CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Thermo-Temp, Inc.
813-A Woodcrest
Houston, TX 77018

Fulfills the requirements of

ISO/IEC 17025:2017

and national standards

ANSI/NCSL Z540-1-1994 (R2002) and
ANSI/NCSL Z540.3-2006 (R2013)

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.

Jason Stine, Vice President

Expiry Date: 12 December 2027
Certificate Number: AC-2535

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

AND

ANSI/NCSL Z540-1-1994 (R2002)
ANSI/NCSL Z540.3-2006 (R2013)

Thermo-Temp, Inc.
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Houston, Texas 77018
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CALIBRATION

ISO/IEC 17025 Accreditation Granted: **10 December 2025**

Certificate Number: **AC-2535** Certificate Expiry Date: **12 December 2027**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Generate [1]	(0 to 330) mV (0 to 3.3) V (0 to 33) V (30 to 330) V (100 to 1 000) V	16 µV/V + 1 µV 9 µV/V + 2 µV 9 µV/V + 20 µV 14 µV/V + 0.15 mV 14 µV/V + 1.5 mV	Comparison to Fluke 5522A Multiproduct Calibrator
DC Voltage – Measure [1]	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (10 to 1 000) V	8 µV/V + 0.3 µV 7 µV/V + 0.3 µV 7 µV/V + 0.5 µV 9 µV/V + 30 µV 10 µV/V + 0.1 mV	Comparison to HP 3458A 8.5 Digit Multimeter
AC Voltage – Generate [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	 0.64 mV/V + 6 µV 0.19 mV/V + 6 µV 0.21 mV/V + 6 µV 0.79 mV/V + 6 µV 2.7 mV/V + 12 µV 6.2 mV/V + 50 µV	Comparison to Fluke 5522A Multiproduct Calibrator

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Generate [1]	(33 to 330) mV		Comparison to Fluke 5522A Multiproduct Calibrator
	(10 to 45) Hz	0.29 mV/V + 8 µV	
	45 Hz to 10 kHz	0.21 mV/V + 8 µV	
	(10 to 20) kHz	0.21 mV/V + 8 µV	
	(20 to 50) kHz	0.32 mV/V + 8 µV	
	(50 to 100) kHz	0.64 mV/V + 32 µV	
	(100 to 500) kHz	1.6 mV/V + 70 µV	
	(0.33 to 3.3) V		
	(10 to 45) Hz	0.23 mV/V + 50 µV	
	45 Hz to 10 kHz	0.12 mV/V + 60 µV	
	(10 to 20) kHz	0.15 mV/V + 60 µV	
	(20 to 50) kHz	0.24 mV/V + 50 µV	
	(50 to 100) kHz	0.54 mV/V + 0.13 mV	
	(100 to 500) kHz	1.8 mV/V + 0.6 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	0.23 mV/V + 0.65 mV	
	45 Hz to 10 kHz	0.12 mV/V + 0.6 mV	
	(10 to 20) kHz	0.19 mV/V + 0.6 mV	
	(20 to 50) kHz	0.27 mV/V + 0.6 mV	
	(50 to 100) kHz	0.7 mV/V + 1.6 mV	
	(33 to 330) V		
	10 Hz to 45 Hz	0.15 mV/V + 2 mV	
	45 Hz to 10 kHz	0.16 mV/V + 6 mV	
	10 kHz to 20 kHz	0.19 mV/V + 6 mV	
	20 kHz to 50 kHz	0.23 mV/V + 6 mV	
	50 kHz to 100 kHz	1.6 mV/V + 50 mV	
	(330 to 1 000) V		
	45 Hz to 1 kHz	0.23 mV/V + 10 mV	
	1 kHz to 5 kHz	0.2 mV/V + 10 mV	
	5 kHz to 10 kHz	0.23 mV/V + 10 mV	

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AC Voltage – Measure [1]	Up to 10 mV		Comparison to HP 3458A 8.5 Digit Multimeter
	(1 to 40) Hz	0.03 % of reading + 3 µV	
	40 Hz to 1 kHz	0.03 % of reading + 1.1 µV	
	(1 to 20) kHz	0.04 % of reading + 1.1 µV	
	(20 to 50) kHz	0.09 % of reading + 1.1 µV	
	(50 to 100) kHz	0.09 % of reading + 1.1 µV	
	(100 to 300) kHz	4.1 % of reading + 2 µV	
	(10 to 100) mV		
	(1 to 40) Hz	0.017 % of reading + 4 µV	
	40 Hz to 1 kHz	0.017 % of reading + 2 µV	
	(1 to 20) kHz	0.022 % of reading + 2 µV	
	(20 to 50) kHz	0.05 % of reading + 2 µV	
	(50 to 100) kHz	0.09 % of reading + 2 µV	
	(100 to 300) kHz	0.31 % of reading + 10 µV	
	300 kHz to 1 MHz	1 % of reading + 10 µV	
	(1 to 2) MHz	1.5 % of reading + 10 µV	
	(0.1 to 1) V		
	(1 to 40) Hz	0.019 % of reading + 0.4 mV	
	40 Hz to 1 kHz	0.019 % of reading + 0.2 mV	
	(1 to 20) kHz	0.023 % of reading + 0.2 mV	
	(20 to 50) kHz	0.04 % of reading + 0.2 mV	
	(50 to 100) kHz	0.08 % of reading + 0.2 mV	
	(100 to 300) kHz	0.3 % of reading + 1 mV	
	300 kHz to 1 MHz	1 % of reading + 1 mV	
	(1 to 2) MHz	1.5 % of reading + 1 mV	
	(1 to 10) V		
	(1 to 40) Hz	0.008 % of reading + 0.4 mV	
	40 Hz to 1 kHz	0.008 % of reading + 0.2 mV	
	(1 to 20) kHz	0.016 % of reading + 0.2 mV	
	(20 to 50) kHz	0.03 % of reading + 0.2 mV	
	(50 to 100) kHz	0.08 % of reading + 0.2 mV	
	(100 to 300) kHz	0.3 % of reading + 1 mV	
	300 kHz to 1 MHz	1 % of reading + 1 mV	
	(1 to 2) MHz	1.5 % of reading + 1 mV	

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure [1]	(10 to 100) V 1 Hz 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 (100 to 1 000) V 1 Hz to 40 Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	 0.02 % of reading + 4 mV 0.02 % of reading + 2 mV 0.02 % of reading + 2 mV 0.036 % of reading + 2 mV 0.12 % of reading + 10 mV 0.4 % of reading + 10 mV 1.5 % of reading + 10 mV 0.04 % of reading + 40 mV 0.04 % of reading + 20 mV 0.06 % of reading + 20 mV 0.12 % of reading + 20 mV 0.3 % of reading + 20 mV	Comparison to HP 3458A 8.5 Digit Multimeter
Resistance – Generate [1]	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) Ω (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) k Ω (110 to 330) kΩ (0.33 to 1.1) kΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (0.33 to 1.1) GΩ	0.2 mΩ/Ω + 10 mΩ 27 μΩ/Ω + 15 mΩ 25 μΩ/Ω + 15 mΩ 22 μΩ/Ω + 20 mΩ 22 μΩ/Ω + 20 mΩ 22 μΩ/Ω + 0.2 Ω 22 μΩ/Ω + 0.1 Ω 22 μΩ/Ω + 1 Ω 22 μΩ/Ω + 1 Ω 25 μΩ/Ω + 10 Ω 25 μΩ/Ω + 10 Ω 47 μΩ/Ω + 0.15 kΩ 0.1 mΩ/Ω + 0.25 kΩ 0.19 mΩ/Ω + 2.5 kΩ 0.39 mΩ/Ω + 3 kΩ 2.3 mΩ/Ω + 0.1 MΩ 12 mΩ/Ω + 0.5 MΩ	Comparison to Fluke 5522A Multiproduct Calibrator
Resistance – Measure [1,2]	(0 to 10) Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ	24 μΩ/Ω + 50 μΩ 22 μΩ/Ω + 0.5 mΩ 20 μΩ/Ω + 0.5 mΩ 15 μΩ/Ω + 5 mΩ 15 μΩ/Ω + 50 mΩ 20 μΩ/Ω + 2 Ω 57 μΩ/Ω + 0.1 kΩ 0.53 mΩ/Ω + 1 kΩ 5 mΩ/Ω + 10 kΩ	Comparison to HP 3458A 8.5 Digit Multimeter

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Generate [1]	(0 to 330) µA (0 to 3.3) mA (0 to 33) mA (0 to 330) mA (0 to 1.1) A (1.1 to 3) A (0 to 11) A (11 to 20.5) A	0.12 mA/A + 20 nA 78 µA/A + 50 nA 78 µA/A + 0.25 µA 78 µA/A + 2.5 µA 0.37 mA/A + 40 µA 0.3 mA/A + 40 µA 0.39 mA/A + 0.5 mA 0.78 mA/A + 0.75 mA	Comparison to Fluke 5522A Multiproduct Calibrator (Locked Ranges)
DC Current – Measure	(0 to 100) nA (0.1 to 1) µA (1 to 10) µA (10 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	36 µA/A + 40 pA 26 µA/A + 40 pA 26 µA/A + 0.1 nA 30 µA/A + 0.8 nA 28 µA/A + 5 nA 28 µA/A + 50 nA 46 µA/A + 0.5 µA 0.12 mA/A + 10 µA	Comparison to HP 3458A 8.5 Digit Multimeter
AC Current – Generate [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	 0.17 % of reading + 0.1 µA 0.14 % of reading + 0.1 µA 0.12 % of reading + 0.1 µA 0.23 % of reading + 0.2 µA 0.62 % of reading + 0.2 µA 1.2 % of reading + 0.4 µA 0.17 % of reading + 0.15 µA 0.12 % of reading + 0.2 µA 0.1 % of reading + 0.2 µA 0.53 % of reading + 0.2 µA 0.39 % of reading + 0.3 µA 0.78 % of reading + 0.6 µA 0.16 % of reading + 2 µA 0.1 % of reading + 2 µA 0.078 % of reading + 2 µA 0.062 % of reading + 2 µA 0.16 % of reading + 3 µA 0.31 % of reading + 4 µA	Comparison to Fluke 5522A Multiproduct Calibrator

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AC Current – Generate [1]	(33 to 330) mA		Comparison to Fluke 5522A Multiproduct Calibrator
	(10 to 20) Hz	0.16 % of reading + 20 µA	
	(20 to 45) Hz	0.1 % of reading + 20 µA	
	45 Hz to 1 kHz	0.031 % of reading + 20 µA	
	(1 to 5) kHz	0.078 % of reading + 50 µA	
	(5 to 10) kHz	0.16 % of reading + 0.1 mA	
	(10 to 30) kHz	0.31 % of reading + 0.2 mA	
	(0.33 to 1.1) A		
	(10 to 45) Hz	0.14 % of reading + 0.1 mA	
	45 Hz to 1 kHz	0.05 % of reading + 0.1 mA	
	(1 to 5) kHz	0.47 % of reading + 1 mA	
	(5 to 10) kHz	1.9 % of reading + 5 mA	
	(1.1 to 3) A		
	(10 to 45) Hz	0.14 % of reading + 0.1 mA	
	45 Hz to 1 kHz	0.05 % of reading + 0.1 mA	
	(1 to 5) kHz	0.47 % of reading + 1 mA	
	(5 to 10) kHz	1.9 % of reading + 5 mA	
	(3 to 11) A		
	(45 to 500) Hz	0.05 % of reading + 2 mA	
	500 Hz to 1 kHz	0.08 % of reading + 2 mA	
	(1 to 5) kHz	2.3 % of reading + 2 mA	
	(11 to 20.5) A		
	(45 to 100) Hz	0.09 % of reading + 5 mA	
	100 Hz to 1 kHz	0.12 % of reading + 5 mA	
	(1 to 5) kHz	2.3 % of reading + 5 mA	
AC Current – Measure	(5 to 100) µA		Comparison to HP 3458A 8.5 Digit Multimeter
	(10 to 20) Hz	4.1 mA/A + 30 nA	
	(20 to 45) Hz	1.7 mA/A + 30 nA	
	(45 to 100) Hz	0.95 mA/A + 30 nA	
	100 to 5 kHz	0.95 mA/A + 30 nA	
	(0.1 to 1) mA		
	(10 to 20) Hz	4.1 mA/A + 0.2 µA	
	(20 to 45) Hz	1.7 mA/A + 0.2 µA	
	(45 to 100) Hz	0.94 mA/A + 0.2 µA	
	100 to 5 kHz	0.78 mA/A + 0.2 µA	
	(5 to 20) kHz	0.94 mA/A + 0.2 µA	
	(20 to 50) kHz	4.1 mA/A + 0.4 µA	
	(50 to 100) kHz	5.6 mA/A + 1.5 µA	

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure	(1 to 10) mA		Comparison to HP 3458A 8.5 Digit Multimeter
	(10 to 20) Hz	4.1 mA/A + 20 µA	
	(20 to 45) Hz	1.7 mA/A + 20 µA	
	(45 to 100) Hz	0.93 mA/A + 20 µA	
	100 to 5 kHz	0.32 mA/A + 20 µA	
	(5 to 20) kHz	0.61 mA/A + 20 µA	
	(20 to 50) kHz	4 mA/A + 40 µA	
	(50 to 100) kHz	5.5 mA/A + 0.15 mA	
	(10 to 100) mA		
	(10 to 20) Hz	4.1 mA/A + 20 µA	
	(20 to 45) Hz	1.7 mA/A + 20 µA	
	(45 to 100) Hz	0.95 mA/A + 20 µA	
	100 to 5 kHz	0.33 mA/A + 20 µA	
	(5 to 20) kHz	0.62 mA/A + 20 µA	
	(20 to 50) kHz	4 mA/A + 40 µA	
	(50 to 100) kHz	5.5 mA/A + 0.15 mA	
	(0.1 to 1) A		
	(10 to 20) Hz	4.1 mA/A + 0.2 mA	
	(20 to 45) Hz	1.8 mA/A + 0.2 mA	
	(45 to 100) Hz	0.83 mA/A + 0.2 mA	
	100 to 5 kHz	1 mA/A + 0.2 mA	
	(5 to 20) kHz	3 mA/A + 0.2 mA	
	(20 to 50) kHz	10 mA/A + 0.4 mA	
Capacitance – Generate [1] (Simulation)	(0.19 to 0.4) nF	3.9 % of reading + 10 pF	Comparison to Fluke 5522A Multiproduct Calibrator
	(0.4 to 1.1) nF	1.4 % of reading + 10 pF	
	(1.1 to 3.3) nF	1.1 % of reading + 10 pF	
	(3.3 to 11) nF	0.28 % of reading + 10 pF	
	(11 to 33) nF	0.43% of reading + 10 pF	
	(33 to 110) nF	0.26.% of reading + 10 pF	
	(110 to 330) nF	0.19 % of reading + 30 pF	
	(0.33 to 1,1) µF	0.19 % of reading + 1 nF	
	(1.1 to 3.3) µF	0.19 % of reading + 3 nF	
	(3.3 to 11) µF	0.19 % of reading + 10 nF	
	(11 to 33) µF	0.31 % of reading + 30 nF	
	(33 to 110) µF	0.35 % of reading + 0.1 µF	
	(110 to 330) µF	0.35 % of reading + 0.3 µF	
	(0.33 to 1.1) mF	0.35 % of reading + 1 µF	
	(1.1 to 3.3) mF	0.35 % of reading + 3 µF	
	(3.3 to 11) mF	0.35 % of reading + 10 µF	
	(11 to 33) mF	0.58 % of reading + 30 µF	
	(33 to 110) mF	0.85 % of reading + 0.1 mF	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Generate/Measure [1]	Type J		Comparison to Fluke 5522A Multiproduct Calibrator
	(-210 to -100) °C	0.24 °C	
	(-100 to -30) °C	0.12 °C	
	(-30 to 150) °C	0.13 °C	
	(150 to 760) °C	0.13 °C	
	(760 to 1 200) °C	0.19 °C	
	Type K		
	(-200 to -100) °C	0.35 °C	
	(-100 to -25) °C	0.14 °C	
	(-25 to 120) °C	0.18 °C	
	(120 to 1 000) °C	0.2 °C	
	(1 000 to 1 372) °C	0.33 °C	
	Type N		
	(-200 to -100) °C	0.33 °C	
	(-100 to -25) °C	0.17 °C	
	(-25 to 120) °C	0.17 °C	
	(120 to 410) °C	0.14 °C	
	(410 to 1 300) °C	0.21 °C	
	Type R		
	(0 to 250) °C	0.44 °C	
	(250 to 400) °C	0.27 °C	
	(400 to 1 000) °C	0.26 °C	
	(1 000 to 1 767) °C	0.31 °C	
	Type S		
	(0 to 250) °C	0.37 °C	
	(250 to 1 000) °C	0.28 °C	
	(1 000 to 1 400) °C	0.29 °C	
	(1 400 to 1 767) °C	0.36 °C	
	Type T		
	(-250 to -150) °C	0.49 °C	
	(-150 to 0) °C	0.19 °C	
	(0 to 120) °C	0.12 °C	
	(120 to 400) °C	0.11 °C	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance Simulation of RTD Indicating Devices – Generate [1]	Pt 385, 100 Ω (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C Pt 3926, 100 Ω (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °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	 0.04 °C 0.05 °C 0.05 °C 0.07 °C 0.08 °C 0.09 °C 0.18 °C 0.04 °C 0.05 °C 0.07 °C 0.08 °C 0.16 °C 0.19 °C 0.03 °C 0.04 °C 0.05 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.18 °C	Comparison to Fluke 5522A Multiproduct Calibrator

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calipers [1,3,5] (OD, ID, Step, Depth)	(0 to 36) in	(1 + 5.3L) µin	Comparison to Gage Blocks
Depth Micrometers [1,3,5]	(0 to 12) in	(3 + 5.1L) µin	Comparison to Gage Blocks, Surface Plate
Inside Micrometers [1,3]	(0 to 36) in	(8 + 5.1L) µin	Comparison to Gage Blocks

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Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Outside Micrometers [1,3,5]			Comparison to Gage Blocks
Travel	Up to 6 in (6 to 18) in (18 to 36) in	(34 + 8.6*L*) µin (64 + 3.7*L*) µin (50 + 4.4*L*) µin	
Flatness/Parallelism	Up to 1 in	13 µin	Optical Flat
Optical Comparators [1,3]			Comparison to Reticle Plate
X-Y Travel	Up to 3 in (3 to 14) in	120 µin 290 µin	
Angle	Up to 90°	23″	Reticle Plate
Magnification	10X, 20X, 31.25X, 50X, 62.5X	(540 + 20*L*) µin	Magnification Checker
Surface Plates [1,5]			In accordance with ASME B89.3.7 using Electronic Level System
Overall Flatness	Up to 80 in*DL*	(6*DL*) µin	
Local Area Flatness (Repeat Readings)	Up to 0.001 in	27 µin	Repeat-o-Meter

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness Testers [1]	HRA		Indirect Verification per ASTM E 18 using Test Blocks
	Low	0.89 HRA	
	Middle	0.89 HRA	
	High	0.53 HRA	
	HRBW		
	Low	1.43 HRBW	
	Middle	1.37 HRBW	
	High	1.17 HRBW	
Rockwell Hardness Testers [1]	HRC		Indirect Verification per ASTM E 18 using Test Blocks
	Low	0.81 HRC	
	Middle	0.79 HRC	
	High	0.71 HRC	

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Mass and Mass Related

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Brinell Hardness Testers [1,4]	HBW 106 HBW 223 HBW 451 HBW	7.2 HBW 7.2 HBW 18 HBW	Indirect Verification per ASTM E 10 using Test Blocks
Pressure Gauges, Differential Pressure Gauges [1,3]	(-14 to 15) psig (0 to 150) psig	0.002 9 psi 0.021 psi	Comparison to Druck DPI150 Pressure/Vacuum Calibrator
Pressure Gauges, Differential Pressure Gauges [1,3]	(0 to 1 000) psig (200 to 20 000) psig	0.14 psi 4.6 psi	Comparison to Budenberg CPB5800 Deadweight Tester
Pressure Gauges, Differential Pressure Gauges [1,3]	(10 000 to 72 500) psig	4.8 psi	Comparison to Fluke PG7302 Hydraulic Piston Gauge

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature – Measure [1]	(-197 to -80) °C (-80 to -38.84) °C (-38.84 to 0) °C (0 to 231.9) °C (231.9 to 419.5) °C (419.5 to 660) °C	0.016 °C 0.023 °C 0.028 °C 0.082 °C 0.11 °C 0.16 °C	Comparison to Fluke 1502A Thermometer Readout, Fluke 562xA Secondary PRT
Temperature – Measure [1] (In-field)	(-196 to 420) °C	1.1 °C	Comparison to Pyromation PRT with Fluke 754 Documenting Process Calibrator
Temperature – Measuring Equipment [1]	(-197 to -80) °C (-80 to -38.84) °C (-38.84 to 0) °C (0 to 231.9) °C (231.9 to 419.5) °C (419.5 to 660) °C	0.02 °C 0.026 °C 0.034 °C 0.1 °C 0.16 °C 0.2 °C	Comparison to Fluke 1502A Thermometer Readout, Fluke 562xA Secondary PRT, Liquid Bath, Dry Well

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Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
System Accuracy Test (SAT)	(200 to 2 000) °F (2 000 to 2 200) °F	2.6 °F 3.9 °F	Process Calibrator, Type K MGO Thermocouple Probe per AMS 2750.
Temperature Uniformity Survey (TUS)	(200 to 1 600) °F (1 600 to 2 000) °F (2 000 to 2 200) °F	4.8 °F 2.7 °F 4 °F	Data Acquisition Recorder, Type K Thermocouple Wire per AMS 2750.
Radiation (Infrared) Thermometers [1,3,6]	-15 °C 0 °C 50 °C 100 °C 120 °C	0.61 °C 0.52 °C 0.64 °C 0.65 °C 0.74 °C	Direct Measurement using Fluke 4180 Blackbody Source (flat plate) $\varepsilon = 0.95$, $\lambda = (8 \text{ to } 14)$ µm
Radiation (Infrared) Thermometers [1,3,6]	35 °C 100 °C 200 °C 350 °C 500 °C	0.47 °C 0.7 °C 0.94 °C 1.6 °C 2.1 °C	Direct Measurement using Fluke 4181 Blackbody Source (flat plate) $\varepsilon = 0.95$, $\lambda = (8 \text{ to } 14)$ µm
Radiation (Infrared) Thermometers [1,3,6]	-19.9 °C 0.92 °C 32 °C 50 °C 100 °C 200 °C 350 °C 500 °C 800 °C 1004 °C 1107 °C	0.95 °C 0.79 °C 0.73 °C 0.86 °C 1.3 °C 2.1 °C 3.3 °C 4.5 °C 7 °C 8.6 °C 9.5 °C	Comparison to Heitronics KT19.82II Infrared Radiation Thermometer $\varepsilon = (0.9 \text{ to } 1)$, $\lambda = (8 \text{ to } 14)$ µm

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Generate [1]	10 mHz to 2 MHz	0.000 2 % of reading + 5 µHz	Comparison to Fluke 5522A Multiproduct Calibrator

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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. For 2-wire measurement, add 0.25 Ω.
3. 0.6R will be added to the Measurement Uncertainty at the time of calibration (where R = resolution of the device under calibration).
4. The range value is a nominal value. The actual value of the standard will be used during calibration and the associated uncertainty will be utilized to calculate measurement uncertainty.
5. L = length in inches; DL = diagonal length in inches; ″ = arc-second.
6. Other test points are available for the calibration of Radiation (Infrared) Thermometers. Please contact the laboratory for additional information related to those points and their associated Uncertainty values.
7. Unless otherwise specified in the far-right column, the calibration method/procedure utilized by the laboratory was developed and validated internally.

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