PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Cal Tec Labs, LLC.

501 Mansfield Avenue, Pittsburgh, PA 15205

(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:

ISO/IEC 17025:2017
& Meets the Requirements of ANSI/NCSI Z540.3-2006 sub-clause 5.3 and Z540-1-1994

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):

Dimensional, Electrical, Mechanical, Time & Frequency, Thermodynamic, Mass, Force, and Weighing 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

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

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
November 23, 2013	July18, 2024	September 30, 2026

Accreditation No.:	*Certificate No.:*
74269	L24-551

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.pjlabs.com

Certificate of Accreditation: Supplement

Cal Tec Labs, LLC.
501 Mansfield Avenue, Pittsburgh, PA 15205
Contact Name: George Urban Phone: 412-919-1377

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Micrometers Outside FO	0.05 in to 48 in	(50 + 15L) µin	Gage Blocks, End Rod Standards	D10-04
Micrometer Depth FO	0.05 in to 12 in	(95 + 9L) µin	Gage Blocks Size Control Depth Master	D14-00
Indicators FO	0.1 in to 2 in	91 µin	Mitutoyo Digital Micrometer Head	D15-01
Calipers FO (OD, ID, Depth)	0.05 in to 24 in	(250 + 11L) µin	Size Control Kalmaster Size Control Depth Master D12-01	
Gage Blocks FO	0.005 in to 4 in	(2.5 + 3.3L) µin	Gage Blocks Pratt & Whitney Labmaster	D16-00
Length Standards FO	1 in to 48 in	(41 + 15L) µin	Scherr Tumico End Measuring Rod Standards Micrometer Head Dial Indicator, Trimos Height	Gage D17-00
Pin Gages / Pain Plug Gages FO	0.012 in to 2 in	76 µin	Master Plug Gage Z- Mike Laser Micrometer	D18-00
Surface Finish Equipment / Profilometers FO	16 µin Ra	3.1 µin Ra	Mahr Precision Roughness Specimen	P51-00
	118 µin Ra			

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Equipment to Measure DC Voltage FO	Up to mV to 330 mV	74 µV/V + 3 µV	Fluke 5502A	E150
	0.33 mV to 33 V	59 µV/V + 5 µV		
	3.3 V to 33 V	59 µV/V + 50 µV		
	33 V to 330 V	65 µV/V + 500 µV		
	330 V to 1 020 V	65 µV/V + 1 500 µV		
Equipment to Output DC Voltage FO	Up to mV to 100 mV	9.2 µV/V + 7.6 µV	Keysight 34470A	E150
	100 mV to 1 V	43 µV/V + 4.1 µV		
	1V to 10 V	5.6 µV/V + 4.1 µV		
	10 V to 100 V	18 mV/V + 6.6 µV		
	100 V to 1 000 V	83 mV/V + 6.6 µV		

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Equipment to Measure AC Voltage At the Listed Frequencies [FO]			Fluke 5502A	E150
10 Hz to 45 Hz	Up to 33 mV	0.17 % + 20 µV		
45 Hz to 10 kHz	Up to 33 mV	0.12 % + 20 µV		
10 kHz to 20 kHz	Up to 33 mV	0.17 % + 20 µV		
20 kHz to 50 kHz	Up to 33 mV	0.23 % + 20 µV		
50 kHz to 100 kHz	Up to 33 mV	0.4 % + 33 µV		
100 kHz to 500 kHz	Up to 33 mV	1.2 % + 60 µV		
Equipment to Measure AC Voltage At the Listed Frequencies [FO]				
10 Hz to 45 Hz	33 mV to 330 mV	0.058 % + 20 µV		
45 Hz to 10 kHz	33 mV to 330 mV	0.035 % + 20 µV		
10 kHz to 20 kHz	33 mV to 330 mV	0.081 % + 20 µV		
20 kHz to 50 kHz	33 mV to 330 mV	0.12 % + 20 µV		
50 kHz to 100 kHz	33 mV to 330 mV	0.27 % + 40 µV		
100 kHz to 500 kHz	33 mV to 330 mV	0.58 % + 170 µV		
Equipment to Measure AC Voltage At the Listed Frequencies [FO]				
10 Hz to 45 Hz	0.33 V to 3.3 V	0.058 % + 60 µV		
45 Hz to 10 kHz	0.33 V to 3.3 V	0.035 % + 60 µV		
10 kHz to 20 kHz	0.33 V to 3.3 V	0.081 % + 60 µV		
20 kHz to 50 kHz	0.33 V to 3.3 V	0.12 % + 60 µV		
50 kHz to 100 kHz	0.33 V to 3.3 V	0.27 % + 0.2 mV		
100 kHz to 500 kHz	0.33 V to 3.3 V	0.58 % + 0.9 mV		
Equipment to Measure AC Voltage At the Listed Frequencies [FO]				
10 Hz to 45 Hz	3.3 V to 33 V	0.058 % + 0.8 mV		
45 Hz to 10 kHz	3.3 V to 33 V	0.035 % + 0.6 mV		
10 kHz to 20 kHz	3.3 V to 33 V	0.081 % + 0.6 mV		
20 kHz to 50 kHz	3.3 V to 33 V	0.12 % + 06 mV		
50 kHz to 100 kHz	3.3 V to 33 V	0.27 % + 0.2 mV		

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Equipment to Measure AC Voltage At the Listed Frequencies [FO]			Fluke 5502A	E150
45 Hz to 1 kHz	33 V to 330 V	0.058 % + 3 mV		
1 kHz to 10 kHz	33 V to 330 V	0.092 % + 9 mV		
10 kHz to 20 kHz	33 V to 330 V	0.1 % + 9 mV		
20 t kHz o 50 kHz	33 V to 330 V	0.14 % + 9 mV		
50 kHz to 100 kHz	33 V to 330 V	0.28 % + 80 mV		
1 kHz to 10 kHz	33 V to 330 V	0.092 % + 9 mV		
Equipment to Measure AC Voltage At the Listed Frequencies [FO]				
45 Hz to 1 kHz	330 V to 1 020 V	0.058 % + 20 mV		
1 kHz to 5 kHz	330 V to 1 020 V	0.092 % + 20 mV		
5 kHz to 10 kHz	330 V to 1 020 V	0.1 % + 20 mV		
Equipment to Output AC Voltage At the Listed Frequencies [FO]			Keysight 34470A	E111
1 Hz to 10 Hz	1 mV to 100 mV	70 µV/V + 123 µV		
10 Hz to 40 Hz	1 mV to 100 mV	20 µV/V + 123 µV		
40 Hz to 100 Hz	1 mV to 100 mV	20 µV/V + 105 µV		
100 Hz to 2 kHz	1 mV to 100 mV	83 uV/V + 104 µV		
2 kHz to 10 kHz	1 mV to 100 mV	110 uV/V + 103 µV		
10 kHz to 30 kHz	1 mV to 100 mV	125 uV/V + 304 µV		
30 kHz to 100 kHz	1 mV to 100 mV	150 uV/V + 706 µV		
Equipment to Output AC Voltage At the Listed Frequencies [FO]				
1 Hz to 10 Hz	1 V to 100 V	60 µV/V + 105 µV		
10 Hz to 40 Hz	1 V to 100 V	10 mV/V + 104 µV		
40 Hz to 100 Hz	1 V to 100 V	10 mV/V + 82 µV		
100 Hz to 2 kHz	1 V to 100 V	81 mV/V + 63 µV		
2 kHz to 10 kHz	1 V to 100 V	100 mV/V + 82 µV		
10 kHz to 30 kHz	1 V to 100 V	120 mV/V + 201 µV		
30 kHz to 100 kHz	1 V to 100 V	150 mV/V + 501 µV		
Equipment to Output AC Voltage At the Listed Frequencies [FO]				
100 kHz to 300 kHz	1 V to 100 V	1.22 % range + 0.45 % reading		
300 kHz to 1 MHz	1 V to 100 V	3.06 % range + 1.41 %reading		

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Equipment to Output AC Voltage At the Listed Frequencies FO			Keysight 34470A	E111
1 Hz to 10 Hz	100 V to 700 V	104 µV + 70 µV/V		
10 Hz to 40 Hz	100 V to 700 V	250 mV + 20 µV/V		
40 Hz to10 kHz	100 V to 700 V	850 mV + 10mV/V		
10 kHz to 30 kHz	100 V to 700 V	850 mV + 40 mV/V		
30 kHz to 100 kHz	100 V to 700 V	850 mV + 200 mV/V		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E FO	-250 to -100 °C	0.59 °C	Fluke 5502A	P21-00
	-100 °C to -25 °C	0.23 °C		
	-25 °C to 350 °C	0.21 °C		
	350 °C to 650 °C	0.23 °C		
	650 °C to 1 000 °C	0.28 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J FO	-210 °C to -100 °C	0.34 °C		
	-100 °C to -30 °C	0.23 °C		
	-30 °C to 150 °C	0.21 °C		
	150 °C to 760 °C	0.24 °C		
	760 °C to 1 200 °C	0.30 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K FO	-200 °C to -100 °C	0.38 °C		
	-100 °C to -25 °C	0.25 °C		
	-25 °C to 120 °C	0.23 °C		
	120 °C to 1 000 °C	0.33 °C		
	1 000 °C to 1 372 °C	0.48 °C		
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T FO	-250 °C to -150 °C	0.74 °C		
	-150 °C to 0 °C	0.31 °C		
	Up to 120 °C	0.23 °C		
	120 °C to 400 °C	0.21 °C		
Equipment to Measure Resistance FO	Up to 11 Ω	0.015 % + 0.001 Ω	Fluke 5502A	E150
	11 Ω to 33 Ω	0.014 % + 0.001 5 Ω		
	33 Ω to 110 Ω	0.01 % + 0.001 4 Ω		
	110 Ω to 330 Ω	0.01 % + 0.002 Ω		
	0.33 kΩ to 1.1 kΩ	0.01 % + 0.002 Ω		
	1.1 kΩ to 3.3 kΩ	0.01 % + 0.02 Ω		
	3.3 kΩ to 11 kΩ	0.01 % + 0.02 Ω		
	11 kΩ to 33 kΩ	0.01 % + 0.2 Ω		
	33 kΩ to 110 kΩ	0.013 % + 0.2 Ω		

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Equipment to Measure Resistance FO	110 kΩ to 330 kΩ	0.014 % + 2 Ω	Fluke 5502A	E150
	0.33 MΩ to 1.1 MΩ	0.017 % + 2 Ω		
	1.1 MΩ to 33 MΩ	0.017 % + 30 Ω		
	3.3 MΩ to 11 MΩ	0.069 % + 50 Ω		
	11 MΩ to 33 MΩ	0.12 % + 2.5 kΩ		
	33 MΩ to 110 MΩ	0.58 % + 3 kΩ		
	110 MΩ to 330 MΩ	0.58 % + 0.1 MΩ		
	330 MΩ to 1 100 MΩ	1.7 % + 0.5 MΩ		
Equipment to Measure Resistance FO	10 Ω to 100 Ω	3 mΩ/Ω + 9 µΩ	Keysight 34470A	E160
	100 Ω to 1 kΩ	5.2 mΩ/kΩ + 7 mΩ		
	1 kΩ to 10 kΩ	10 mΩ/kΩ + 7 mΩ		
	10 kΩ to 100 kΩ	12 mΩ/kΩ + 7 mΩ		
	100 kΩ to 1 MΩ	170 Ω/MΩ + 12 Ω		
	1 MΩ to 10 MΩ	650 Ω/MΩ + 13 Ω		
	10 MΩ to 100 MΩ	650 Ω/MΩ + 47 Ω		
Equipment to Measure DC Current FO	Up to 330 µA	0.017 % + 0.02 µA	Fluke 5502A	E150
	0.33 mA to 3.3 mA	0.015 % + 0.05 µA		
	3.3 mA to 33 mA	0.012 % + 0.25 µA		
	33 mA to 330 mA	0.015 % + 2.5 µA		
	0.33 A to 1.1 A	0.044 % + 44 µA		
	1.1 A to 3 A	0.045 % + 44 µA		
	3 A to 11 A	0.073 % + 0.5 mA		
	11 A to 20.5 A	0.12 % + 0.75 mA		
Equipment to Measure DC Current FO	10 A to 16.5 A	0.25 % + 0.002 A	Fluke 5502A Fluke 5500A/Coil	E120
	16.5 A to 150 A	0.26 % + 0.015 A		
	150 A to 1 025 A	0.28 % + 0.05 A		
Equipment to Output DC Current FO	1 A to 3 A	5.4 mA/A + 260 µA	Keysight 34470A	E111
	3 A to 10 A	27 mA/A + 260 µA		
	1 mA to 10 mA	8.4 µA/A + 26 µA		
	10 mA to 100 mA	67 µA/A + 51 µA		
	100 mA to 1 A	1.1 mA/A + 151 µA		

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Equipment to Measure AC Current At the Listed Frequencies [FO]			Fluke 5502A	E150
10 Hz to 20 Hz	Up to 330 uA	0.23 % + 0.1 µA		
20 Hz to 45 Hz	Up to 330 uA	0.17 % + 0.1 µA		
45 Hz to 1 kHz	Up to 330 uA	0.14 % + 0.1 µA		
1 kHz to 5 kHz	Up to 330 uA	0.35 % + 0.15 µA		
5 kHz to 10 kHz	Up to 330 uA	0.92 % + 0.2 µA		
10 kHz to 30 kHz	Up to 330 uA	1.8 % + 0.4 µA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 20 Hz	0.33 mA to 3.3 mA	0.23 % + 0.15 µA		
20 Hz to 45 Hz	0.33 mA to 3.3 mA	0.14 % + 0.15 µA		
45 Hz to 1 kHz	0.33 mA to 3.3 mA	0.12 % + 0.15 µA		
1 kHz to 5 kHz	0.33 mA to 3.3 mA	0.23 % + 0.2 µA		
5 kHz to 10 kHz	0.33 mA to 3.3 mA	0.58 % + 0.3 µA		
10 kHz to 30 kHz	0.33 mA to 3.3 mA	1.2 % + 0.6 µA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 20 Hz	3.3 mA to 33 mA	0.21 % + 2 µA		
20 Hz to 45 Hz	3.3 mA to 33 mA	0.1 % + 2 µA		
45 Hz to 1 kHz	3.3 mA to 33 mA	0.046 % + 2 µA		
1 kHz to 5 kHz	3.3 mA to 33 mA	0.092 % + 2 µA		
5 kHz to 10 kHz	3.3 mA to 33 mA	0.23 % + 3 µA		
10 kHz to 30 kHz	3.3 mA to 33 mA	0.46 % + 4 µA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 20 Hz	33 mA to 330 mA	0.21 % + 20 µA		
20 Hz to 45 Hz	33 mA to 330 mA	0.1 % + 20 µA		
45 Hz to 1 kHz	33 mA to 330 mA	0.046 % + 20 µA		
1 kHz to 5 kHz	33 mA to 330 mA	0.12 % + 50 µA		
5 kHz to 10 kHz	33 mA to 330 mA	0.23 % + 0.1 mA		
10 kHz to 30 kHz	33 mA to 330 mA	0.46 % + 0.2 mA		

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Equipment to Measure AC Current At the Listed Frequencies [FO]			Fluke 5502A	E150
10 Hz to 45 Hz	0.33 A to 1.1 A	0.21 % + 0.1 mA		
45 Hz to 1 kHz	0.33 A to 1.1 A	0.058 % + 0.1 mA		
1 kHz to 5 kHz	0.33 A to 1.1 A	0.069 % + 1 mA		
5 kHz to 10 kHz	0.33 A to 1.1 A	2.9 % + 5 mA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 45 Hz	1.1 A to 3 A	0.21 % + 0.1 mA		
45 Hz to 1 kHz	1.1 A to 3 A	0.058 % + 0.1 mA		
1 kHz to 5 kHz	1.1 A to 3 A	0.069 % + 1 mA		
5 kHz to 10 kHz	1.1 A to 3 A	2.9 % + 5 mA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 45 Hz	3 A to 11 A	0.21 % + 0.1 mA		
45 Hz to 1 kHz	3 A to 11 A	0.058 % + 0.1 mA		
1 kHz to 5 kHz	3 A to 11 A	0.069 % + 1 mA		
Equipment to Measure AC Current At the Listed Frequencies [FO]			Fluke 5502A with LCOMP On	E150
10 Hz to 100 Hz	Up to 330 µA	0.29 % + 0.2 µA		
100 Hz to 1 kHz	Up to 330 µA	0.69 % + 0.5 µA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 100 Hz	0.33 mA to 3.3 mA	0.29 % + 0.3 µA		
100 Hz to 1 kHz	0.33 mA to 3.3 mA	0.69 % + 0.8 µA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 100 Hz	0.33 mA to 3.3 mA	0.29 % + 0.2 µA		
100 Hz to 1 kHz	0.33 mA to 3.3 mA	0.69 % + 0.5 µA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 100 Hz	0.33 mA to 3.3 mA	0.092 % + 40 µA		
100 Hz to 1 kHz	0.33 t mA o 3.3 mA	0.23 % + 10 µA		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
10 Hz to 100 Hz	0.33 A to 3 A	0.14 % + 0.2 µA		
100 Hz to 400 Hz	0.33 A to 3 A	0.35 % + 1 mA		

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Equipment to Measure AC Current At the Listed Frequencies [FO]			Fluke 5502A with LCOMP On	E150
10 Hz to 100 Hz	3 A to 20.5 A	0.14 % + 2 mA		
100 Hz to 400 Hz	3 A to 20.5 A	1.2 % + 5 mA		
Equipment to Measure AC Current At the Listed Frequencies [FO]			5502A, 50 turnCoil	E120
45 Hz to 65 Hz	16.5 A to 150 A	0.029 % + 0.003 A		
65 Hz to 440 Hz	16.5 A to 150 A	0.083 % + 0.003 A		
Equipment to Measure AC Current At the Listed Frequencies [FO]				
45 Hz to 65 Hz	150 A to 1 025 A	0.32 % + 0.025 A		
65 Hz to 440 Hz	150 A to 1 025 A	0.87 % + 0.027 A		
Capacitance – Source	220 pF to 400 pF	0.58 % + 0.01 nF	Fluke 5502A	E160
	0.4 nF to 1.1 nF	0.58 % + 0.01 nF		
	1.1 nF to 3.3 nF	0.58 % + 0.01 nF		
	3.3 nF to 11 nF	0.29 % + 0.01 nF		
	11 nF to 33 nF	0.29 % + 0.1 nF		
	33 nF to 110 nF	0.29 % + 0.1 nF		
	110 nF to 330 nF	0.29 % + 0.3 nF		
	0.33 µF to 1.1 µF	0.29 % + 1 nF		
	1.1 µF to 3.3 µF	0.29 % + 3 nF		
	3.3 µF to 11 µF	0.29 % + 10 nF		
	11 µF to 33 µF	0.46 % + 30 nF		
	33 µF to 110 µF	0.52 % + 0.1 µF		
	110 µF to 330 µF	0.52 % + 0.3 µF		
	0.33 mF to 1.1 mF	0.52 % + 1 µF		
	1.1 mF to 3.3 mF	0.52 % + 3 µF		
	3.3 mF to 11 mF	0.52 % + 10 µF		
	11 mF to 33 mF	0.87 % + 30 µF		
	33 mF to 110 mF	1.2 % + 100 µF		
Equipment to Output AC Current At the Listed Frequencies [FO]			Keysight 34470A	E111
10 Hz to 5 kHz	1 mA to 10 mA	60 µA/A + 216 µA		
10 Hz to 5 kHz	10 mA to 100 mA	100 µA/A + 216 µA		
10 Hz to 1 kHz	100 mA to 1 mA	320 µA/A + 508 µA		

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Bandwidth [FO] At 50 kHz Reference 6 div	50 kHz to 600 MHz	5.1 % of reading	Fluke 5502A/SC600	E170
Time Marker Output [FO]	2 ns to 100 ms	3.9 % of reading		
Amplitude [FO]	5 mV to 5.5 V	2.3 % of reading		

Mass, Force, and Weighing Devices

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Balances/Scales [O]	1 g to 10 kg	260 mg	NIST Handbook 105-1 (Class F) Test Weights	P23-00

Mechanical

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Pressure Gauge [FO]	5 psig to 300 psig	0.33 psi	Fluke 702 with module 700PO7,	P25-00
	100 psi to 10 000 psi	0.82 % of reading	Additel ADT760	P25-00
Torque Wrench [FO]	5 lbf•in to 25 lbf•in	1.3 lbf•in	Mark-10 TT02,	P24-00
	20 lbf•in to 100 lbf•in	1.8 lbf•in	Mark-10 TT03,	P24-00
	100 lbf•in to 200 lbf•in	3.9 lbf•in	CDI 10002-I-DTT	P24-00
	200 lbf•in to 600 lbf•in	5 lbf•in		
	600 lbf•in to 1 000 lbf•in	6 lbf•in		
	60 lbf•ft to 300 lbf•ft	2 lbf•ft	CDI 6004-F-DTT	P24-00
	300 lbf•ft to 600 lbf•ft	3.6 lbf•ft		

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Thermometers & Temperature Indicators with Probe [FO]	95 °F to 707 °F	0.81 °C	Fluke 9100S Drywell Calibrator	P21-02

Certificate of Accreditation: Supplement

Cal Tec Labs, LLC.
501 Mansfield Avenue, Pittsburgh, PA 15205
Contact Name: George Urban Phone: 412-919-1377

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

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED	CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED
Equipment to Source Frequency FO	10 Hz to 100 Hz	0.15 Hz	Fluke 5502A	E140
	100 Hz to 1 kHz	0.16 Hz		
	1 kHz to 10 kHz	0.6 Hz		
	10 kHz to 100 kHz	6 Hz		
	100 kHz to 1 MHz	6 kHz		
	1 MHz to 10 MHz	6 kHz	Hewlett Packard 8648C Signal Generator	E140
	10 MHz to 100 MHz	6 kHz		
	100 MHz to 300 MHz	6 kHz		
Equipment to Measure Frequency FO	1 MHz to 10 MHz	62 Hz	Keysight 53210A Timer/Counter/Analyzer	E141
	10 MHz to 100 MHz	610 Hz		
	100 MHz to 500 MHz	3.1 kHz		
	500 MHz to 1 GHz	6.1 kHz		
	1 GHz to 2 GHz	13 kHz		
	1 GHz to 3.2 GHz	13 kHz		
	10 Hz to 100 Hz	0.15 Hz		
	100 Hz to 1 kHz	0.16 Hz		
	1 kHz to 10 kHz	0.6 Hz		
	10 kHz to 100 kHz	6 Hz		
	100 kHz to 1 MHz	6 kHz		
Equipment to Measure Frequency FO	1 MHz to 10 MHz	6 kHz	Tektronix FCA 3003 Timer/Counter/Analyzer	E141
	10 MHz to 100 MHz	6 kHz		
	100 MHz to 300 MHz	6 kHz		
Timers/Stopwatches FO	Up to 24 hr	0.5 s/day	Tektronix FCA 3003 Timer/Counter/Analyzer	NIST 960-12
Tachometers, Photo FO	60 rpm to 100 000 rpm	0.67%	Fluke 5502A	P-48

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

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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 F means that the laboratory performs calibration of the indicated parameter at its fixed location.

4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations.

5. 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