



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

(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 Electrical, Time & Frequency, Mechanical, Mass, Force & Weighing and Thermodynamics 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

Initial Accreditation Date:

September 22, 2012

Issue Date:

November 28, 2022

Expiration Date:

November 28, 2024

Accreditation No.:

73879

Certificate No.:

L22-795

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

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

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

Contact Name: Curt Blair Phone: 215-647-6000

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 DC Voltage ^{FO} | 3 mV to 330 mV | 21 μ V/V + 0.9 μ V | Fluke 5520A SWI: B2135 |
| | 0.33 V to 3.3 V | 13 μ V/V + 3 μ V | |
| | 3.3 V to 33 V | 15 μ V/V + 7 μ V | |
| | 33 V to 330 V | 19 μ V/V + 149 μ V | |
| | 330 V to 1 000 V | 19 μ V/V + 700 μ V | |
| Equipment to Output DC Voltage ^{FO} | 1 mV to 100 mV | 9 μ V/V + 1.6 μ V | HP3458A SWI: B2135 |
| | 0.1 V to 1V | 12 μ V/V + 1.4 μ V | |
| | 1 V to 10 V | 15 μ V/V + 2.5 μ V | |
| | 10 V to 100 V | 15 μ V/V + 48 μ V | |
| | 100 V to 1 000 V | 29 μ V/V + 1.4 μ V | |
| Equipment to Measure DC Current ^{FO} | 10 μ A to 330 μ A | 138 μ A/A + 0.1 μ A | Fluke 5520A SWI: B2135 |
| | 0.33 mA to 3.3 mA | 124 μ A/A + 0.1 μ A | |
| | 3.3 mA to 33 mA | 141 μ A/A + 0.05 μ A | |
| | 33 mA to 330 mA | 145 μ A/A + 0.07 μ A | |
| | 0.33 A to 1.1 A | 251 μ A/A + 0.2 mA | |
| | 1.1 A to 3 A | 398 μ A/A + 0.2 mA | |
| | 3 A to 11 A | 620 μ A/A + 0.9 mA | |
| Equipment to Output DC Current ^{FO} | 0.1 mA to 1 mA | 14 μ A/A + 0.9 μ A | HP3458A SWI: B2135 |
| | 1 mA to 10 mA | 27 μ A/A + 0.8 μ A | |
| | 10 mA to 100 mA | 42 μ A/A + 0.7 μ A | |
| | 0.1 A to 1 A | 127 μ A/A + 8 μ A | |
| Equipment to Measure Resistance ^{FO} | 1 Ω to 11 Ω | 74 $\mu\Omega/\Omega$ + 1 m Ω | Fluke 5520A SWI: B2135 |
| | 11 Ω to 110 Ω | 40 $\mu\Omega/\Omega$ + 1.5 m Ω | |
| | 110 Ω to 1.1 k Ω | 61 $\mu\Omega/\Omega$ + 0.9 m Ω | |
| | 1.1 k Ω to 11 k Ω | 57 $\mu\Omega/\Omega$ + 5 m Ω | |
| | 11 k Ω to 110 k Ω | 50 $\mu\Omega/\Omega$ + 76 m Ω | |
| | 110 k Ω to 1.1 M Ω | 25 $\mu\Omega/\Omega$ + 3 Ω | |
| | 1.1 M Ω to 3.3 M Ω | 71 $\mu\Omega/\Omega$ + 48 Ω | |
| | 3.3 M Ω to 11 M Ω | 130 $\mu\Omega/\Omega$ + 243 Ω | |
| | 11 M Ω to 33 M Ω | 2.3 m Ω/Ω + 2.4 k Ω | |
| | 33 M Ω to 110 M Ω | 0.55 m Ω/Ω + 3.3 k Ω | |
| | 110 M Ω to 330 M Ω | 3.5 m Ω/Ω + 0.3 M Ω | |
| 330 M Ω to 1 100 M Ω | 16 m Ω/Ω + 0.7 M Ω | | |



Certificate of Accreditation: Supplement

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

Contact Name: Curt Blair Phone: 215-647-6000

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 Resistance ^{FO} | 1 Ω to 10 Ω | 15 $\mu\Omega/\Omega$ + 88 $\mu\Omega$ | HP3458A SWI: B2135 |
| | 10 Ω to 100 Ω | 35 $\mu\Omega/\Omega$ + 100 $\mu\Omega$ | |
| | 100 Ω to 1 000 Ω | 25 $\mu\Omega/\Omega$ + 0.8 m Ω | |
| | 1 k to 10 k Ω | 25 $\mu\Omega/\Omega$ + 0.8 m Ω | |
| | 10 k Ω to 100 k Ω | 27 $\mu\Omega/\Omega$ + 27 m Ω | |
| | 100 k Ω to 1 M Ω | 28 $\mu\Omega/\Omega$ + 0.2 Ω | |
| | 1 M Ω to 10 M Ω | 108 $\mu\Omega/\Omega$ + 80 Ω | |
| | 10 M Ω to 100 M Ω | 0.7 m Ω/Ω + 0.6 k Ω | |
| 100 M Ω to 500 M Ω | 7 m Ω/Ω + 6.5 k Ω | | |
| Equipment to Measure AC Voltage at the Listed Frequencies ^{FO} | | | Fluke 5520A SWI: B2135 |
| 10 Hz to 45 Hz | 3 mV to 33 mV | 592 $\mu\text{V}/\text{V}$ + 125 μV | |
| 45 Hz to 10 kHz | 3 mV to 33 mV | 23 $\mu\text{V}/\text{V}$ + 140 μV | |
| 10 kHz to 20 kHz | 3 mV to 33 mV | 214 $\mu\text{V}/\text{V}$ + 140 μV | |
| 20 kHz to 50 kHz | 3 mV to 33 mV | 804 $\mu\text{V}/\text{V}$ + 137 μV | |
| 50 kHz to 100 kHz | 3 mV to 33 mV | 2.9 mV/V + 132 μV | |
| 100 kHz to 500 kHz | 3 mV to 33 mV | 49 mV/V + 132 μV | |
| Equipment to Measure AC Voltage at the Listed Frequencies ^{FO} | | | Fluke 5520A SWI: B2135 |
| 10 Hz to 45 Hz | 33 mV to 330 mV | 317 $\mu\text{V}/\text{V}$ + 46 μV | |
| 45 Hz to 10 kHz | 33 mV to 330 mV | 254 $\mu\text{V}/\text{V}$ + 26 μV | |
| 10 kHz to 20 kHz | 33 mV to 330 mV | 234 $\mu\text{V}/\text{V}$ + 39 μV | |
| 20 kHz to 50 kHz | 33 mV to 330 mV | 417 $\mu\text{V}/\text{V}$ + 21 μV | |
| 50 kHz to 100 kHz | 33 mV to 330 mV | 863 $\mu\text{V}/\text{V}$ + 34 μV | |
| 100 kHz to 500 kHz | 33 mV to 330 mV | 1.4 mV/V + 140 μV | |
| Equipment to Measure AC Voltage at the Listed Frequencies ^{FO} | | | Fluke 5520A SWI: B2135 |
| 10 Hz to 45 Hz | 0.33 V to 3.3 V | 405 $\mu\text{V}/\text{V}$ + 0.8 mV | |
| 45 Hz to 10 kHz | 0.33 V to 3.3 V | 247 $\mu\text{V}/\text{V}$ + 1 mV | |
| 10 kHz to 20 kHz | 0.33 V to 3.3 V | 308 $\mu\text{V}/\text{V}$ + 1 mV | |
| 20 kHz to 50 kHz | 0.33 V to 3.3 V | 289 $\mu\text{V}/\text{V}$ + 2 mV | |
| 50 kHz to 100 kHz | 0.33 V to 3.3 V | 1.5 mV/V + 5 mV | |
| 100 kHz to 500 kHz | 0.33 V to 3.3 V | 1.9 $\mu\text{V}/\text{V}$ + 5 mV | |



Certificate of Accreditation: Supplement

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

Contact Name: Curt Blair Phone: 215-647-6000

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 AC Voltage at the Listed Frequencies ^{FO} | | | Fluke 5520A SWI: B2135 |
| 10 Hz to 45 Hz | 3.3 V to 33 V | 298 μ V/V + 2 mV | |
| 45 Hz to 10 kHz | 3.3 V to 33 V | 237 μ V/V + 1.6 mV | |
| 10 kHz to 20 kHz | 3.3 V to 33 V | 295 μ V/V + 3 mV | |
| 20 kHz to 50 kHz | 3.3 V to 33 V | 263 μ V/V + 3 mV | |
| 50 kHz to 100 kHz | 3.3 V to 33 V | 1.2 mV/V + 18 mV | |
| Equipment to Measure AC Voltage at the Listed Frequencies ^{FO} | | | |
| 45 Hz to 1 kHz | 33 V to 330 V | 267 μ V/V + 2 mV | |
| 1 kHz to 10 kHz | 33 V to 330 V | 551 μ V/V + 5 mV | |
| 10 kHz to 20 kHz | 33 V to 330 V | 440 μ V/V + 3 mV | |
| 20 kHz to 50 kHz | 33 V to 330 V | 618 μ V/V + 2 mV | |
| 50 kHz to 100 kHz | 33 V to 330 V | 1.7 mV/V + 71 mV | |
| Equipment to Measure AC Voltage at the Listed Frequencies ^{FO} | | | |
| 45 Hz to 1 kHz | 330 V to 1 020 V | 372 μ V/V + 10 mV | |
| 1 kHz to 5 kHz | 330 V to 1 020 V | 324 μ V/V + 59 mV | |
| 5 kHz to 10 kHz | 330 V to 1 020 V | 249 μ V/V + 71 mV | |
| Equipment to Output AC Voltage at the Listed Frequencies ^{FO} | | | HP3458A SWI: B2135 |
| 1 Hz to 1 kHz | 10 mV to 100 mV | 5 μ V/V + 8 μ V | |
| 1 Hz to 1 kHz | 100 mV to 1 V | 8 μ V/V + 8 μ V | |
| 1 Hz to 1 kHz | 1 V to 10 V | 12 μ V/V + 3 μ V | |
| 1 Hz to 1 kHz | 10 V to 100 V | 46 μ V/V + 0.3 mV | |
| 1 Hz to 1 kHz | 100 V to 1 000 V | 61 μ V/V + 2 mV | |
| Equipment to Measure AC Current at the Listed Frequencies ^{FO} | | | Fluke 5520A SWI: B2135 |
| 45 Hz to 1 kHz | 29 μ A to 330 μ A | 0.13 % + 0.12 μ A | |
| 45 Hz to 1 kHz | 0.33 mA to 3.3 mA | 0.17 % + 2 μ A | |
| 45 Hz to 1 kHz | 3.3 mA to 33 mA | 0.03 % + 12 μ A | |
| 45 Hz to 1 kHz | 33 mA to 330 mA | 0.06 % + 13 μ A | |
| 45 Hz to 1 kHz | 0.33 A to 1.1 A | 0.04 % + 125 μ A | |
| 45 Hz to 1 kHz | 1.1 A to 3 A | 0.1 % + 57 μ A | |
| 45 Hz to 1 kHz | 3 A to 11 A | 0.1 % + 1 mA | |
| 1 kHz to 5 kHz | 3 A to 11 A | 2.3 % + 6 mA | |



Certificate of Accreditation: Supplement

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

Contact Name: Curt Blair Phone: 215-647-6000

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 at the listed Frequencies ^{FO} | | | |
| 45 Hz to 5 kHz | 1 to 10 mA | 10 μ A/A + 3 μ A | HP3458A SWI: B2135 |
| 45 Hz to 5 kHz | 10 to 100 mA | 336 μ A/A + 0.4 μ A | |
| 45 Hz to 5 kHz | 0.1 to 1 A | 376 μ A/A + 4 μ A | |
| Equipment to Measure Capacitance ^{FO} | 1.1 nF to 3.299 9 nF | 0.5 % + 0.01 nF | Fluke 5520A SWI: B2135 |
| | 3.3 nF to 10.999 9 μ F | 0.25 % + 0.03 nF | |
| | 0.33 μ F to 1.099 99 μ F | 0.25 % + 6 nF | |
| | 1.1 μ F to 3.299 99 μ F | 0.25 % + 4 nF | |
| | 3.3 μ F to 10.999 9 μ F | 0.25 % + 13 nF | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J (Resolution = 0.1°C) ^{FO} | -210 °C to -100 °C | 0.56 °C | Fluke 5520A Electrical Simulation of Thermocouple Output SWI:B2100 |
| | -100 °C to -30 °C | 0.30 °C | |
| | -30 °C to 150 °C | 0.26 °C | |
| | 150 °C to 760 °C | 0.39 °C | |
| | 760 °C to 1 200 °C | 0.63 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K (Resolution = 0.1°C) ^{FO} | -200 °C to -100 °C | 0.52 °C | Fluke 5520A Electrical Simulation of Thermocouple Output SWI:B2100 |
| | -100 °C to -25 °C | 0.31 °C | |
| | -25 °C to 120 °C | 0.33 °C | |
| | 120 °C to 1 000 °C | 0.55 °C | |
| | 1 000 °C to 1 372 °C | 0.66 °C | |
| Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T (Resolution = 0.1°C) ^{FO} | -250 °C to 150 °C | 0.67 °C | Fluke 5520A Electrical Simulation of Thermocouple Output SWI:B2100 |
| | -150 °C to 0 °C | 0.32 °C | |
| | 0 °C to 120 °C | 0.33 °C | |
| | 120 °C to 400 °C | 0.56 °C | |
| Temperature Calibration, Indication and Control Equipment used with RTD 385 100 Ω RTD ^{FO} | -200 °C to 0 °C | 0.28 °C | Fluke 5520A Electrical Simulation of RTD Output SWI:B2100 |
| | 0 °C to 100 °C | 0.17 °C | |
| | 100 °C to 400 °C | 0.18 °C | |
| | 400 °C to 630 °C | 0.24 °C | |
| | 630 °C to 800 °C | 0.27 °C | |
| Temperature Calibration, Indication and Control Equipment used with RTD 3926 100 Ω ^{FO} | -200 °C to 0 °C | 0.19 °C | Fluke 5520A Electrical Simulation of RTD Output SWI:B2100 |
| | 0 °C to 100 °C | 0.13 °C | |
| | 100 °C to 300 °C | 0.27 °C | |
| | 300 °C to 400 °C | 0.29 °C | |
| | 400 °C to 630 °C | 0.32 °C | |



Certificate of Accreditation: Supplement

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

Contact Name: Curt Blair Phone: 215-647-6000

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 |
|--|---|--|---|
| Temperature Calibration, Indication and Control Equipment used with RTD 385 1 k Ω ^{FO} | -200 °C to 0 °C | 0.31 °C | Fluke 5520A Electrical Simulation of RTD Output SWI:B2100 |
| | 0 °C to 100 °C | 0.18 °C | |
| | 100 °C to 300 °C | 0.23 °C | |
| | 300 °C to 600 °C | 0.30 °C | |
| | 600 °C to 630 °C | 0.34 °C | |

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} | 1 Hz to 1.2 kHz | 1.7 mHz/Hz + 12 mHz | Fluke 5520A SWI: B2135 |
| | 1.2 kHz to 120 kHz | 97.8 μ Hz/Hz + 1.2 Hz | |
| Equipment to Output Frequency ^{FO} | 1 Hz to 100 MHz | 0.66 μ Hz/Hz + 0.2 mHz | Fluke PM6666 1s Time base SWI:B2135 |
| Timers and Stopwatches ^{FO} | 10 s to 24 hr | 0.26 s/d | Fluke PM6666 SWI: B2800 |

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 |
|--|---|--|--|
| Pressure Gages and Measuring Devices ^{FO} | Up to 9 psi | 0.006 psi | Crystal n-Vision Module 30 PSI SWI:B2000 |
| | 9 psi to 30 psi | 0.02 psi | |
| | -14 psi to 0 psi | 0.02 psi | Crystal n-Vision Module 300 PSI SWI:B2000 |
| | 30 psi to 90 psi | 0.05 psi | |
| | 90 psi to 300 psi | 0.16 psi | |
| | 300 psi to 900 psi | 0.92 psi | Crystal n-Vision Module 3 000 PSI SWI:B2000 |
| | 900 psi to 3 000 psi | 3 psi | |
| 3 000 psi to 10 000 psi | 20 psi | Crystal n-Vision Module 10 000 PSI SWI:B2000 | |



Certificate of Accreditation: Supplement

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

Contact Name: Curt Blair Phone: 215-647-6000

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

Mass, Force, and Weighing Device

| 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 |
|--|---|--|---|
| Balances and Scales ^{FO} | 1 mg to 500 mg | 0.03 mg | Class 1 Weights SWI: B2600 |
| | 500 mg to 100 g | 0.08 mg | |
| | 100 g to 200 g | 0.1 mg | |
| | 200 g to 500 g | 1.1 mg | |
| | 500 g to 1 kg | 5.6 mg | |
| | 1 kg to 5 kg | 8.3 mg | |
| | 5 kg to 10 kg | 28 mg | |
| | 10 kg to 20 kg | 56 mg | |
| Pipette ^F | 20 kg to 30 kg | 84 mg | AnD HM202 Balance / Gravimetric Analysis SWI: B2600 |
| | 1 μ L | 0.04 μ L | |
| | 2 μ L | 0.05 μ L | |
| | 5 μ L | 0.06 μ L | |
| | 10 μ L | 0.06 μ L | |
| | 20 μ L | 0.07 μ L | |
| | 50 μ L | 0.11 μ L | |
| | 100 μ L | 0.23 μ L | |
| | 200 μ L | 0.34 μ L | |
| | 500 μ L | 0.96 μ L | |
| | 1 000 μ L | 2.6 μ L | |
| | 5 000 μ L | 10 μ L | |
| 10 000 μ L | 19 μ L | | |

Thermodynamic

| 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 |
|--|---|--|--|
| Humidity Measuring Devices ^{FO} | 10 % RH to 90 % RH | 1.0% RH at 25 °C | Kaymont M2000SP SWI: B2150 |
| Liquid-in-Glass Thermometers and Temperature Measuring Devices ^{FO} | -80 °C to 0 °C | 0.42 °C | Fluke 5520A, GE M2801, Fluke 5628, constant temperature liquid bath, dry well constant temperature block SWI: B2100 |
| | 0.1 °C to 100 °C | 0.28 °C | |
| | 100.1 °C to 300 °C | 0.37 °C | |
| | 300.1 °C to 600 °C | 0.58 °C | |
| | 600.1 °C to 900 °C | 0.86 °C | |



Certificate of Accreditation: Supplement

JOULÉ, Equipment Services

1777 Sentry Park West, Suite 201, Blue Bell, PA 19422

Contact Name: Curt Blair Phone: 215-647-6000

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.