.09 % of reading	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	2 μ A + 0.04 % of reading	
1 kHz to 5 kHz	3.3 mA to 32.999 mA	2 μ A + 0.08 % of reading	
5 kHz to 10 kHz	3.3 mA to 32.999 mA	3 μ A + 0.2 % of reading	
10 kHz to 30 kHz	3.3 mA to 32.999 mA	4 μ A + 0.4 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	33 mA to 329.999 mA	20 μ A + 0.18 % of reading	
20 Hz to 45 Hz	33 mA to 329.999 mA	20 μ A + 0.09 % of reading	
45 Hz to 1 kHz	33 mA to 329.999 mA	20 μ A + 0.04 % of reading	
1 kHz to 5 kHz	33 mA to 329.999 mA	50 μ A + 0.1 % of reading	
5 kHz to 10 kHz	33 mA to 329.999 mA	100 μ A + 0.2 % of reading	
10 kHz to 30 kHz	33 mA to 329.999 mA	200 μ A + 0.4 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 45 Hz	0.33 A to 1.099 99 A	100 μ A + 0.18 % of reading	
45 Hz to 1 kHz	0.33 A to 1.099 99 A	100 μ A + 0.05 % of reading	
1 kHz to 5 kHz	0.33 A to 1.099 99 A	1 000 μ A + 0.6 % of reading	
5 kHz to 10 kHz	0.33 A to 1.099 99 A	5 000 μ A + 2.5 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 45 Hz	1.1 A to 2.999 99 A	100 μ A + 0.18 % of reading	
45 Hz to 1 kHz	1.1 A to 2.999 99 A	100 μ A + 0.06 % of reading	
1 kHz to 5 kHz	1.1 A to 2.999 99 A	1 000 μ A + 0.6 % of reading	
5 kHz to 10 kHz	1.1 A to 2.999 99 A	5 000 μ A + 2.5 % of reading	



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Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5520A/SC600
45 Hz to 100 Hz	3 A to 10.999 A	2 000 μ A + 0.06 % of reading	
100 Hz to 1 kHz	3 A to 10.999 A	2 000 μ A + 0.1 % of reading	
1 kHz to 5 kHz	3 A to 10.999 A	2 000 μ A + 3 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
45 Hz to 100 Hz	11 A to 20.5 A	5 000 μ A + 0.12 % of reading	
100 Hz to 1 kHz	11 A to 20.5 A	5 000 μ A + 0.15 % of reading	
1 kHz to 5 kHz	11 A to 20.5 A	5 000 μ A + 3 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5520A/SC600 With LCOMP On
10 Hz to 100 Hz	29 μ A to 329.99 μ A	0.2 μ A + 0.25 % of reading	
100 Hz to 1 kHz	29 μ A to 329.99 μ A	0.5 μ A + 0.6 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5520A/SC600
10 Hz to 100 Hz	0.33 mA to 3.299 9 mA	0.3 μ A + 0.25 % of reading	
100 Hz to 1 kHz	0.33 mA to 3.299 9 mA	0.8 μ A + 0.6 % of reading	
500 Hz to 1 kHz	0.33 mA to 3.299 9 mA	0.15 μ A + 0.1 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 100 Hz	33 mA to 329.99 mA	40 μ A + 0.08 % of reading	
100 Hz to 1 kHz	33 mA to 329.99 mA	100 μ A + 0.2 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 100 Hz	33 mA to 329.99 mA	200 μ A + 0.12 % of reading	
100 Hz to 440 Hz	33 mA to 329.99 mA	1 000 μ A + 0.3 % of reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 100 Hz	3 A to 20.5 A	2 000 μ A + 0.12 % of reading	
100 Hz to 1 kHz	3 A to 20.5 A	5 000 μ A + 1 % of reading	
Equipment to Measure DC Voltage ^{FO}			
	3 μ V to 329.999 9 mV	1 μ V + 0.002 % of reading	
	6 μ V to 3.299 99 V	2 μ V + 0.001 1 % of reading	
	60 μ V to 32.999 9 V	20 μ V + 0.001 2 % of reading	
	30 V to 329.999 9 V	150 μ V + 0.001 8 % of reading	
	100 V to 1.02 V	1 500 μ V + 0.001 8 % of reading	



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Equipment to Measure DC Current ^{FO}	0.006 μ A to 329.999 μ A	0.002 μ A + 0.015 % of reading	Fluke 5520A/SC600
	0.015 μ A to 32.999 9 μ A	0.005 μ A + 0.01 % of reading	
	0.075 μ A to to 329.999 mA	0.025 μ A + 0.01 % of reading	
	7.5 μ A to 329.999 mA	2.5 μ A + 0.01 % of reading	
	120.1 μ A to 1.099 99 A	40 μ A + 0.02 % of reading	
	1.1 A to 2.999 99 A	40 μ A + 0.038 % of reading	
	1.5 mA to 10.999 99 A	500 μ A + 0.05 % of reading	
	11 A to 20.5 A	750 μ A + 0.1 % of reading	
Equipment to Measure Capacitance ^{FO}	0.19 nF to 0.399 9 nF	0.01 nF + 0.5 % of reading	
	0.4 nF to 1.099 9 nF	0.01 nF + 0.5 % of reading	
	1.1 nF to 3.299 9 nF	0.01 nF + 0.5 % of reading	
	3.3 nF to 10.999 nF	0.01 nF + 0.25 % of reading	
	11 nF to 32.999 nF	0.1 nF + 0.25 % of reading	
	33 nF to 109.99 nF	0.1 nF + 0.25 % of reading	
	110 nF to 329.99 nF	0.3 nF + 0.25 % of reading	
	0.33 μ F to 1.099 99 μ F	1 nF + 0.25 % of reading	
	1.1 μ F to 3.299 99 μ F	3 nF + 0.25 % of reading	
Equipment to Measure Capacitance ^{FO}	3.3 μ F to 10.999 9 μ F	10 nF + 0.25 % of reading	
	11 μ F to 32.999 9 μ F	30 nF + 0.4 % of reading	
	33 μ F to 109.999 μ F	100 nF + 0.45 % of reading	
	110 μ F to 329.999 μ F	300 nF + 0.45 % of reading	
	0.33 μ F to 1.099 99 mF	1 μ F + 0.45 % of reading	
	1.1 mF to 3.299 9 mF	3 μ F + 0.45 % of reading	
	3.3 mF to 10.999 9 mF	10 μ F + 0.45 % of reading	
	11 mF to 32.999 mF	30 μ F + 0.75 % of reading	
33 mF to 100 mF	100 μ F + 1.1 % of reading		
Oscilloscopes - DC Voltage (50 Ω) ^{FO}	1 mV to 6.6 V	40 μ V + 0.29 % of reading	
Oscilloscopes - DC Voltage (1 M Ω) ^{FO}	1 mV to 130 V	40 μ V + 0.054 4 % of reading	
Oscilloscopes - AC Voltage (50 Ω) ^{FO}	1 mV to 6.6 V	40 μ V + 0.29 % of reading	
Oscilloscopes - AC Voltage (1 M Ω) ^{FO}	1 mV to 130 V	40 μ V + 0.11 % of reading	



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Oscilloscopes - Wave Gen. (50 Ω) ^{FO}	0.001 8 Vp-p to 2.5 Vp-p	100 μ V + 0.346 % of reading	Fluke 5520A/SC600
Oscilloscopes - Wave Gen. (1 M Ω) ^{FO}	0.001 8 Vp-p to 55 Vp-p	100 μ V + 0.346 % of reading	
Oscilloscopes - Input Impedance Measure ^{FO}	50 Ω to 60 Ω	0.1 % of reading	
	0.5 M Ω to 1 M Ω	0.1 % of reading	
Oscilloscopes - Leveled Sinewave 50 kHz to 11.1 GHz ^{FO}	5 mV to 5.5 V	100 μ V + 5.07 % of reading	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E ^{FO}	-250 $^{\circ}$ C to -100 $^{\circ}$ C	0.5 $^{\circ}$ C	Electrical Simulation of Thermocouple Output Fluke 5520A/SC600
	-100 $^{\circ}$ C to -25 $^{\circ}$ C	0.16 $^{\circ}$ C	
	-25 $^{\circ}$ C to 350 $^{\circ}$ C	0.14 $^{\circ}$ C	
	350 $^{\circ}$ C to 650 $^{\circ}$ C	0.16 $^{\circ}$ C	
	650 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.21 $^{\circ}$ C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J ^{FO}	-210 $^{\circ}$ C to -100 $^{\circ}$ C	0.27 $^{\circ}$ C	
	-100 $^{\circ}$ C to -30 $^{\circ}$ C	0.16 $^{\circ}$ C	
	-30 $^{\circ}$ C to 150 $^{\circ}$ C	0.14 $^{\circ}$ C	
	150 $^{\circ}$ C to 760 $^{\circ}$ C	0.17 $^{\circ}$ C	
	760 $^{\circ}$ C to 1 200 $^{\circ}$ C	0.23 $^{\circ}$ C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K ^{FO}	-200 $^{\circ}$ C to -100 $^{\circ}$ C	0.33 $^{\circ}$ C	
	-100 $^{\circ}$ C to -25 $^{\circ}$ C	0.18 $^{\circ}$ C	
	-25 $^{\circ}$ C to 120 $^{\circ}$ C	0.16 $^{\circ}$ C	
	120 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.26 $^{\circ}$ C	
	1 000 $^{\circ}$ C to 1 372 $^{\circ}$ C	0.4 $^{\circ}$ C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R ^{FO}	0 $^{\circ}$ C to 250 $^{\circ}$ C	0.57 $^{\circ}$ C	
	250 $^{\circ}$ C to 400 $^{\circ}$ C	0.35 $^{\circ}$ C	
	400 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.33 $^{\circ}$ C	
	1 000 $^{\circ}$ C to 1 767 $^{\circ}$ C	0.4 $^{\circ}$ C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S ^{FO}	0 $^{\circ}$ C to 250 $^{\circ}$ C	0.47 $^{\circ}$ C	
	250 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.36 $^{\circ}$ C	
	1 000 $^{\circ}$ C to 1 400 $^{\circ}$ C	0.37 $^{\circ}$ C	
	1 400 $^{\circ}$ C to 1 767 $^{\circ}$ C	0.46 $^{\circ}$ C	



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 Contact: Kim Kirkpatrick Phone: 815-227-4266

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T ^{FO}	-250 °C to -150 °C	0.63 °C	Electrical Simulation of Thermocouple Output Fluke 5520A/SC600
	-150 °C to 0 °C	0.24 °C	
	0 °C to 120 °C	0.16 °C	
	120 °C to 400 °C	0.14 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B ^{FO}	600 °C to 800 °C	0.44 °C	
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.3 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C ^{FO}	0 °C to 150 °C	0.3 °C	
	150 °C to 650 °C	0.26 °C	
	650 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 800 °C	0.5 °C	
	1 800 °C to 2 316 °C	0.84 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type L ^{FO}	-200 °C to -100 °C	0.37 °C	
	-100 °C to 800 °C	0.26 °C	
	800 °C to 900 °C	0.17 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N ^{FO}	-200 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 410 °C	0.18 °C	
	410 °C to 1 300 °C	0.27 °C	

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Torque ^F	9.49 N•m to 338.95 N•m (7 lbf•ft to 780 lbf•ft)	1.1 N•m (0.81 lbf•ft)	Norbar Analyzer TWA 1000
	1.13 N•m to 11.30 N•m (10 lbf•in to 50 lbf•ft)	0.96 % of reading	Utica Analyzer Models TA4-10B-1 & TA4-05F-1



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Mechanical

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Pressure Gage ^{FO}	20 psi to 2 000 psi	$(2.58 \times 10^{-1} + 5.11 \times 10^{-4}P)$ psi	Beta PI 2K Digital Test Gage
	1 500 psi to 7 000 psi	0.17 psi + 0.011 % of reading	Ashcroft 302089D027000 #1316415 Dead Weight Tester
	7 000 psi to 15 000 psi	0.17 psi + 0.013 % of reading	Ashcroft 302074D02L15000 #412030016
Indirect Verification of Vickers Hardness ^{FO}	220 HV to 720 HV	13 HV	Master Test Blocks Stage Micrometer ASTM E384
Indirect Verification of Knoop Hardness ^{FO}	220 HK to 500 HK	15 HK	
Indirect Verification of Rockwell Hardness ^{FO}	HRA		Calibrated Rockwell Hardness Test Blocks ASTM E18-08a
	20 HRA to 65 HRA	1.3 HRA	
	70 HRA to 78 HRA	1.3 HRA	
	80 HRA to 84 HRA	1.3 HRA	
	HRBW		
	40 HRBW to 59 HRBW	1.5 HRBW	
	60 HRBW to 79 HRBW	1.5 HRBW	
	80 HRBW to 100 HRBW	1.4 HRBW	
	HRC		
	20 HRC to 30 HRC	1.3 HRC	
	35 HRC to 55 HRC	1.3 HRC	
	60 HRC to 65 HRC	0.78 HRC	
	HR15N		
	70 HR15N to 77 HR15N	1.4 HR15N	
	78 HR15N to 88 HR15N	1.4 HR15N	
	90 HR15N to 92 HR15N	1.1 HR15N	
	HR15N		
70 HR15N to 77 HR15N	1.4 HR15N		
78 HR15N to 88 HR15N	1.4 HR15N		
90 HR15N to 92 HR15N	1.1 HR15N		



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Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Indirect Verification of Rockwell Hardness ^{FO}	HR45N		Calibrated Rockwell Hardness Test Blocks ASTM E18-08a
	20 HR15N to 31 HR45N	1.5 HR45N	
	37 HR15N to 61 HR45N	1.5 HR45N	
	66 HR15N to 72 HR45N	1.1 HR45N	
	HR30TW		
	43 HR30TW to 56 HR30TW	1.5 HR30TW	
	57 HR30TW to 69 HR30TW	1.5 HR30TW	
	70 HR30TW to 83 HR30TW	1.4 HR30TW	

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Force Gage ^{FO}	5 lb to 110 lb	$(0.17 + 2 \times 10^{-3}F)$ lb	Class 7 Weights
Tension/Compression ^{FO}	25 lb to 2 000 lb	$(1.7 \times 10^{-1} + 2 \times 10^{-3}Wt)$ lb	
Weight Scale ^{FO}	30 g to 1 000 g	$(1.13 \times 10^{-2} + 5.1 \times 10^{-4}Wt)$ g	Class 6 Weights
	2.5 lb to 110 lb	$(4.55 \times 10^{-2} + 4.55 \times 10^{-3}Wt)$ g	Class 7 Weights

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represent the smallest measurement uncertainties attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is 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 O means that the laboratory performs calibration of the indicated parameter onsite at customer locations. Example: Outside Micrometer^O would mean that the laboratory performs this calibration onsite at the customer's location.



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

5. 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.
6. 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.
7. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.
8. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
9. The term P represents pressure in units appropriate to the uncertainty statement.
10. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
11. The term "X" preceded by a number represents the number of times a lense system magnifies an image relative to its actual size. CMC stated as "% of magnification" represents the CMC of magnification expressed as a percentage of the total magnification.
12. The term F represents Force appropriate to the uncertainty statement.

