

**CERTIFICATE OF ACCREDITATION**

**The ANSI National Accreditation Board**

Hereby attests that

**Mobile Instrument Company, Inc.**

**745 Lakeside Drive Mobile, AL 36693**

Fulfills the requirements of

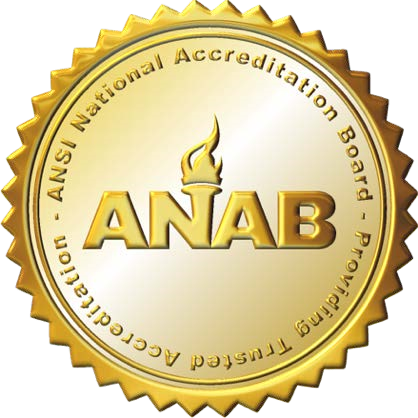
**ISO/IEC 17025:2017**

In the field of

# CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document. The current scope of accreditation can be verified at [www.anab.org.](http://www.anab.org/)

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 02 February 2024 Certificate Number: AC-2549

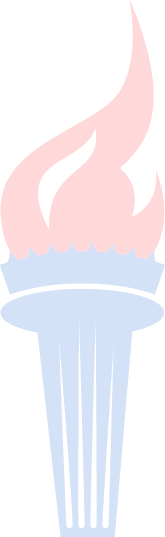
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

## SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

**Mobile Instrument Company, Inc.**

745 Lakeside Drive Mobile, AL 36693

Edward Wynn 251-660-7474 ewynn@mobileinstrumentco.com

## CALIBRATION

Valid to: **February 2, 2024** Certificate Number: **AC-2549**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| DC Voltage – Source 1 | Up to 330 mV  330 mV to 3.3 V  (3.3 to 33) V  (33 to 330) V  (330 to 1 000) V | 16 μV/V + 1 μV  8.7 μV/V + 2 μV 9.4 μV/V + 20 μV 14 μV/V + 0.15 mV  14 μV/V + 1.5 mV | Fluke 5520A Multiproduct Calibrator |
| DC Voltage – Measure | Up to 100 mV  100 mV to 1V  (1 to 10) V  (10 to 100) V  (100 to 1 000) V | 11 μV/V + 0.3 μV 12 μV/V + 0.3 μV   1. μV/V + 0.5 μV 2. μV/V + 30 μV   12 μV/V + 0.1 mV | HP 3458A  8.5 Digit Multimeter |

**Chemical Quantities**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| pH meters | 4 pH  7 pH  10 pH | 0.02 pH  0.02 pH  0.02 pH | Accredited pH Buffer Solutions |
| Conductivity Meters | 10 μS/cm  100 μS/cm 1 413 μS/cm  10 000 µS/cm | 1 μS/cm  4.5 μS/cm  16 μS/cm 56 µS/cm | Accredited Conductivity Solutions |
| Refractometers | 10 °brix  40 °brix | 0.016 °brix | Accredited Aqueous Solutions |

**Electrical – DC/Low Frequency**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| DC High Voltage – Measure 1 | (0.5 to 150) kV | 0.5 % of reading | HP 3458A Multimeter w/ High Voltage Inc. DVR150 Divider |
| DC Current – Source 1 | Up to 330 μA  330 μA to 3.3 mA  3.3 mA to 33 mA  33 mA to 330 mA  330 mA to 1.1 A  (1.1 to 3.0) A  (3.0 to 11) A  (11 to 20.5) A | 120 μA/A + 20 nA  78 μA/A + 20 nA  78 μA/A + 0.25 μA  78 μA/A + 2.5 μA  0.16 mA/A + 40 μA 0.3 mA/A + 40 μA  0.39 mA/A + 0.5 mA  0.78 mA/A + 0.75 mA | Fluke 5520A Multiproduct Calibrator |
| DC Current – Measure | Up to 100 μA  (0.1 to 1) mA  (1 to 10) mA  (10 to 100) mA  (0.1 to 1) A | 26 μA/A + 0.8 nA  26 μA/A + 5 nA  26 μA/A + 50 nA  43 μA/A + 0.5 μA  0.12 mA/A + 10 μA | HP 3458A  8.5 Digit Multimeter |
| (1 to 200) A | 0.021 % reading | HP 3458A  8.5 Digit Multimeter,  Ohm Labs CS-200 Current Shunt |
| (200 to 1 000) A | 0.26 % of reading | HP 3458A  8.5 Digit Multimeter,  Ohm Labs CS-1000 Current Shunt |
| DC Current Clamp Meters 1 (Toroidal) | (16.5 to 150) A  (150 to 1 000) A | 0.23 % reading + 17 mA 0.22 % reading + 88 mA | Fluke 5520A  Multiproduct Calibrator,  50-turn Coil |
| DC Current Clamp Meters 1 (Non-Toroidal) | (16.5 to 150) A  (150 to 1 000) A | 0.41 % reading + 0.14 A 0.46 % reading + 0.54 A | Fluke 5520A  Multiproduct Calibrator,  50-turn Coil |
| Resistance – Source 1 | Up to 11 Ω  (11 to 33) Ω  (33 to 110) Ω (110 to 330) Ω (.33 to 1.1) kΩ  (1.1 to 3.3) kΩ  (3.3 to 11) kΩ  (11 to 33) kΩ  (33 to 110) kΩ | 45 μΩ/Ω + 1 mΩ  26 μΩ/Ω + 1.5 mΩ  23 μΩ/Ω + 1.4 mΩ  23 μΩ/Ω + 2 mΩ  25 μΩ/Ω + 2 mΩ  22 μΩ/Ω + 20 mΩ  22 μΩ/Ω + 20 mΩ  22 μΩ/Ω + 0.2 Ω 24 μΩ/Ω + 0.2 Ω | Fluke 5520A Multiproduct Calibrator |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Resistance – Source 1 | (110 to 330) kΩ  (0.33 to 1.1) MΩ  (1.1 to 3.3) MΩ  (3.3 to 11) MΩ  (11 to 33) MΩ  (33 to 110) MΩ  (110 to 330) MΩ  330 MΩ to 1.1 GΩ | 25 μΩ/Ω + 2 Ω 25 μΩ/Ω + 2 Ω  47 μΩ/Ω + 30 Ω  0.11 mΩ/Ω + 50 Ω  0.2 mΩ/Ω + 2.5 kΩ  0.39 mΩ/Ω + 3 kΩ  2.4 mΩ/Ω + 0.1 MΩ  12 mΩ/Ω + 0.5 MΩ | Fluke 5520A Multiproduct Calibrator |
| Resistance – Measure | Up to 1 Ω  (1 to 10) Ω  (10 to 100) Ω  (100 to 1 000) Ω  (1 to 10) kΩ  (10 to 100) kΩ  (100 to 1 000) kΩ  (1 to 10) MΩ  (10 to 100) MΩ  (0.1 to 1) GΩ | 73 µΩ/Ω + 2 μΩ  27 μΩ/Ω + 50 μΩ  16 μΩ/Ω + 0.5 mΩ   1. μΩ/Ω + 0.5 mΩ 2. μΩ/Ω + 5 mΩ   13 μΩ/Ω + 50 mΩ 19 μΩ/Ω + 2 Ω  54 μΩ/Ω + 0.1 kΩ  0.54 mΩ/Ω + 1 kΩ  6.3 mΩ/Ω + 10 kΩ | HP 3458A  8.5 Digit Multimeter |
| AC Voltage – Source 1 | (1 to 33) mV  (10 to 45) Hz  45 Hz to 10 kHz  (10 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 500) kHz  (33 to 330) mV  (10 to 45) Hz  45 Hz to 10 kHz (10 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 500) kHz  330 mV to 3.3 V  (10 to 45) Hz  45 Hz to 10 kHz  (10 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 500) kHz | 0.65  mV/V + 6 μV    0.15  mV/V + 6 μV    0.18  mV/V + 6 μV    0.79  mV/V + 6 μV    2.8  mV/V + 12 μV    6.2  mV/V + 50 μV      0.24  mV/V + 8 μV    0.12    mV/V + 8 μV    0.13  mV/V + 8 μV    0.28  mV/V + 8 μV    0.62  mV/V + 32 μV    2  mV/V + 70 μV      0.24  mV/V + 50 μV    0.12  mV/V + 60 μV    0.15  mV/V + 60 μV    0.24  mV/V + 50 μV    0.55  mV/V + 0.13 mV  1.9  mV/V + 0.6 mV | Fluke 5520A Multiproduct Calibrator |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| AC Voltage – Source 1 | (3.3 to 33) V  (10 to 45) Hz  45 Hz to 10 kHz  (10 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (33 to 330) V  45 Hz to 1 kHz  (1 to 10) kHz  (10 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (330 to 1 020) V  45 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz | 0.24 mV/V + 0.65 mV  0.12 mV/V + 0.6 mV  0.19 mV/V + 0.6 mV  0.28 mV/V + 0.6 mV  0.7 mV/V + 1.6 mV    0.15 mV/V + 2 mV  0.16 mV/V + 6 mV 0.2 mV/V + 6 mV  0.24 mV/V + 6 mV  1.6 mV/V + 50 mV    0.24 mV/V + 10 mV 0.2 mV/V + 10 mV  0.24 mV/V + 10 mV | Fluke 5520A Multiproduct Calibrator |
| AC Voltage – Measure | Up to 10 mV  (1 to 40) Hz  40 Hz to 1 kHz  (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  (10 to 100 mV)  (1 to 40) Hz  40 Hz to 1 kHz  (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  (0.3 to 1) MHz  100 mV to 1 V  (1 to 40) Hz  40 Hz to 1 kHz (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  300 kHz to 1 MHz | 0.031 % of reading + 3 μV  0.022 % of reading + 1.1 μV  0.031 % of reading + 1.1 μV 0.1 % of reading + 1.1 μV  0.5 % of reading + 1.1 μV 4 % of reading + 2 μV    0.007 3 % of reading + 2 μV 0.007 4 % of reading + 2 μV  0.015 % of reading + 2 μV 0.031 % of reading + 2 μV  0.081 % of reading + 2 μV 0.3 % of reading + 10 μV 1 % of reading + 10 μV    0.007 4 % of reading + 40 μV  0.007 4 % of reading + 20 μV  0.015 % of reading + 20 μV 0.031 % of reading + 20 μV 0.081 % of reading + 20 μV    0.3 % of reading + 0.1 mV  1 % of reading + 0.1 mV | HP 3458A  8.5 Digit Multimeter |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| AC Voltage – Measure | 1 to 10 V  (1 to 40) Hz  40 Hz to 1 kHz (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  300 kHz to 1 MHz  (1 to 100) V  40 Hz to 1 kHz  (1 to 20) kHz  (20 to 50) kHz  (50 to 100) kHz  (100 to 300) kHz  (1 to 1 000) V  40 Hz to 1 kHz  (1 to 20) kHz | 0.007 3 % of reading + 0.4 mV  0.007 3 % of reading + 0.2 mV  0.015 % of reading + 0.2 mV  0.031 % of reading + 0.2 mV  0.081 % of reading + 0.2 mV 0.3 % of reading + 1 mV  1 % of reading + 1 mV    0.021 % of reading + 2 mV  0.021 % of reading + 2 mV  0.036 % of reading + 2 mV  0.12 % of reading + 2 mV  0.4 % of reading + 10 mV    0.041 % of reading + 20 mV  0.061 % of reading + 20 mV | HP 3458A  8.5 Digit Multimeter |
| AC High Voltage – Measure 1 | (1 to 100) kV 60 Hz | 0.52  % of reading | HP 3458A  8.5 Digit Multimeter,  High Voltage Inc. DVR150 Divider |
| AC Current – Source 1 | (29 to 330) μA  (10 to 20) Hz  (20 to 45) Hz  45 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz  (10 to 30) kHz (0.33 to 3.3) mA  (10 to 20) Hz  (20 to 45) Hz  45 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz  (10 to 30) kHz  (3.3 to 33) mA  (10 to 20) Hz  (20 to 45) Hz  45 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz  (10 to 30) kHz | 1.6 mA/A + 0.1 μA  1.2 mA/A + 0.1 μA  0.97 mA/A + 0.1 μA  3.8 mA/A + 0.15 μA 6.2 mA/A + 0.2 μA 13 mA/A + 0.4 μA    1.6 mA/A + 0.15 μA  0.97 mA/A + 0.15 μA 0.78 mA/A + 0.1 μA  1.6 mA/A + 0.2 μA  3.9 mA/A + 0.3 μA  7.8 mA/A + 0.6 μA    1.4 mA/A + 2 μA 0.7 mA/A + 2 μA  0.32 mA/A + 2 μA  0.62 mA/A + 2 μA  1.6 mA/A + 3 μA  3.1 mA/A + 4 μA | Fluke 5520A Multiproduct Calibrator |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| AC Current – Source 1 | (33 to 330) mA (10 to 20) Hz  (20 to 45) Hz  45 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz  (10 to 30) kHz  (0.33 to 1.1) A  (10 to 45) Hz  45 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz (1.1 to 3) A  (10 to 45) Hz  45 Hz to 1 kHz  (1 to 5) kHz  (5 to 10) kHz  (3 to 11) A  (45 to 100) Hz  100 Hz to 1 kHz  (1 to 5) kHz  (11 to 20.5) A  (45 to 100) Hz  100 Hz to 1 kHz  (1 to 5) kHz | 1.4  mA/A + 20 μA    0.7  mA/A + 20 μA    0.32  mA/A + 20 μA    0.78  mA/A + 50 μA    1.6  mA/A + 0.1 mA  3.1  mA/A + 0.2 mA    1.4  mA/A + 0.1 mA  0.4  mA/A + 0.1 mA  4.7  mA/A + 1 mA  20  mA/A + 5 mA    1.4  mA/A + 0.1 mA  0.47  mA/A + 0.1 mA  4.7  mA/A + 1 mA  20  mA/A + 5 mA    0.49  mA/A + 2 mA  0.78  mA/A + 2 mA  24  mA/A + 2 mA    0.94  mA/A + 5 mA  1.2  mA/A + 5 mA  24  mA/A + 5 mA | Fluke 5520A Multiproduct Calibrator |
| AC Current Clamp Meters 1 (Toroidal) | (16.5 to 150) A  (45 to 65) Hz  (65 to 100) Hz  (100 to 440) Hz  (150 to 1 000) A  (45 to 65) Hz  (65 to 100) Hz  (100 to 440) Hz | 0.27 % reading + 30 mA  0.64 % reading + 27 mA  0.68 % reading + 32 mA    0.25 % reading + 0.34 A  0.63 % reading + 0.10 A  1.0 % reading + 0.11 A | Fluke 5520A Multi Product Calibrator w/ 50 Turn Coil |
| AC Current Clamp Meters 1 (Non-Toroidal) | (16.5 to 150) A  (45 to 65) Hz  (65 to 100 Hz  (100 to 440) Hz  (150 to 1 000) A  (45 to 65) Hz  (65 to 100) Hz  (100 to 440) Hz | 0.48 % reading + 0.26 A  0.82 % reading + 0.26 A  0.85 % reading + 0.3 A    0.5 % reading + 1 A  0.82 % reading + 1 A  1.2 % reading + 1.2 A | Fluke 5520A Multi Product Calibrator w/ 50 Turn Coil |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| AC Current – Measure 1 | Up to 100 μA  (10 to 20) Hz  (20 to 45) Hz  45 Hz to 5 kHz | 0.4 % of reading + 30 nA  0.16 % of reading + 30 nA  0.061 % of reading + 30 nA | HP 3458A  8.5 Digit Multimeter |
| AC Current – Measure | (0.1 to 1) mA  (10 to 20) Hz  (20 to 45) Hz  (45 to 100) Hz  100 Hz to 5 kHz  (5 to 20) kHz  (20 to 50) kHz (1 to 10) mA  (10 to 20) Hz  (20 to 45) Hz  (45 to 100) Hz  100 Hz to 5 kHz  (5 to 20) kHz  (20 to 50) kHz  (10 to 100) mA  (10 to 20) Hz  (20 to 45) Hz  (45 to 100) Hz  100 Hz to 5 kHz  (5 to 20) kHz  (20 to 50) kHz  (0.1 to 1) A  (10 to 20) Hz  (20 to 45) Hz  (45 to 100) Hz  100 Hz to 5 Hz  (5 to 20) kHz | 0.4  % of reading + 0.2 μA    0.16  % of reading + 0.2 μA    0.062  % of reading + 0.2 μA    0.031  % of reading + 0.2 μA    0.061  % of reading + 0.2 μA    0.4  % of reading + 0.4 μA      0.4  % of reading + 2 μA    0.16  % of reading + 2 μA    0.061  % of reading + 2 μA    0.031  %  of reading + 2 μA    0.061  % of reading + 2 μA    0.4  % of reading + 4 μA      0.4  % of reading + 20 μA    0.16  % of reading + 20 μA    0.061  % of reading + 20 μA    0.031  % of reading + 20 μA    0.061  % of reading + 20 μA    0.4  % of reading + 40 μA      0.4  % of reading + 0.2 mA  0.17  % of reading + 0.2 mA  0.081  % of reading + 0.2 mA  0.11  % of reading + 0.2 mA  0.3  % of reading + 0.2 mA | HP 3458A  8.5 Digit Multimeter |
| Capacitance – Source 1 | (0.19 to 3.3) nF  DC to 3 kHz  10 Hz to 1 kHz  (3.3 to 11) nF  (11 to 33) nF  (33 to 110) nF  (110 to 330) nF | 0.56 % of reading + 0.01 nF    0.25 % of reading + 0.01 nF  0.43 % of reading + 0.1 nF  0.28 % of reading + 0.1 nF 0.21 % of reading + 0.3 nF | Fluke 5520A Multiproduct Calibrator |

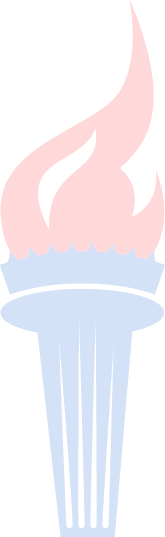
|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Capacitance – Source 1 | (0.33 to 1.1) μF  (10 to 600) Hz  (1.1 to 3.3) μF  (10 to 300) Hz  (3.3 to 11) μF   1. to 150) Hz 2. to 33) μF   (10 to 120) Hz  (33 to 110) μF (10 to 80) Hz  (110 to 330) μF  (DC to 50) Hz (0.33 to 1.1) mF  (DC to 20) Hz  (1.1 to 3.3) mF  (DC to 6) Hz (3.3 to 11) mF  (DC to 2) Hz | 0.22 % of reading + 1 nF    0.22 % of reading + 3 nF    0.2 % of reading + 10 nF    0.49 % of reading + 30 nF    0.37 % of reading + 0.1 µF    0.4 % of reading + 0.3 µF    0.36 % of reading + 1 μF    0.35 % of reading + 3 μF    0.35 % of reading + 10 μF | Fluke 5520A Multiproduct Calibrator |
| Electrical Simulation of Thermocouple Indicating  Devices – Source/Measure 1 | Type B  (600 to 800) °C  (800 to 1 000) °C  (1 000 to 1 550) °C  (1 550 to 1 820) °C  Type E  (-250 to -100v °C  (-100 to -25) °C  (-25 to 350) °C  (350 to 650) °C  (650 to 1 000) °C Type J  (-210 to -100) °C  (-100 to -30) °C  (-30 to 150) °C  (150 to 760) °C  (760 to 1 200) °C | 0.35    °  C  0.27    °  C  0.26    °  C  0.29    °  C    0.41    °  C  0.16    °  C  0.15    °  C  0.17    °  C  0.2    °  C    0.24    °  C  0.18    °  C  0.13    °  C  0.18    °  C  0.2    °  C | Fluke 5520A Multiproduct Calibrator |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Electrical Simulation of Thermocouple Indicating  Devices – Source/Measure 1 | Type K  (-200 to -100) °C  (-100 to -25) °C  (-25 to 120) °C  (120 to 1 000) °C  (1 000 to 1 372) °C  Type N  (-200 to -100) °C  (-100 to -25) °C  (-25 to 120) °C  (120 to 410) °C  (410 to 1 300) °C Type R  (0 to 250) °C  (250 to 400) °C  (400 to 1 000) °C  (1 000 to 1 767) °C Type S  (0 to 250) °C  (250 to 1 000) °C  (1 000 to 1 400) °C  (1 400 to 1 767) °C Type T  (-250 to -150) °C  (-150 to 0) °C  (0 to 120) °C  (120 to 400) °C | 0.29    °  C  0.19    °  C  0.16    °  C  0.23    °  C  0.32    °  C    0.34    °  C  0.21    °  C  0.19    °  C  0.17    °  C  0.24    °  C    0.49    °  C  0.3    °  C  0.28    °  C  0.33    °  C    0.4    °  C  0.3    °  C  0.32    °  C  0.38    °  C    0.51    °  C  0.24    °  C  0.18    °  C    0.16  °  C | Fluke 5520A Multiproduct Calibrator |
| Electrical Simulation of RTD Measuring Equipment – Source 1 | Pt 385, 100 Ω  (-200 to 0) °C  (0 to 100) °C  (100 to 300) °C (300 to 400) °C  (400 to 630) °C (630 to 800) °C | 0.04 °C  0.055 °C  0.071 °C  0.078 °C  0.094 °C  0.18 °C | Fluke 5520A Multiproduct Calibrator |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Electrical Simulation of RTD Measuring Equipment –  Source 1 | Pt 3926, 100 Ω  (-200 to 0) °C  (0 to 100) °C  (100 to 300) °C (300 to 400) °C  (400 to 630) °C  Pt 3916, 100 Ω  (-200 to -190) °C  (-190 to -80) °C  (-80 to 0) °C  (0 to 100) °C  (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C  (600 to 630) °C  Pt 385, 200 Ω  (-200 to 100) °C  (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C  (600 to 630) °C  Pt 385, 500 Ω  (-200 to -80) °C  (-80 to 100) °C  (100 to 260) °C (260 to 400) °C  (400 to 600) °C  (600 to 630) °C  Pt 385, 1000 Ω  (-200 to 0) °C  (0 to 100) °C  (100 to 260) °C  (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C | 0.04    °  C  0.055    °  C  0.071    °  C  0.078    °  C  0.094    °  C    0.2    °  C  0.032    °  C  0.04    °  C  0.047    °  C  0.055    °  C  0.063    °  C  0.07    °  C  0.078    °  C  0.18    °  C    0.032    °  C  0.04    °  C  0.094    °  C  0.11    °  C  0.11    °  C  0.13    °  C    0.032    °  C  0.04    °  C  0.047    °  C  0.063    °  C  0.071    °  C  0.086    °  C    0.024    °  C  0.032    °  C  0.041    °  C  0.047    °  C  0.055    °  C  0.056    °  C  0.18    °  C | Fluke 5520A Multiproduct Calibrator |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Electrical Simulation of RTD Measuring Equipment –  Source 1 | Ni 385, 120 Ω  (-200 to 0) °C  (0 to 100) °C  (100 to 260) °C  Cu 427, 10 Ω  (-100 to 260) °C | 0.063 °C  0.063 °C  0.11 °C    0.24 °C | Fluke 5520A Multiproduct Calibrator |

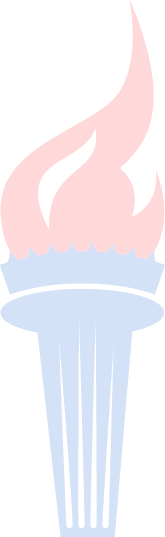
|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Calipers 1,2 | Up to 80 in | (248 + 8.6*L*) μin | Gage Blocks |
| Micrometers 1,2 | Up to 60 in | (19 + 13*L*) μin | Gage Blocks |
| Height Gages 2 | Up to 24 in | (180 + 13*L*) μin | Gage Blocks |
| Length Standards 2 | Up to 60 in | (13 + 3.7*L*) μin | Gage Blocks, Mu-checker |
| Dial Indicators 1,2 | Up to 5 in | (20 + 82*L*) μin | Gage Blocks |
| Rulers | Up to 40 in | 0.005 8 in | Gage Blocks |
| Cylindrical Pins, Cylindrical Plugs 2 | (0.011 to 10) in | (5 +8.2*L*) μin | Pratt & Whitney ULM, Master Gage Blocks |
| Digital and Mechanical Protractors 2 | Up to 90° | 8.3ʺ | Gage Blocks, Sine Plate |
| Bore Gages Micrometers 1,2 | Up to 20 in | (116 + 24*L*) μin | Cylindrical Ring Gages |
| Eddy Current Thickness Measurement Instruments 1,2 (Ferrous and Non-Ferrous) | (3, 10, 20, 40, 60) mils | 0.13 mils | Coating Thickness  Standards  (Nominal Values within +/- 10 %) |
| Ultrasonic Thickness Instruments | Up to 1 in | 580 µin | Gage Blocks |
| Cylindrical Ring Gages | Up to 13 in | (12 + 1.7*L*) µin | Pratt & Whitney ULM,  Master Gage Blocks,  Master Cylindrical Ring Gages |

**Length – Dimensional Metrology**

**Length – Dimensional Metrology**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Thread Plugs 2  Major Diameter    Pitch Diameter | Up to 12 in    Up to 12 in | (19 + 6.3*L*) µin    (78 + 4.2*L*) µin | Pratt & Whitney ULM,  Van Keuren Thread Wires, Master Gage Blocks |
| Solid Thread Rings Pitch Diameter | Up to 10 in | 110 µin | Pratt & Whitney ULM |

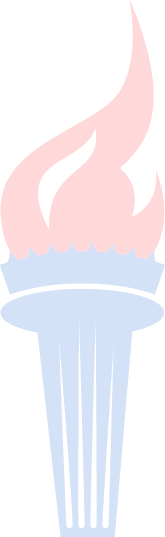
|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Scales and Balances 1,3 | Up to 410 g | 0.26 mg | ASTM E617 Class 1  Weights and NIST HB 44 utilized in the calibration of the weighing system. |
| (0.005 to 5 000) lb | 0.017 % of applied load | NIST Class F Weights and  NIST HB 44 utilized in the calibration of the weighing system. |
| Hydraulic Pressure Devices 1 | (200 to 20 200) psig | 0.31 psi or 0.019 % of reading (whichever is greater) | Fluke P3116 Dead Weight Tester |
| (30 to 30 000) psig  (60 to 60 000) psig | 33 psi  90 psi | Additel ADT680  Pressure Gauge,  Heise CM Pressure Gauge |
| Pneumatic Pressure Devices 1 | Up to 30 psig | 0.001 psi | Fluke PPC4/RPM4  Pressure Calibrator |
| (30 to 100) psig | 0.011 % of reading | Fluke PPC4/RPM4  Pressure Calibrator |
| Up to 2 000 psig | 0.012 % of reading | Fluke 6270 Pressure Controller |
| Pneumatic Vacuum Devices 1 | Down to -14.5 psiv | 0.000 68 psi | Fluke PPC4/RPM4  Pressure Calibrator |
| Absolute Pressure Devices 1 | Up to 1 000 psia | 0.012 % of reading | Fluke 6270 |
| Torque Wrenches 1 | 5 ozf⋅in to 2 000 lbf⋅ft | 0.31 % of reading |
| Torque Analyzers, Torque Transducers | 5 ozf⋅in to 2 000 lbf⋅ft | 0.085 % of reading | NIST Class F Weights, Torque Arms/Wheels |
| Force  (Tension and Compression) | (1 to 600) lbf | 0.051 % of reading | NIST Class F Weights |

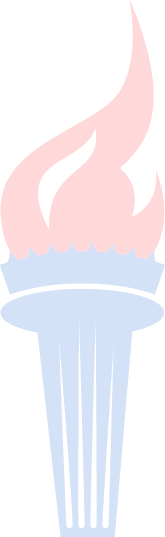
**Mass and Mass Related**

**Mass and Mass Related**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Force  (Tension and Compression) | (50 to 2 000) lbf  (200 to 10 000) lbf  (500 to 50 000) lbf  (2 000 to 100 000) lbf | 0.011 % of reading  0.011 % of reading  0.011 % of reading  0.011 % of reading | Morehouse Universal Calibration Machine w/Load Cells |
| Rockwell Hardness Testers 1 | (40 to 59) HRBW  (60 to 79) HRBW  (80 to 100) HRBW    (20 to 30) HRC  (30 to 55) HRC  (60 to 65) HRC    (70 to 79) HREW  (84 to 90) HREW  (93 to 100) HREW | 0.78 HRBW  0.76 HRBW  0.7 HRBW    0.52 HRC  0.53 HRC  0.5 HRC    0.68 HREW  0.66 HREW  0.63 HREW | Indirect verification  method per ASTM E18 using Hardness Blocks. |
| Leeb Hardness 1 | 744 HLD | 9.6 HLD | Indirect verification  method per ASTM A956 using Hardness Block. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter/Equipment** | **Range** | **Expanded Uncertainty of Measurement (+/-)** | **Reference Standard,**  **Method, and/or Equipment** |
| Temperature – Measure 1,2 | (-196 to 100) °C  (100 to 400) °C (400 to 660) °C | 0.034 °C  0.055 °C  0.068 °C | Fluke 1524 Indicator w/ 5615 or 5609 PRT |
| Temperature – Source 1,2,4 | (-35 to 100) °C  (100 to 400) °C (400 to 660) °C | 0.049 °C  0.061 °C  0.085 °C | Fluke 1524 Indicator w/  5615 or 5609 PRT and  Liquid Baths, Drywells |
| Humidity and Temperature – Source | (10 to 95) %RH (15 to 35) °C | 0.61 %RH  0.13 °C | Thunder Scientific 2500 Environmental Chamber |
| Humidity and Temperature – Measure 1 | (10 to 90) %RH (18 to 28) °C | 1.2 %RH  0.27 °C | Vaisala HM141/HMP46  Temperature/Humidity  Indicator |
| Infrared Thermometers 1 | 35 °C  100 °C  200 °C  350 °C 500 °C | 0.53 °C 0.91 °C  1.3 °C  2.1 °C  2.9 °C | Fluke 4181  Infrared Calibrator (Flat Plate)  λ = (8 to 14) µm  Ɛ = (0.9 to 1) |

**Thermodynamic**



**Time and Frequency**

**Parameter/Equipment**

**Range**

**Expanded Uncertainty of**

**Measurement (+/-)**

**Reference Standard**

**,**

**Method, and/or**

**Equipment**

Frequency – Source

1

0.01

Hz to 2 MHz

2.1

μHz/Hz + 5 μHz

Fluke 5520A

Multi

p

roduct Calibrator

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and

reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a

coverage factor of 2 (

*k*

=2)

, corresponding to a confidence level of approximately 95%.

Notes:

1.

On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement

uncertainties are expected on-site than what is reported on the accredited scope.

2.

*L*

length in inches; ʺ = arc

=

second; 1 mil = 0.001 inch.

-

3.

The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit

under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.

4.

Resolution of DUT may be different at the time of calibration and will be included in the Measurement Uncertainty (MU).

5.

This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2549.

