



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Certified Test Equipment, Inc.

708 Cooper Drive, Wylie, TX 75098

(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 April 2017):

Acoustic, Chemical, Dimensional, Electrical, Frequency, Mechanical and Optical 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/Operations Manager

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

Initial Accreditation Date:

April 14, 2004

Issue Date:

October 9, 2018

Expiration Date:

October 9, 2020

Accreditation No.:

59237

Certificate No.:

L18-464

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

Certified Test Equipment, Inc.

708 Cooper Drive, Wylie, TX 75098

Contact Name: John Collinsworth Phone: 972-429-3722

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 |
|---|---|--|--|
| Sound level meters (at the listed frequencies) ^{FO} | | | GR 1562A |
| 125 Hz | 114 dB | 0.67 dB | |
| 250 Hz | 114 dB | 0.67 dB | |
| 500 Hz | 114 dB | 0.67 dB | |
| 1 000 Hz | 114 dB | 0.67 dB | |
| 2 000 Hz | 114 dB | 0.67 dB | |
| 1 000 Hz | 94 dB | 0.58 dB | Cel Inst. CEL-284/2B |

Chemical

| 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 |
|---|---|--|--|
| pH meter/Probe Calibration Fixed Points ^{FO} | 4 pH | 0.43 % of reading | pH Buffer Solutions & Fluke 743B |
| | 7 pH | 0.43 % of reading | |
| | 10 pH | 0.43 % of reading | |
| Conductivity Meter Fixed Points Measured at 25 °C ^{FO} | 23 μ s/cm | 0.65 % of reading | Conductivity Solutions & Fluke 743B |
| | 84 μ s/cm | 0.65 % of reading | |
| | 447 μ s/cm | 0.65 % of reading | |
| | 1 413 μ s/cm | 0.65 % of reading | |
| | 2 070 μ s/cm | 0.65 % of reading | |
| | 2 764 μ s/cm | 0.65 % of reading | |
| | 12 800 μ s/cm | 0.65 % of reading | |
| | 80 000 μ s/cm | 0.65 % of reading | |

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 |
|--|---|--|--|
| Micrometers, Outside ^{FO} | 0.05 in to 24 in | 500 μ in | Gage Block Set |
| Micrometers , Depth ^{FO} | 0.05 in to 24 in | 500 μ in | |
| Micrometers, Inside ^{FO} | 1.5 in to 12 in | 500 μ in | |
| Calipers ^{FO} | 0.05 in to 12 in | 500 μ in | |
| | 12 in to 48 in | 1 000 μ in | |
| Height Gages ^{FO} | 0 in to 18 in | 250 μ in | Height master |
| Height Masters ^{FO} | 0 in to 24 in | 150 μ in | Gage Block Set |



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|--|---|--|---|
| Thread Ring Gage Pitch Diameter ^{FO} | 0-80 to 2-6 | 250 μ in | Thread setting Standard |
| Thread Plug Gages Pitch Diameter ^{FO} | 0-80 to 2-6 | 1 000 μ in | Optical Comparator Thread Wire Set Fed Std H28/20 |
| Major Diameter ^{FO} | 0.04 in to 2 in | 1 000 μ in | Super Micrometer |
| Minor Diameter ^{FO} | | | |
| Dial Indicators ^{FO} | 0 in to 2 in | 150 μ in | Dial Indicator |
| Test Indicators ^{FO} | 0 in to 0.125 in | 150 μ in | Calibrator |
| Cylindrical Plug Gages Class XXX ^{FO} | 0.06 in to 0.825 in | 73 μ in | Laser Micrometer |
| | 0.83 in to 1.51 in | 74 μ in | |
| | 1.51 in to 10 in | (65.9 + 8.5L) μ in | |
| Cylindrical Plug Gages ^{FO} | 0.06 in to 0.83 in | 89 μ in | Laser Micrometer |
| | 0.83 in to 1.51 in | 95 μ in | |
| | 1.51 in to 10 in | (73.2 + 14.7L) μ in | |
| Cylindrical Ring Gages ^{FO} | 0.06 in to 0.83 in | 28 μ in | Gage Block Set and Comparator |
| | 0.83 in to 1.51 in | 34 μ in | |
| | 1.51 in to 10 in | (49.7 + 20L) μ in | |
| Sine Bars & Plates Parallelism ^{FO} | 6 in to 12 in | 95 μ in | Gage Block Set and probe |
| Surface Plates ^{FO} | 4 in to 12 in | 55 μ in | Autocollimator |
| Gage Blocks – Grade 3 ^{FO} | 0.05 in to 4 in | (2.7 + 0.8L) μ in | Comparator and Master Blocks |

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 AM Modulated Signals (at the listed frequencies) ^{FO} | | | Boonton 8210 |
| 50 Hz to 5 kHz | 10 % to 90 % | 1.5 % of reading | |
| 5 kHz to 7.5 kHz | 10 % to 90 % | 3 % of reading | |
| Equipment to Output FM Modulated Signals (at the listed frequencies) ^{FO} | | | |
| 50 Hz to 5 kHz | 10 % to 90 % | 0.5 % of reading | |
| 5 kHz to 7.5 kHz | 10 % to 90 % | 1 % of reading | |



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|---|---|--|--|
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | Wavetek 9100 |
| 10 Hz to 3 kHz | 0.1 mV to 10 mV | 0.02 % of setting + 384 V | |
| 3 kHz to 10 kHz | 0.1 mV to 10 mV | 0.02 % of setting + 512 μ V | |
| 10 kHz to 30 kHz | 0.1 mV to 10 mV | 0.03 % of setting + 960 μ V | |
| 30 kHz to 50 kHz | 0.1 mV to 10 mV | 0.05 % of setting + 1.92 mV | |
| 50 kHz to 100 kHz | 0.1 mV to 10 mV | 0.1 % of setting + 5.12 mV | |
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 10 mV to 32 mV | 0.02 % of setting + 96 V | |
| 3 kHz to 10 kHz | 10 mV to 32 mV | 0.02 % of setting + 128 μ V | |
| 10 kHz to 30 kHz | 10 mV to 32 mV | 0.03 % of setting + 240 μ V | |
| 30 kHz to 50 kHz | 10 mV to 32 mV | 0.1 % of setting + 480 μ V | |
| 50 Hz to 100 kHz | 10 mV to 32 mV | 0.1 % of setting + 1.28 mV | |
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 32 mV to 320 mV | 0.02 % of setting + 19.2 V | |
| 3 kHz to 10 kHz | 32 mV to 320 mV | 0.02 % of setting + 25.6 μ V | |
| 10 kHz to 30 kHz | 32 mV to 320 mV | 0.03 % of setting + 48 μ V | |
| 30 kHz to 50 kHz | 32 mV to 320 mV | 0.05 % of setting + 96 μ V | |
| 50 kHz to 100 kHz | 32 mV to 320 mV | 0.1 % of setting + 256 μ V | |
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 0.32 V to 3.2 V | 0.02 % of setting + 192 V | |
| 3 kHz to 10 kHz | 0.32 V to 3.2 V | 0.02 % of setting + 256 μ V | |
| 10 kHz to 30 kHz | 0.32 V to 3.2 V | 0.03 % of setting + 480 μ V | |
| 30 kHz to 50 kHz | 0.32 V to 3.2 V | 0.1 % of setting + 960 μ V | |
| 50 kHz to 100 kHz | 0.32 V to 3.2 V | 0.1 % of setting + 2.56 mV | |
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 3.2 V to 32 V | 0.02 % of setting + 1.92 mV | |
| 3 kHz to 10 kHz | 3.2 V to 32 V | 0.03 % of setting + 2.56 mV | |
| 10 kHz to 30 kHz | 3.2 V to 32 V | 0.04 % of setting + 4.8 mV | |
| 30 kHz to 50 kHz | 3.2 V to 32 V | 0.1 % of setting + 9.6 mV | |
| 50 kHz to 100 kHz | 3.2 V to 32 V | 0.2 % of setting + 32 mV | |



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|---|---|---|---|
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | Wavetek 9100 |
| 10 Hz to 3 kHz | 32 V to 105 V | 0.02 % of setting + 6.3 mV | |
| 3 kHz to 10 kHz | 32 V to 105 V | 0.03 % of setting + 8.4 mV | |
| 10 kHz to 30 kHz | 32 V to 105 V | 0.04 % of setting + 15.8 mV | |
| 30 kHz to 50 kHz | 32 V to 105 V | 0.08 % of setting + 31.5 mV | |
| 50 kHz to 100 kHz | 32 V to 105 V | 0.18 % of setting + 105 mV | |
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | |
| 40 Hz to 100 Hz | 105 V to 320 V | 0.03 % of setting + 19.2 mV | |
| 100 Hz to 1 kHz | 105 V to 320 V | 0.03 % of setting + 19.2 mV | |
| 1 kHz to 3 kHz | 105 V to 320 V | 0.04 % of setting + 19.2 mV | |
| 3 kHz to 10 kHz | 105 V to 320 V | 0.04 % of setting + 32 mV | |
| 10 kHz to 20 kHz | 105 V to 320 V | 0.06 % of setting + 48 mV | |
| 20 kHz to 30 kHz | 105 V to 320 V | 0.08 % of setting + 64 mV | |
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | |
| 40 Hz to 100 Hz | 320 V to 800 V | 0.03 % of setting + 63 mV | |
| 100 Hz to 1 kHz | 320 V to 800 V | 0.03 % of setting + 63 mV | |
| 1 kHz to 3 kHz | 320 V to 800 V | 0.04 % of setting + 63 mV | |
| 3 kHz to 10 kHz | 320 V to 800 V | 0.04 % of setting + 105 mV | |
| 10 kHz to 20 kHz | 320 V to 800 V | 0.06 % of setting + 158 mV | |
| 20 kHz to 30 kHz | 320 V to 800 V | 0.08 % of setting + 210 mV | |
| Equipment to measure AC Voltage (at the listed frequencies) ^{F0} | | | |
| 40 Hz to 100 Hz | 800 V to 1 050 V | 0.03 % of setting + 126 mV | |
| 100 Hz to 1 kHz | 800 V to 1 050 V | 0.03 % of setting + 126 mV | |
| 1 kHz to 3 kHz | 800 V to 1 050 V | 0.04 % of setting + 126 mV | |
| 3 kHz to 10 kHz | 800 V to 1 050 V | 0.04 % of setting + 210 mV | |
| 10 kHz to 20 kHz | 800 V to 1 050 V | 0.06 % of setting + 315 mV | |
| 50 kHz to 110 kHz | 800 V to 1 050 V | 0.08 % of setting + 50 μ V | HP 745A/HP 746A |



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|--|---|--|--|
| Equipment to output AC Voltage (at the listed frequencies) ^{F0} | | | Keithley 2001 |
| 1 Hz to 10 Hz | 2 mV to 200 mV | 0.05 % of reading + 30 V | |
| 10 Hz to 50 Hz | 2 mV to 200 mV | 0.02 % of reading + 30 V | |
| 50 Hz to 10 kHz | 2 mV to 200 mV | 0.02 % of reading + 30 V | |
| 10 kHz to 30 kHz | 2 mV to 200 mV | 0.02 % of reading + 30 V | |
| 30 kHz to 50 kHz | 2 mV to 200 mV | 0.03 % of reading + 30 V | |
| 50 kHz to 100 kHz | 2 mV to 200 mV | 0.38 % of reading + 30 V | |
| 100 kHz to 200 kHz | 2 mV to 200 mV | 0.15 % of reading + 50 V | |
| 0.2 MHz to 1 MHz | 2 mV to 200 mV | 1 % of reading + 200 μ V | |
| 1 MHz to 2 MHz | 2 mV to 200 mV | 2.5 % of reading + 400 μ V | |
| Equipment to output AC Voltage (at the listed frequencies) ^{F0} | | | |
| 1 Hz to 10 Hz | 200 mV to 2 V | 0.05 % of reading + 300 V | |
| 10 Hz to 50 Hz | 200 mV to 2 V | 0.02 % of reading + 300 V | |
| 50 Hz to 10 kHz | 200 mV to 2 V | 0.02 % of reading + 300 V | |
| 10 kHz to 30 kHz | 200 mV to 2 V | 0.02 % of reading + 300 V | |
| 30 kHz to 50 kHz | 200 mV to 2 V | 0.03 % of reading + 300 V | |
| 50 kHz to 100 kHz | 200 mV to 2 V | 0.15 % of reading + 300 V | |
| 100 kHz to 200 kHz | 200 mV to 2 V | 0.38 % of reading + 500 V | |
| 0.2 MHz to 1 MHz | 200 mV to 2 V | 1 % of reading + 2 mV | |
| 1 MHz to 2 MHz | 200 mV to 2 V | 2.5 % of reading + 4 mV | |
| Equipment to output AC Voltage (at the listed frequencies) ^{F0} | | | |
| 1 Hz to 10 Hz | 2 V to 20 V | 0.05 % of reading + 3 mV | |
| 10 Hz to 50 Hz | 2 V to 20 V | 0.03 % of reading + 3 mV | |
| 50 Hz to 2 kHz | 2 V to 20 V | 0.02 % of reading + 3 mV | |
| 2 kHz to 10 kHz | 2 V to 20 V | 0.03 % of reading + 3 mV | |
| 10 kHz to 30 kHz | 2 V to 20 V | 0.04 % of reading + 3 mV | |
| 30 kHz to 50 kHz | 2 V to 20 V | 0.05 % of reading + 3 mV | |
| 50 kHz to 100 kHz | 2 V to 20 V | 0.15 % of reading + 3 mV | |
| 100 kHz to 200 kHz | 2 V to 20 V | 0.38 % of reading + 5 mV | |
| 0.2 MHz to 1 MHz | 2 V to 20 V | 2 % of reading + 40 mV | |
| 1 MHz to 2 MHz | 2 V to 20 V | 3.5 % of reading + 40 mV | |



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|---|---|--|--|
| Equipment to output AC Voltage (at the listed frequencies) ^{F0} | | | Keithley 2001 |
| 1 Hz to 10 Hz | 20 V to 200 V | 0.05 % of reading + 30 mV | |
| 10 Hz to 50 Hz | 20 V to 200 V | 0.03 % of reading + 30 mV | |
| 50 Hz to 2 kHz | 20 V to 200 V | 0.02 % of reading + 30 mV | |
| 2 kHz to 10 kHz | 20 V to 200 V | 0.03 % of reading + 30 mV | |
| 10 kHz to 30 kHz | 20 V to 200 V | 0.04 % of reading + 30 mV | |
| 30 kHz to 50 kHz | 20 V to 200 V | 0.05 % of reading + 30 mV | |
| 50 kHz to 100 kHz | 20 V to 200 V | 0.15 % of reading + 30 mV | |
| 100 kHz to 200 kHz | 20 V to 200 V | 0.38 % of reading + 50 mV | |
| 0.2 MHz to 1 MHz | 20 V to 200 V | 2 % of reading + 400 mV | |
| Equipment to output AC Voltage (at the listed frequencies) ^{F0} | | | |
| 1 Hz to 10 Hz | 200 V to 750 V | 0.07 % of reading + 0.112 5 V | |
| 10 Hz to 50 Hz | 200 V to 750 V | 0.05 % of reading + 0.112 5 V | |
| 50 Hz to 2 kHz | 200 V to 750 V | 0.04 % of reading + 0.112 5 V | |
| 2 kHz to 10 kHz | 200 V to 750 V | 0.05 % of reading + 0.112 5 V | |
| 10 kHz to 30 kHz | 200 V to 750 V | 0.06 % of reading + 0.112 5 V | |
| 30 kHz to 50 kHz | 200 V to 750 V | 0.08 % of reading + 0.112 5 V | |
| 50 kHz to 100 kHz | 200 V to 750 V | 0.25 % of reading + 0.112 5 V | |
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | Wavetek 9100 |
| 10 Hz to 3 kHz | 0.01 μ A to 32 μ A | 0.04 % of setting + 900 nA | |
| 3 kHz to 10 kHz | 0.01 μ A to 32 μ A | 0.05 % of setting + 1.8 μ A | |
| 10 kHz to 20 kHz | 0.01 μ A to 32 μ A | 0.10 % of setting + 6 μ A | |
| 20 kHz to 30 kHz | 0.01 μ A to 32 μ A | 0.13 % of setting + 9 μ A | |
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 32.001 μ A to 320 μ A | 0.04 % of setting + 300 nA | |
| 3 kHz to 10 kHz | 32.001 μ A to 320 μ A | 0.05 % of setting + 600 nA | |
| 10 kHz to 20 kHz | 32.001 μ A to 320 μ A | 0.10 % of setting + 2 μ A | |
| 20 kHz to 30 kHz | 32.001 μ A to 320 μ A | 0.13 % of setting + 3 μ A | |
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 0.320 01 mA to 3.2 mA | 0.04 % of setting + 300 nA | |
| 3 kHz to 10 kHz | 0.320 01 mA to 3.2 mA | 0.05 % of setting + 600 nA | |
| 10 kHz to 20 kHz | 0.320 01 mA to 3.2 mA | 0.10 % of setting + 2 μ A | |
| 20 kHz to 30 kHz | 0.320 01 mA to 3.2 mA | 0.13 % of setting + 3 μ A | |



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|---|---|--|--|
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | Wavetek 9100 |
| 10 Hz to 3 kHz | 3.200 01 mA to 32 mA | 0.04 % of setting + 3.2 μ A | |
| 3 kHz to 10 kHz | 3.200 01 mA to 32 mA | 0.05 % of setting + 6.4 μ A | |
| 10 kHz to 20 kHz | 3.200 01 mA to 32 mA | 0.10 % of setting + 12.8 μ A | |
| 20 kHz to 30 kHz | 3.200 01 mA to 32 mA | 0.13 % of setting + 22.4 μ A | |
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 32.00 1 mA to 320 mA | 0.04 % of setting + 32 μ A | |
| 3 kHz to 10 kHz | 32.00 1 mA to 320 mA | 0.05 % of setting + 48 μ A | |
| 10 kHz to 20 kHz | 32.00 1 mA to 320 mA | 0.10 % of setting + 64 μ A | |
| 20 kHz to 30 kHz | 32.00 1 mA to 320 mA | 0.13 % of setting + 96 μ A | |
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 0.321 A to 3.2 A | 0.05 % of setting + 480 μ A | |
| 3 kHz to 10 kHz | 0.321 A to 3.2 A | 0.13 % of setting + 2.56 mA | |
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 3.21 A to 10.5 A | 0.10 % of setting + 3 mA | |
| 3 kHz to 10 kHz | 3.21 A to 10.5 A | 0.25 % of setting + 10 mA | |
| Equipment to Measure AC Current (at the listed frequencies) ^{F0} | | | |
| 10 Hz to 3 kHz | 10.500 1 A to 20 A | 0.10 % of setting + 6.9 mA | |
| 3 kHz to 10 kHz | 10.500 1 A to 20 A | 0.25 % of setting + 23 mA | |
| Equipment to Output AC Current (at the listed frequencies) ^{F0} | | | Keithley 2001 |
| 20 Hz to 50 Hz | 0.01 μ A to 200 μ A | 0.18 % of reading + 30 nA | |
| 50 Hz to 200 Hz | 0.01 μ A to 200 μ A | 0.10 % of reading + 30 nA | |
| 200 Hz to 1 kHz | 0.01 μ A to 200 μ A | 0.20 % of reading + 30 nA | |
| 1 kHz to 10 kHz | 0.01 μ A to 200 μ A | 0.25 % of reading + 30 nA | |
| Equipment to Output AC Current (at the listed frequencies) ^{F0} | | | |
| 20 Hz to 50 Hz | 210 μ A to 2 mA | 0.15 % of reading + 0.3 μ A | |
| 50 Hz to 200 Hz | 210 μ A to 2 mA | 0.08 % of reading + 0.3 μ A | |
| 200 Hz to 1 kHz | 210 μ A to 2 mA | 0.06 % of reading + 0.3 μ A | |
| 1 kHz to 10 kHz | 210 μ A to 2 mA | 0.06 % of reading + 0.3 μ A | |
| Equipment to Output AC Current (at the listed frequencies) ^{F0} | | | |
| 20 Hz to 50 Hz | 2.1 mA to 20 mA | 0.15 % of reading + 3 μ A | |
| 50 Hz to 200 Hz | 2.1 mA to 20 mA | 0.08 % of reading + 3 μ A | |
| 200 Hz to 1 kHz | 2.1 mA to 20 mA | 0.06 % of reading + 3 μ A | |
| 1 kHz to 10 kHz | 2.1 mA to 20 mA | 0.06 % of reading + 3 μ A | |



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|--|---|--|--|
| Equipment to Output AC Current (at the listed frequencies) ^{FO} | | | Keithley 2001 |
| 20 Hz to 50 Hz | 21 mA to 200 mA | 0.15 % of reading + 30 μ A | |
| 50 Hz to 200 Hz | 21 mA to 200 mA | 0.08 % of reading + 30 μ A | |
| 200 Hz to 1 kHz | 21 mA to 200 mA | 0.06 % of reading + 30 μ A | |
| 1 kHz to 10 kHz | 21 mA to 200 mA | 0.08 % of reading + 30 μ A | |
| Equipment to Output AC Current (at the listed frequencies) ^{FO} | | | |
| 20 Hz to 50 Hz | 210 mA to 2 A | 0.18 % of reading + 300 μ A | |
| 50 Hz to 200 Hz | 210 mA to 2 A | 0.10 % of reading + 300 μ A | |
| 200 Hz to 1 kHz | 210 mA to 2 A | 0.15 % of reading + 300 μ A | |
| 1 kHz to 10 kHz | 210 mA to 2 A | 0.23 % of reading + 300 μ A | |
| Equipment to Output AC Current (at the listed frequencies) ^{FO} | | | Keithley 2001 with Fluke i1010 |
| 20 Hz to 10 kHz | 2 A to 600 A | 1.000 6 % of reading + 0.5A | |
| Resistance in Ohms - Source(4 Wire) ^{FO} | 0 Ω to 20 Ω | 0.002 6 % of reading + 0 .000 14 Ω | Keithley 2001 |
| | 21 Ω to 200 Ω | 0.001 8 % of reading + 0.001 4 Ω | |
| | 0.21 k Ω to 2 k Ω | 0.001 65 % of reading + 0.008 Ω | |
| | 2.1 k Ω to 20 k Ω | 0.001 6 % of reading + 0.08 Ω | |
| | 21 k Ω to 200 k Ω | 0.003 6 % of reading + 0.9 Ω | |
| Resistance in Ohms - Source(2 Wire) ^{FO} | 210 k Ω to 2 M Ω | 0.005 5 % of reading + 9 Ω | |
| | 2.1 M Ω to 20 M Ω | 0.03 % of reading + 90 Ω | |
| | 21 M Ω to 200 M Ω | 0.5 % of reading + 20 k Ω | |
| | 210 M Ω to 1 G Ω | 1 % of reading + 100 k Ω | |
| Resistance in Ohms - Source(4 Wire) ^{FO} | 0. 001 Ω | 1.5 x 10 ⁻⁴ % of reading | |
| | 1 Ω | 7.5 x 10 ⁻⁴ % of reading | L&N 4210 |
| | 10 Ω | 5 x 10 ⁻⁴ % of reading | L&N 4025B |
| | 100 Ω | 5 x 10 ⁻⁴ % of reading | L&N 4030B |
| | 10 k Ω | 7 x 10 ⁻⁴ % of reading | ESI SR104 |
| | 1 Ω to 100 Ω | 2.9 x 10 ⁻³ % of reading | ESI SR1010-10 |
| | 10 Ω to 1 k Ω | 5.9 x 10 ⁻³ % of reading | ESI SR1010-100 |
| | 100 Ω to 10 k Ω | 1.2 x 10 ⁻³ % of reading | ESI SR1010-1k |
| | 1 k Ω to 100 k Ω | 7 x 10 ⁻⁴ % of reading | ESI SR1010-10k |
| | 10 k Ω to 1 M Ω | 8 x 10 ⁻⁴ % of reading | ESI SR1010-100k |



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Certified Test Equipment, Inc.

708 Cooper Drive, Wylie, TX 75098

Contact Name: John Collinsworth Phone: 972-429-3722

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 Measure Inductance (@ 1 kHz) ^{FO} | 500 μ H | 0.05 % of reading | GR 1482D QuadTech 1920 LCR |
| | 5 mH | 0.05 % of reading | GR 1482G QuadTech 1920 LCR |
| | 50 mH | 0.04 % of reading | GR 1482K QuadTech 1920 LCR |
| | 500 mH | 0.05 % of reading | GR 1482N QuadTech 1920 LCR |
| | 5 H | 0.05 % of reading | GR 1482R QuadTech 1920 LCR |
| | 5 H to 10 H | 0.39 % of reading | GR 1490D QuadTech 1920 LCR |
| Equipment to Output Capacitance ^{FO} | 0 pF to 1.2 pF | 5×10^{-3} % of reading + 0.000 1 pF | ESI 707B QuadTech 1920 LCR |
| | 1.21 pF to 120 pF | 5×10^{-3} % of reading + 0.001 pF | |
| | 121 pF to 1 200 pF | 5×10^{-3} % of reading + 0.01 pF | |
| | 1 201 pF to 0.012 μ F | 5×10^{-3} % of reading + 0.1 pF | |
| | 0.012 μ F to 0.12 μ F | 5×10^{-3} % of reading + 1 pF | |
| | 0.12 μ F to 1.2 μ F | 0.01 % of reading + 10 pF | |
| Equipment to Output Capacitance ^{FO} | 1 μ F to 1 mF | 0.2 % of reading + 0.001 mF | HP 4282A QuadTech 1920 LCR |
| | 10 mF | 0.5 % of reading + 0.01 mF | |
| | 100 mF | 0.75 % of reading + 0.5 mF | |
| | 1 F | 1.2 % of reading + 0.01 F | |
| Equipment to Measure Capacitance ^{FO} | 0.1 pF | 0.05 % of reading | GR 1403N QuadTech 1920 LCR |
| | 10 pF | 0.05 % of reading | Boonton CS-10 |
| | 50 pF | 0.05 % of reading | Boonton CS-50 |
| | 100 pF | 0.05 % of reading | Boonton CS-100 |
| | 1 000 pF | 0.01 % of reading | GR 1404A |
| | 0.1 μ F to 10 μ F | 0.13 % of reading | GR 1424A |
| Equipment to Measure Optical Power ^{FO} | | | |
| 1 310 nm | 0.1 mW to 9.999 mW | 4.9 μ W/cm ² | Ando AQ1336 |
| 1 550 nm | 0.1 mW to 9.999 mW | 0.02 mW/cm ² | Ando AQ4112 |
| Equipment to Output Optical Power ^{FO} | | | |
| 1 310 nm | 0.1 mW to 9.999 mW | 1.5 % of reading | Laser Precision AM 4000 w/ AM-420 |
| 1 550 nm | 0.1 mW to 9.999 mW | 1.5 % of reading | |



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Electrical

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|---|---|--|---|
| Equipment to Measure DC Voltage ^{FO} | 1 mV to 100 mV | 6×10^{-3} % of setting + 4.16 μ V | Fluke 335A |
| | 0.1 V to 10 V | 1×10^{-3} % of setting + 10 μ V | |
| | 11 V to 100 V | 1×10^{-3} % of setting + 20 μ V | |
| | 110 V to 1 000 V | 1×10^{-3} % of setting + 200 μ V | |
| Equipment to Output DC Voltage ^{FO} | 0.01 mV to 200 mV | 3.7×10^{-3} % of reading + 120 μ V | Keithley 2001 |
| | 210 mV to 2 V | 2.5×10^{-3} % of reading + 400 μ V | |
| | 2.1 V to 20 V | 2.4×10^{-3} % of reading + 8 mV | |
| | 21 V to 200 V | 3.8×10^{-3} % of reading + 63 mV | |
| | 210 V to 1 000 V | 4.1×10^{-3} % of reading + 660 mV | |
| | 1 001 V to 100 000 V | 0.1 % of reading + 600 mV | Keithley 2001 & Spellman HVD100 |
| Equipment to Measure DC Current ^{FO} | 0.01 μ A to 320 μ A | 0.01 % of setting + 11 nA | Keithley 2001 |
| | 0.320 01 mA to 3.2 mA | 0.01 % of setting + 83 nA | |
| | 3.200 1 mA to 32 mA | 0.01 % of setting + 900 nA | |
| | 32.001 mA to 320 mA | 0.01 % of setting + 9.6 μ A | |
| | 0.320 01 A to 3.2 A | 0.03 % of setting + 118 μ A | |
| | 3.21 A to 10.5 A | 0.03 % of setting + 940 μ A | |
| | 10.51 A to 20 A | 0.03 % of setting + 4.5 mA | |
| Equipment to Output DC Current ^{FO} | 0.001 μ A to 200 μ A | 0.03 % of reading + 2.5 μ A | Keithley 2001 with L&N 4360 |
| | 210 μ A to 2 mA | 0.02 % of reading + 2 μ A | |
| | 2.1 mA to 20 mA | 0.02 % of reading + 2 μ A | |
| | 21 mA to 200 mA | 0.03 % of reading + 2 μ A | |
| | 210 mA to 2 A | 0.05 % of reading + 2 μ A | |
| | 2 A to 15 A | 0.05 % of reading + 2 μ A | |
| | 15 A to 300 A | 0.05 % of reading + 2 μ A | |
| | 300 A to 1 000 A | 1 % of reading + 0.5 A | Keithley 2001 with Fluke i1010 |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B ^{FO} | 500 °C to 800 °C | 0.56 °C | Wavetek 9100 Electrical Simulation of Thermocouple Output ITS-90 Reference Table NIST Monograph 175 |
| | 800 °C to 1 000 °C | 0.43 °C | |
| | 1 000 °C to 1 400 °C | 0.36 °C | |
| | 1 400 °C to 1 820 °C | 0.39 °C | |
| | 1 800 °C to 2 320 °C | 0.43 °C | |



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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 |
|---|---|--|---|
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C ^{FO} | 0 °C to 600 °C | 0.31 °C | Wavetek 9100 Electrical Simulation of Thermocouple Output ITS-90 Reference Table NIST Monograph 175 |
| | 600 °C to 1 000 °C | 0.30 °C | |
| | 1 000 °C to 1 800 °C | 0.42 °C | |
| | 1 800 °C to 2 320 °C | 0.43 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E ^{FO} | -250 °C to -200 °C | 0.46 °C | |
| | -200 °C to -100 °C | 0.25 °C | |
| | -100 °C to 100 °C | 0.21 °C | |
| | 100 °C to 1 000 °C | 0.24 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J ^{FO} | -210 °C to -100 °C | 0.28 °C | |
| | -100 °C to 800 °C | 0.23 °C | |
| | 800 °C to 1 000 °C | 0.24 °C | |
| | 1 000 °C to 1 200 °C | 0.26 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K ^{FO} | -250 °C to -200 °C | 0.58 °C | |
| | -200 °C to -100 °C | 0.30 °C | |
| | -100 °C to 100 °C | 0.23 °C | |
| | 100 °C to 600 °C | 0.26 °C | |
| | 600 °C to 1 372 °C | 0.30 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type L ^{FO} | -200 °C to -50 °C | 0.29 °C | |
| | -50 °C to 200 °C | 0.22 °C | |
| | 200 °C to 700 °C | 0.23 °C | |
| | 700 °C to 900 °C | 0.26 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N ^{FO} | -200 °C to -100 °C | 0.35 °C | |
| | -100 °C to 900 °C | 0.26 °C | |
| | 900 °C to 1 100 °C | 0.25 °C | |
| | 1 100 °C to 1 300 °C | 0.27 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R ^{FO} | 0 °C to 100 °C | 0.53 °C | |
| | 100 °C to 200 °C | 0.42 °C | |
| | 200 °C to 1 600 °C | 0.37 °C | |
| | 1 600 °C to 1 767 °C | 0.31 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S ^{FO} | 0 °C to 200 °C | 0.50 °C | |
| | 200 °C to 1 000 °C | 0.39 °C | |
| | 1 000 °C to 1 400 °C | 0.37 °C | |
| | 1 400 °C to 1 767 °C | 0.37 °C | |



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Electrical

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|---|---|--|--|
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T ^{FO} | -250 °C to -200 °C | 0.60 °C | Wavetek 9100 |
| | -200 °C to -100 °C | 0.30 °C | Electrical Simulation of Thermocouple Output ITS-90 Reference Table NIST Monograph 175 |
| | -100 °C to 0.0 °C | 0.25 °C | |
| | 0 °C to 400 °C | 0.21 °C | |
| Temperature Calibration, Indication and Control Equipment used with RTD Pt 385 100 Ω ^{FO} | -100 °C to 100 °C | 0.10 °C | Wavetek 9100 |
| | 100 °C to 630 °C | 0.20 °C | Electrical Simulation of RTD Output |
| | 630 °C to 850 °C | 0.30 °C | |
| Equipment to Output RF ^{FO} Power 50 MHz to 26.5 GHz | 1 μ W to 100 mW | 4.2 % | HP 438A w/ HP 8485A |

Mechanical

| 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 |
|---|---|--|--|
| Direct Verification of Durometer Hardness Tester Types A, B, C, D ^{FO} | | | Optical Comparator 20X Mitutoyo 516-422 Grade 2 Gage Block Set |
| Extension at Zero Reading | 2.46 mm to 2.54 mm | 0.02 mm | |
| Indentor Shape ^{FO} | | | Optical Comparator 20X |
| A, B, C, D Indentor Diameter | 1.27 mm | 0.06 mm | |
| A, C Indentor Tip Diameter | 0.79 mm | 0.02 mm | |
| B, D Indentor Tip Diameter | 0.1 mm | 0.01 mm | |
| A, C Indentor Tip Angle | 35 ° | 0.13 ° | |
| B, D Indentor Tip Angle | 30 ° | 0.25 ° | |
| Durometer Indentor Spring ^{FO} | | | |
| Types A, B | 0.55 N to 8.05 N | 0.04 N | Sartorius QS4000 |
| Types C, D | 4.45 N to 44.45 N | 0.22 N | |
| Indirect Verification of Rockwell Hardness Testers HRA ^{FO} | 20 HRA to 40 HRA | 0.6 HRA | ASTM E 18-8 and Calibrated Rockwell Hardness Test Blocks |
| | 40 HRA to 60 HRA | | |
| | 60 HRA to 85 HRA | | |
| Indirect Verification of Rockwell Hardness Testers HRB ^{FO} | 40 HRB to 60 HRB | 1.5 HRB | |
| | 60 HRB to 80 HRB | 1.1 HRB | |
| | 80 HRB to 100 HRB | | |
| Indirect Verification of Rockwell Hardness Testers HRC ^{FO} | 25 HRC to 35 HRC | 1.1 HRC | |
| | 35 HRC to 55 HRC | 0.9 HRC | |
| | 55 HRC to 65 HRC | 0.7 HRC | |



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Mechanical

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|--|---|--|--|
| Indirect Verification of Rockwell Hardness Testers HRD ^{FO} | 40 HRD to 50 HRD | 0.6 HRD | ASTM E 18-8 and Calibrated Rockwell Hardness Test Blocks |
| | 50 HRD to 60 HRD | | |
| | 60 HRD to 75 HRD | | |
| Indirect Verification of Rockwell Hardness Testers HR15N ^{FO} | 70 HR15N to 80 HR15N | 0.7 HR15N | |
| | 80 HR15N to 90 HR15N | | |
| Indirect Verification of Rockwell Hardness Testers HR30N ^{FO} | 40 HR30N to 50 HR30N | 1.1 HR30N | |
| | 50 HR30N to 60 HR30N | 0.9 HR30N | |
| | 60 HR30N to 75 HR30N | 0.7 HR30N | |
| Indirect Verification of Rockwell Hardness Testers HR45N ^{FO} | 20 HR45N to 37 HR45N | 0.6 HR45N | |
| | 37 HR45N to 55 HR45N | | |
| | 55 HR45N to 70 HR45N | | |
| Indirect Verification of Rockwell Hardness Testers HR15T ^{FO} | 60 HR15T to 65 HR15T | 0.9 HR15T | |
| | 65 HR15T to 70 HR15T | | |
| | 70 HR15T to 75 HR15T | | |
| Indirect Verification of Rockwell Hardness Testers HR30T ^{FO} | 15 HR30T to 40 HR30T | 1.5 HR30T | |
| | 40 HR30T to 65 HR30T | 1.2 HR30T | |
| | 65 HR30T to 90 HR30T | 1.1 HR30T | |
| Indirect Verification of Rockwell Hardness Testers HR45T ^{FO} | 10 HR45T to 37 HR45T | 0.8 HR45T | |
| | 37 HR45T to 65 HR45T | 0.6 HR45T | |
| | 65 HR45T to 90 HR45T | | |
| Torque Watches ^{FO} | 0.5 ozf·in to 360 ozf·in | 0.5 % of reading | Class 7 Weight Set, Torque Arm |
| Torque Drivers & Wrenches ^{FO} | 90 lbf·in to 900 lbf·in | 1.6 % of reading | Norbar TWA 100/A Skidmore Wilhelm WD |
| | 15 lbf·ft to 150 lbf·ft | | |
| Torque Transducers ^{FO} | 0.1 ozf·in to 366 ozf·in | 0.57 % of reading | Class 7 Weight Set, Torque Arm |
| | 0.1 lbf·in to 900 lbf·in | 0.51 % of reading | |
| | 2 lbf·ft to 150 lbf·ft | | |



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|--|--|---|--|
| Viscometers- Kinematic, Zahn, Shell, Ford, ISO & DIN Cups @ 25 °C ^{FO} | 17.57 mm ² /s | 0.44 % | Cannon C10 Fluke 743B – Temperature Measurement Robic Stopwatch |
| | 33.69 mm ² /s | 0.44 % | Cannon C20 Robic Stopwatch Fluke 743B – Temperature Measurement |
| | 119.1 mm ² /s | 0.45 % | Cannon C60 Robic Stopwatch Fluke 743B – Temperature Measurement |
| | 232 mm ² /s | 0.45 % | Cannon C100 Robic Stopwatch Fluke 743B – Temperature Measurement |
| | 392 mm ² /s | 0.45 % | Cannon C200 Robic Stopwatch Fluke 743B – Temperature Measurement |
| Viscometers- Dynamic, Rotary, Thomas Stormer, ICI Cone Plate 15 °C to 45 °C ^{FO} | 309.4 mPa•s to 369.1 mPa•s | 0.45 % of reading | Cannon S200KU Fluke 743B – Temperature Measurement |
| | 991.6 mPa•s to 1 206 mPa•s | 0.47 % of reading | Cannon S600KU Fluke 743B – Temperature Measurement |
| | 71.7 mPa•s to 106.1 mPa•s | 0.44 % of reading | Cannon RT100 Fluke 743B – Temperature Measurement |
| | 731.4 mPa•s to 1 090 mPa•s | 0.45 % of reading | Cannon RT1000 Fluke 743B – Temperature Measurement |
| | 3 651 mPa•s to 5 419 mPa•s | 0.47 % of reading | Cannon RT5000 Fluke 743B – Temperature Measurement |
| | 8 842 mPa•s to 13 150 mPa•s | 0.47 % of reading | Cannon RT12500 Fluke 743B – Temperature Measurement |



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Mechanical

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|--|--|--|--|
| Vacuum Gages ^{FO} | -28.5 inHg to 0 inHg | 0.1 inHg + 0.13 % of reading | Hass A-1 Barometer |
| Pressure Gages Pneumatic ^{FO} | 0.20 psi to 15 psi | 0.06 psi | Wallace & Tiernan FA154 |
| Pressure Gages Hydraulic ^{FO} | 15 psi to 100 psi | 0.05 psi | Fluke 743B w/700P06 See note 5 |
| | 100 psi to 500 psi | 0.13 % of reading | Mansfield & Green T-1 Dual Range |
| | 500 psi to 5 000 psi | | |
| | 5 000 psi to 10 000 psi | 0.67 % of reading | Ashcroft 1305N |
| Low Pressure ^{FO} | 0.05 H ₂ O to 0.25 H ₂ O | 0.5 % of reading | Dwyer 115 |
| | 0.02 H ₂ O to 3 H ₂ O | | Dwyer 209 |
| | 0.1 H ₂ O to 40 H ₂ O | 0.36 % of reading | Dwyer 477-2 |

Mass, Force & 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 |
|---|---|--|--|
| Force (Tension & Compression) ^{FO} | 0.1 lb to 100 lb | 0.25 % of reading | Class 7 Weight Set |
| | 100 lb to 5 000 lb | 0.26 % of reading | Transducer Tech. SW-5K |
| Force (Compression) ^{FO} | 5 000 lb to 50 000 lb | 0.25 % of reading | Transducer Tech. HSW-50K |
| Bench Scales ^{FO} | 0.01 g to 200 g | 0.97 mg | Class 4 Weight Set |
| | 0. 201 kg to 4.99 kg | 0.09 g | |
| | 5 kg to 226.8 kg | 210 g | |
| Floor Scales ^{FO} | 227 kg to 2 270 kg | 500 g | Class 7 Weight Set |

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 |
|--|---|--|--|
| Equipment to Measure Frequency ^{FO} | 0.01 Hz to 20 MHz | 2.5×10^{-4} % of setting | HP 3325A |
| | 0.01 GHz to 2 GHz | 4.1×10^{-2} % of setting | HP 8642M |
| | 2 GHz to 26 GHz | 5.5×10^{-5} % of setting | HP 8673A |
| Equipment to Output Frequency ^{FO} | 0.01 Hz to 100 MHz | 2.7×10^{-2} % of reading | HP 5334B |
| | 100 MHz to 40 GHz | 1.0×10^{-4} % of reading | EIP 548A |



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Thermodynamic

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|---|---|--|--|
| Temperature Measurement Thermocouple Type E ^{FO} | -150 °C to 0 °C | 0.02 % of reading °C + 0.2 °C | Ectron 1100 |
| | 0 °C to 1 000 °C | 0.02 % of reading °C + 0.3 °C | |
| Temperature Measurement Thermocouple Type J ^{FO} | -150 °C to 0 °C | 0.02 % of reading °C + 0.2 °C | |
| | 0 °C to 1 200 °C | 0.02 % of reading °C + 0.3 °C | |
| Temperature Measurement Thermocouple Type K ^{FO} | -150 °C to 0 °C | 0.02 % of reading °C + 0.2 °C | |
| | 0 °C to 1 372 °C | 0.02 % of reading °C + 0.2 °C | |
| Temperature Measurement Thermocouple Type T ^{FO} | -150 °C to 0 °C | 0.02 % of reading °C + 0.2 °C | |
| | 0 °C to 400 °C | 0.02 % of reading °C + 0.2 °C | |
| Equipment to Measure Humidity at 15 °C to 30 °C ^{FO} | 11 % RH | 1.5 % | Humidity Salt Solutions |
| | 33 % RH | 1.2 % | |
| | 76 % RH | | |

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.