



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
ANSI/NCSL Z540-1-1994 & ANSI/NCSL Z540.3-2006

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CALIBRATION

Valid To: February 29, 2020

Certificate Number: 2516.03

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Chemical

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---|---|---|------------------------|
| pH – Measuring Equipment ^{3,7} | (4, 7, 10) units | 0.016 units | Buffer solutions |
| Electrolytic Conductivity – Measuring Equipment | ≈10 μS/cm ≈100 μS/cm ≈1000 μS/cm ≈10 000 μS/cm | 0.53 μS/cm 2.4 μS/cm 23 μS/cm 0.23 mS/cm | Conductivity solutions |

II. Dimensional

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|--|-------------|----------------------|------------------------|
| Angle – Measure ⁷ | Up to 60° | 5.8” | Gage blocks & sine bar |
| Bore Gages, Bore Micrometers & Holtests ^{3,7} | Up to 20 in | 2.3 μin/in + 60 μin | Plain ring gages |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---|--|---|---|
| Diameter, External ⁷ – Cylindrical Gauging, Pin, Wire and Plug Gages, Gear, Datum Spheres, Steel Balls | Up to 20 in | 2.2 μin/in + 9.2 μin | ULM w/ gage blocks |
| Diameter, Internal ⁷ – Plain Ring Gages | (0.02 to 0.5) in (0.5 to 20) in | 2.2 μin/in + 33 μin 2.2 μin/in + 16 μin | ULM w/ ruby balls w/ plain rings |
| Flatness ⁷ | 3 in | 3.5 μin | Optical flat |
| Hand Tools ^{3,7} – Indicators Micrometers Depth Gages Height Gages Calipers | Up to 1 in (1 to 6) in (1 to 72) in (1 to 72) in (1 to 72) in (1 to 120) in | 2.7 μin/in + 5.1 μin | Gage blocks |
| Length Measurement ^{3,7} | Up to 40 in | 1.6 μin/in | Optodyne LDDM |
| Length Measurement ⁷ – Length Fixtures, Glass Scales, Loupes, Magnification, Steel Rules | Up to 1 in (1 to 6) in (6 to 12) in (12 to 144) in | 200 μin 280 μin 490 μin 9.2 μin/in + 380 μin | Optical comparator |
| Length Standards ^{3,7} – Gage Blocks, End Standards, etc. | Up to 20 in (20 to 80) in | 2.2 μin/in + 8.0 μin 1.8 μin/in + 15 μin | ULM Gage blocks & height comparator |

| Parameter/Equipment | Range | CMC ^{2, 4, 6} (±) | Comments |
|---|--|--|--|
| Eddy Current Thickness Measurement Instruments – Ferrous Non-Ferrous | Up to 75 mils | 0.0018 mils 0.0063 mils | Film thickness standards |
| Ultrasonic Measurement Instruments | Up to 1 in | 0.0071 in | Metal thickness standards |
| Optical Comparators ^{3, 7} – Linear Travel Magnification | Up to 30 in 10x to 100x | 170 μin 0.010 % | Glass scales and balls |
| Steel Tapes ^{3, 7} | Up to 30 ft | 0.02 in | Steel rule and loupe |
| Straight Edges/Parallels ⁷ | Up to 60 in | 3.9 μin/in + 25 μin | Gage blocks w/indicator |
| Squareness ⁷ | 90° | 12 μin/in + 30 μin | Master square |
| Surface Plates ³ – Flatness Repeatability | Up to 170 in diagonal 0.001 in | 1.5D μin 28 μin | Laser Repeat-O-Meter |
| Thread Gauging, External ⁷ – Plug Gages, Discs Major Diameter Pitch Diameter Up to 8 in National Pipe (NPT) Pitch Diameter | Up to 1 in (> 1 to 8) in 29° 55° 60° Up to 3 in | 23 μin 3.0 μin/in + 13 μin 6.1 μin/in + 72 μin 6.1 μin/in + 81 μin 14 μin/in + 120 μin 14 μin/in + 72 μin | ULM Gage blocks, contact method Master wires |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---|------------|----------------------|--------------|
| Thread Gauging, External ⁷ – (cont) | | | |
| Step | Up to 4 in | 41 µin | Master wires |

III. Electrical – DC/Low Frequency

| Parameter/Equipment | Range | CMC ^{2,5} (±) | Comments |
|--------------------------------------|--|---|--|
| DC Voltage – Generate ^{3,7} | Up to 220 mV (0.22 to 2.2) V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1100) V | 6.8 µV/V + 0.40 µV 3.7 µV/V + 0.80 µV 4.9 µV/V + 3.0 µV 4.9 µV/V + 4.3 µV 3.7 µV/V + 48 µV 4.7 µV/V + 0.48 mV | Fluke 5720A |
| Fixed Points | 1 V 10 V | 3.6 µV/V 0.6 µV/V | Fluke 732B, Agilent 3458A |
| DC Voltage – Measure ^{3,7} | Up to 100 mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V | 11 µV/V + 0.37 µV 7.3 µV/V + 0.37 µV 6.9 µV/V + 0.60 µV 9.8 µV/V + 37 µV 9.8 µV/V + 0.12 mV | Agilent 3458A |
| DC Current – Generate ^{3,7} | Up to 220 µA (0.22 to 2.2) mA (2.2 to 22) mA (22 to 220) mA (0.22 to 2.2) A (2.2 to 11) A (11 to 20.5) A (20.5 to 150) A (150 to 1000) A | 35 µA/A + 6.0 nA 31 µA/A + 7.0 nA 30 µA/A + 41 nA 41 µA/A + 0.71 µA 77 µA/A + 12 µA 0.034 % + 0.48 mA 0.10 % + 0.91 A 0.58 % + 0.16 A 0.60 % + 0.58 A | Fluke 5720A Fluke 5522A Fluke 5522A w/ coil |

| Parameter/Equipment | Range | CMC ^{2,5} (±) | Comments |
|-------------------------------------|---|--|---------------|
| Resistance – Measure ^{3,7} | Up to 10 Ω (10 to 100) Ω (100 to 1000) Ω (1 to 10) kΩ (10 to 100) kΩ (100 to 1000) kΩ (1 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ | 18 μΩ/Ω + 58 μΩ 12 μΩ/Ω + 0.58 mΩ 9.5 μΩ/Ω + 5.8 mΩ 9.5 μΩ/Ω + 58 mΩ 9.7 μΩ/Ω + 0.58 Ω 15 μΩ/Ω + 2.3 Ω 58 μΩ/Ω + 0.12 kΩ 0.058 % + 1.2 kΩ 0.59 % + 12 kΩ | Agilent 3458A |

| Parameter/Range | Frequency | CMC ^{2,5} (±) | Comments |
|---|---|---|-------------|
| Capacitance – Generate ^{3,7} (0.10 to 3.299) nF (0.33 to 10.999) nF (11 to 109.999) nF (110 to 329.99) nF (0.33 to 1.0999) μF (1.1 to 3.2999) μF (3.3 to 10.999) μF (11 to 32.999) μF (33 to 109.99) μF (110 to 329.99) μF (0.33 to 1.0999) mF (1.1 to 3.2999) mF (3.3 to 10.999) mF (11 to 32.999) mF (33 to 110) mF | 10 Hz to 10 kHz (10 to 1000) Hz (10 to 1000) Hz (10 to 1000) Hz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz Up to 50 Hz Up to 20 Hz Up to 6 Hz Up to 2 Hz Up to 0.6 Hz Up to 0.2 Hz | 0.51 % + 12 pF 0.26 % + 12 pF 0.26 % + 0.12 nF 0.26 % + 0.31 nF 0.26 % + 1.2 nF 0.26 % + 3.1 nF 0.26 % + 12 nF 0.42 % + 31 nF 0.46 % + 0.12 μF 0.46 % + 0.31 μF 0.46 % + 1.2 μF 0.46 % + 3.1 μF 0.46 % + 12 μF 0.78 % + 31 μF 1.2 % + 0.12 mF | Fluke 5522A |

| Parameter/Range | Frequency | CMC ^{2,5} (\pm) | Comments |
|--------------------------------------|--|---|-------------|
| AC Voltage – Generate ^{3,7} | | | |
| Up to 2.2 mV | (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz | 0.022 % + 4.0 μ V 85 μ V/V + 4.0 μ V 75 μ V/V + 4.0 μ V 0.018 % + 4.0 μ V 0.046 % + 5.0 μ V 0.090 % + 10 μ V 0.12 % + 20 μ V 0.25 % + 20 μ V | Fluke 5720A |
| (2.2 to 22) mV | (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz | 0.022 % + 4.0 μ V 85 μ V/V + 4.0 μ V 75 μ V/V + 4.0 μ V 0.018 % + 4.0 μ V 0.046 % + 5.0 μ V 0.090 % + 10 μ V 0.12 % + 20 μ V 0.25 % + 20 μ V | |
| (22 to 220) mV | (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz | 0.022 % + 12 μ V 85 μ V/V + 7.0 μ V 75 μ V/V + 7.0 μ V 0.018 % + 7.0 μ V 0.042 % + 17 μ V 0.075 % + 20 μ V 0.12 % + 25 μ V 0.25 % + 45 μ V | |
| 220 mV to 2.2 V | (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz | 0.022 % + 82 μ V 85 μ V/V + 82 μ V 40 μ V/V + 82 μ V 70 μ V/V + 82 μ V 0.011 % + 82 μ V 0.034 % + 82 μ V 0.090 % + 0.20 mV 0.15 % + 0.32 mV | |

| Parameter/Range | Frequency | CMC ^{2,5} (\pm) | Comments |
|--|--|--|---|
| AC Voltage – Generate ^{3,7} (cont) | | | |
| (2.2 to 22) V | (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz | 0.022 % + 0.40 mV 80 μ V/V + 0.15 mV 40 μ V/V + 50 μ V 70 μ V/V + 0.10 mV 95 μ V/V + 0.20 mV 0.026 % + 0.60 mV 0.090 % + 2.0 mV 0.13 % + 3.2 mV | Fluke 5720A |
| (22 to 220) V* | (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz | 0.022 % + 4.0 mV 80 μ V/V + 1.5 mV 47 μ V/V + 0.61 mV 75 μ V/V + 1.0 mV 0.013 % + 2.5 mV 0.080 % + 16 mV 0.42 % + 40 mV 0.70 % + 80 mV | * 220 V range subject to 2.2E7 V- Hz limitation |
| (220 to 1100) V | (15 to 50) Hz 50 Hz to 1 kHz | 320 μ V/V + 20 mV 75 μ V/V + 4 mV | |

| Parameter/Range | Frequency | CMC ^{2,5} (\pm) | Comments |
|-------------------------------------|--|--|---------------|
| AC Voltage – Measure ^{3,7} | | | |
| (0.1 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 | 0.035 % + 3.5 μ V 0.024 % + 1.3 μ V 0.035 % + 1.3 μ V 0.12 % + 1.3 μ V 0.58 % + 1.3 μ V 4.6 % + 2.3 μ V | Agilent 3458A |
| 10 mV 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 (0.3 to 1) MHz (1 to 2) MHz | 85 μ V/V + 46 μ V/V 91 μ V/V + 23 μ V/V 0.017 % + 23 μ V/V 0.035 % + 23 μ V/V 0.093 % + 23 μ V/V 0.35 % + 0.012 % rng 1.2 % + 0.012 % rng 1.7 % + 0.012 % rng | |
| (10 to 100) 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 (0.3 to 1) MHz | 0.023 % + 4.6 mV 0.023 % + 2.3 mV 0.023 % + 2.3 mV 0.041 % + 2.3 mV 0.14 % + 2.3 mV 0.46 % + 12 mV 1.7 % + 12 mV | |
| (100 to 700) V | (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz | 0.046 % + 33 mV 0.046 % + 16 mV 0.069 % + 16 mV 0.14 % + 16 mV 0.35 % + 16 mV | |

| Parameter/Range | Frequency | CMC ^{2,5} (±) | Comments |
|--------------------------------------|---|--|-------------------------|
| AC Current – Generate ^{3,7} | | | |
| Up to 220 µA | (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.023 % + 16 nA 0.014 % + 10 nA 0.011 % + 8.0 nA 0.025 % + 12 nA 0.090 % + 65 nA | Fluke 5720A |
| 220 µA to 2.2 mA | (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.023 % + 40 nA 0.014 % + 36 nA 0.011 % + 36 nA 0.025 % + 0.11 µA 0.090 % + 0.65 µA | |
| (2.2 to 22) mA | (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.023 % + 0.41 µA 0.014 % + 0.36 µA 0.011 % + 0.36 µA 0.025 % + 0.56 µA 0.090 % + 5.0 µA | |
| (22 to 220) mA | (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.023 % + 4.0 µA 0.014 % + 4.0 µA 0.011 % + 3.0 µA 0.018 % + 4.0 µA 0.090 % + 10 µA | |
| 220 mA to 2.2 A | 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz | 0.024 % + 35 µA 0.039 % + 80 µA 0.60 % + 0.16 mA | |
| (0.33 to 3) A | (10 to 100) Hz (100 to 440) Hz | 0.12 % + 0.2 mA 0.3 % + 1 mA | Fluke 5522A |
| (3 to 20.5) A | (45 to 100) Hz (100 to 440) Hz | 0.12 % + 2 mA 1.0 % + 5 mA | |
| (20.5 to 150) A (150 to 350) A | (45 to 65) Hz (45 to 65) Hz | 0.38 % + 0.029 A 1.0 % + 0.031 A | Fluke 5522A, w/ coil |
| (20.5 to 150) A (150 to 1000) A | (65 to 440) Hz (65 to 440) Hz | 1.0 % + 0.031 A 1.0 % + 0.12 A | |

| Parameter/Range | Frequency | CMC ^{2,5} (\pm) | Comments |
|-------------------------------------|---|---|---------------|
| AC Current – Measure ^{3,7} | | | |
| (5 to 100) μ A | (10 to 20) Hz (20 to 45) Hz 45 Hz to 5 kHz | 0.40 % + 30 nA 0.15 % + 30 nA 0.060 % + 30 nA | Agilent 3458A |
| (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 (50 to 100) kHz | 0.40 % + 0.20 μ A 0.15 % + 0.20 μ A 0.060 % + 0.20 μ A 0.030 % + 0.20 μ A 0.060 % + 0.20 μ A 0.40 % + 0.40 μ A 0.55 % + 1.5 μ A | |
| (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 (50 to 100) kHz | 0.40 % + 2.0 μ A 0.15 % + 2.0 μ A 0.060 % + 2.0 μ A 0.030 % + 2.0 μ A 0.060 % + 2.0 μ A 0.40 % + 4.0 μ A 0.55 % + 15 μ A | |
| (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 (50 to 100) kHz | 0.40 % + 0.20 μ A 0.15 % + 0.20 μ A 0.06 % + 0.20 μ A 0.03 % + 0.20 μ A 0.06 % + 0.20 μ A 0.40 % + 0.40 μ A 0.55 % + 20 μ A | |
| (0.1 to 1) A | (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 | 0.40 % + 0.2 mA 0.16 % + 0.2 mA 0.080 % + 0.2 mA 0.10 % + 0.2 mA 0.30 % + 0.2 mA 1.0 % + 0.4 mA | |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|--|-------------------|----------------------|--------------------|
| Oscilloscopes ^{3, 7} – | | | |
| Risetime – Generate | > 70 ps | 12 ps | Fluke 5522A-SC1100 |
| Bandwidth (Flatness) | 50 kHz to 300 MHz | 1.6 % | |
| | (300 to 550) MHz | 1.5 % | |
| | (0.55 to 3.2) GHz | 1.7 % | |
| | (3.2 to 6.0) GHz | 2.0 % | |
| Thermocouple – Indicating Systems & Measure ³ | | | |
| Type E | (-250 to -200) °C | 0.25 °C | Fluke 7526A |
| | (-200 to -100) °C | 0.12 °C | |
| | (-100 to 0) °C | 0.09 °C | |
| | (0 to 600) °C | 0.08 °C | |
| | (600 to 1000) °C | 0.1 °C | |
| Type J | (-210 to -100) °C | 0.14 °C | |
| | (-100 to 800) °C | 0.09 °C | |
| | (800 to 1200) °C | 0.1 °C | |
| Type K | (-250 to -200) °C | 0.46 °C | |
| | (-200 to -100) °C | 0.16 °C | |
| | (-100 to 500) °C | 0.1 °C | |
| | (500 to 800) °C | 0.1 °C | |
| | (800 to 1372) °C | 0.13 °C | |
| Type T | (-250 to -200) °C | 0.35 °C | |
| | (-200 to -100) °C | 0.16 °C | |
| | (-100 to 0) °C | 0.11 °C | |
| | (0 to 200) °C | 0.09 °C | |
| | (200 to 400) °C | 0.09 °C | |

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---|-------------------|----------------------|-------------|
| Electrical Calibration of RTDs – Generate ³ | | | |
| Pt 385, 100 Ω | (-200 to -80) °C | 0.013 °C | Fluke 7526A |
| | (-80 to 100) °C | 0.02 °C | |
| | (100 to 300) °C | 0.024 °C | |
| | (300 to 400) °C | 0.026 °C | |
| | (400 to 600) °C | 0.033 °C | |
| | (600 to 800) °C | 0.038 °C | |
| Pt 3926, 100 Ω | (-200 to -80) °C | 0.013 °C | |
| | (-80 to 0) °C | 0.015 °C | |
| | (0 to 100) °C | 0.017 °C | |
| | (100 to 300) °C | 0.022 °C | |
| | (300 to 400) °C | 0.026 °C | |
| | (400 to 630) °C | 0.032 °C | |
| Pt 3916, 100 Ω | (-200 to -190) °C | 0.01 °C | |
| | (-190 to -80) °C | 0.013 °C | |
| | (-80 to 0) °C | 0.015 °C | |
| | (0 to 100) °C | 0.017 °C | |
| | (100 to 300) °C | 0.022 °C | |
| | (300 to 400) °C | 0.026 °C | |
| Pt 385, 200 Ω | (-200 to -80) °C | 0.053 °C | |
| | (-80 to 0) °C | 0.056 °C | |
| | (0 to 100) °C | 0.06 °C | |
| | (100 to 260) °C | 0.06 °C | |
| | (260 to 300) °C | 0.069 °C | |
| | (300 to 400) °C | 0.071 °C | |
| Pt 385, 500 Ω | (-200 to 0) °C | 0.026 °C | |
| | (0 to 100) °C | 0.028 °C | |
| | (100 to 300) °C | 0.034 °C | |
| | (300 to 400) °C | 0.038 °C | |
| | (400 to 630) °C | 0.045 °C | |
| Pt 385, 1000 Ω | (-200 to 0) °C | 0.015 °C | |
| | (0 to 100) °C | 0.018 °C | |
| | (100 to 300) °C | 0.024 °C | |
| | (300 to 400) °C | 0.026 °C | |
| | (400 to 630) °C | 0.033 °C | |

| Parameter/Equipment | Range | CMC ^{2,6} (±) | Comments |
|---|---|---|------------------------|
| Electrical Calibration of RTDs – Generate ³ (cont) | | | |
| Ni 385, 120 Ω | (-80 to 260) °C | 0.009 °C | Fluke 7526A |
| Cu 427, 10 Ω | (-100 to 260) °C | 0.11 °C | |
| SPRT | (-200 to 660) °C | 0.06 °C | |
| Electrical Conductivity Meters (IACS) | Up to 35 % IACS (35 to 62) % IACS (> 62) % IACS | 0.98 % + 0.018 % IACS 0.22 % + 0.36 % IACS 0.46 % + 0.12 % IACS | Conductivity standards |

IV. Mechanical

| Parameter/Equipment | Range | CMC ^{2,4,6} (±) | Comments |
|---|--|--------------------------|--|
| Scales ^{3,7} | Up to 1000 lb | 0.023 % | Class F weights |
| | Up to 4800 lb | 0.10 % | |
| | Up to 20 000 kg | 0.15 % | Load cells |
| | (20 000 to 30 000) kg | 0.43 % | |
| Force ³ | Up to 750 lbf | 0.020 % | Deadweight |
| Torque Tools ³ | (4 to 1000) lbf·in (20 to 600) lbf·ft | 0.38 % 0.38 % + 0.6R | CDI 5000-ST |
| Pressure Measuring Equipment ^{3,7} – | (-14 to 30) psi | 0.3 % + 0.058 % rng | Fluke 7526A w/ 700PD5 700P06 700P07 700P08 700P29 700P31 |
| | (10 to 100) psi | 0.05 % + 0.018 % rng | |
| | (50 to 500) psi | 0.05 % + 0.058 % rng | |
| | (100 to 1000) psi | 0.06 % + 0.058 % rng | |
| | (300 to 3000) psi | 0.088 % + 0.058 % rng | |
| | (1 to 10) kpsi | 0.094 % + 0.058 % rng | |
| Differential | Up to 1 psid | 0.24 % + 0.058 % rng | 700P22 |

V. Thermodynamics

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---|--|---------------------------------|-----------------------|
| Temperature – Measure ^{3, 7} | (-200 to 100) °C (100 to 400) °C (400 to 670) °C | 0.043 °C 0.061 °C 0.11 °C | Fluke 7526A w/ 5609 |
| | Up to 1500 °F | 2.8 °F | Fluke 7526A w/ Type K |
| Relative Humidity – Measure ^{3, 7} | (20 to 80) % RH | 1.4 % RH | Vaisala |

VI. Time & Frequency

| Parameter/Equipment | Frequency | CMC ^{2, 4} (±) | Comments |
|---------------------|----------------------|------------------------------------|--------------------------------------|
| Frequency – Measure | 0.001 Hz to 26.5 GHz | 6 parts in 10 ¹⁰ + 0.6R | Counter locked to rubidium reference |

¹ This laboratory offers commercial calibration service and field calibration service.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ In the statement of CMC, D is the length of the diagonal in inches; R is the value of the resolution of the device under test.

⁵ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.

⁶ In the statement of CMC, percentages are percentage of reading unless otherwise indicated.

⁷ Uncertainty components that can be reasonably attributed to the Unit Under Test have not been utilized in the calculation of the CMC value for this measurement parameter.





Accredited Laboratory

A2LA has accredited

TRESCAL, INC.

Mobile, AL

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSLI Z540-1-1994 and the requirements of ANSI/NCSLI Z540.3-2006 and R205 – Specific Requirements: Calibration Laboratory Accreditation Program. 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*).



Presented this 19th day of June 2018.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2516.03
Valid to February 29, 2020
Revised September 23, 2019

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.