CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

BC Group International, Inc.
3081 Elm Point Industrial Drive
Saint Charles, MO 63301

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

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: 19 September 2026

Certificate Number: L2299

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)

BC Group International, Inc.

3081 Elm Point Industrial Drive
Saint Charles, MO 63301
Ken Racen 314-638-3800
kracen@bcgroupintl.com

CALIBRATION

Valid to: **September 19, 2026** Certificate Number: **L2299**

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Capacitance – Source			Fluke 5522A Multiproduct Calibrator
50 Hz to 1 kHz	(0.33 to 11) nF	0.4 % of reading + 0.01 nF	
50 Hz to 1 kHz	(11 to 110) nF	0.25 % of reading + 0.1 nF	
50 Hz to 1 kHz	(110 to 330) nF	0.25 % of reading + 0.3 nF	
50 Hz to 1 kHz	(0.33 to 1.1) µF	0.25 % of reading + 1 nF	
50 Hz to 1 kHz	(1.1 to 3.3) µF	0.35 % of reading + 3 nF	
(50 to 400) Hz	(3.3 to 11) µF	0.35 % of reading + 10 nF	
(50 to 400) Hz	(11 to 33) µF	0.4 % of reading + 30 nF	
(50 to 200) Hz	(33 to 110) µF	0.5 % of reading + 100 nF	
(50 to 100) Hz	(110 to 330) µF	0.7 % of reading + 300 nF	
(50 to 100) Hz	(0.33 to 1.1) mF	0.85 % of reading + 300 nF	
DC Current – Source	(0 to 3.2) mA	0.11 mA/A + 0.05 µA	Fluke 5522A Multiproduct Calibrator
	(0 to 32) mA	90 µA/A + 0.25 µA	
	(0 to 320) mA	90 µA/A + 3.35 µA	
	(0 to 2.1) A	0.28 mA/A + 44 µA	
	(0 to 11) A	0.55 mA/A + 330 µA	
DC Current – Measure	(0 to 100) nA	99 µA/A + 40 pA	HP 3458A Multimeter
	(0.1 to 1) µA	41 µA/A + 0.04 µA	
	(10 to 100) µA	35 µA/A + 0.8 nA	
	(0.1 to 1) mA	35 µA/A + 0.005 µA	
	(1 to 10) mA	35 µA/A + 0.05 µA	
	(10 to 100) mA	51 µA/A + 0.5 µA	
	(0.1 to 1) A	0.14 mA/A + 10 µA	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Current – Source	(0.03 to 0.33) mA		Fluke 5522A Multiproduct Calibrator
	(10 to 20) Hz	0.2 % of reading + 0.15 µA	
	(20 to 45) Hz	0.1 % of reading + 0.15 µA	
	45 Hz to 1 kHz	0.1 % of reading + 0.15 µA	
	(1 to 5) kHz	0.3 % of reading + 0.15 µA	
	(5 to 10) kHz	1 % of reading + 0.15 µA	
	(0.33 to 3.3) mA		
	(10 to 20) Hz	0.2 % of reading + 0.3 µA	
	(20 to 45) Hz	0.1 % of reading + 0.3 µA	
	45 Hz to 1 kHz	0.1 % of reading + 0.3 µA	
	(1 to 5) kHz	0.2 % of reading + 0.3 µA	
	(5 to 10) kHz	0.6 % of reading + 0.3 µA	
	(3.3 to 33) mA		
	(10 to 20) Hz	0.2 % of reading + 3 µA	
	(20 to 45) Hz	0.1 % of reading + 3 µA	
	45 Hz to 1 kHz	0.08 % of reading + 3 µA	
	(1 to 5) kHz	0.2 % of reading + 3 µA	
	(5 to 10) kHz	0.5 % of reading + 3 µA	
	(33 to 330) mA		
	(10 to 20) Hz	0.2 % of reading + 30 µA	
	(20 to 45) Hz	0.1 % of reading + 30 µA	
	45 Hz to 1 kHz	0.08 % of reading + 30 µA	
	(1 to 5) kHz	0.2 % of reading + 30 µA	
	(5 to 10) kHz	0.5 % of reading + 30 µA	
	(0.33 to 2.2) A		
	(10 to 45) Hz	0.16 % of reading + 300 µA	
	45 Hz to 1 kHz	0.08 % of reading + 300 µA	
	(1 to 5) kHz	0.6 % of reading + 300 µA	
	(2.2 to 11) A		
	(45 to 65) Hz	0.06 % of reading + 2 mA	
	(65 to 500) Hz	0.1 % of reading + 2 mA	
	500 Hz to 1 kHz	0.33 % of reading + 2 mA	
High AC Current – Source	(0 to 40) A		Fluke 5522A Multiproduct Calibrator with Transmille EA002 Coil
	DC to 500 Hz	2.1 mA/A + 18mA	
	(0 to 200) A		
	DC to 500 Hz	2.5 mA/A + 60mA	
	(0 to 1 000) A		
	DC to 500 Hz	3.42 mA/A + 250mA	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Current – Measure	(0 to 100) µA (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (0.1 to 1) mA (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (1 to 10) mA (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (10 to 100) mA (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (0.1 to 1) A (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	 2 µA/mA + 0.03 µA 1.1 µA/mA + 0.03 µA 1 µA/mA + 0.03 µA 2 µA/mA + 0.2 µA 1.1 µA/mA + 0.2 µA 0.7 µA/mA + 0.2 µA 2 µA/mA + 2 µA 1.1 µA/mA + 2 µA 0.7 µA/mA + 2 µA 2 µA/mA + 20 µA 1 µA/mA + 20 µA 0.7 µA/mA + 20 µA 2 µA/mA + 200 µA 1 µA/mA + 200 µA 1.3 µA/mA + 200 µA	HP 3458A Multimeter
AC Current - Measure	(0 to 100) mA (40 to 60) Hz (100 to 1 000) mA (40 to 60) Hz (1 to 10) A (40 to 60) Hz (10 to 50) A (40 to 60) Hz	 12 µA/mA + 1 µA 12 µA/mA + 20 µA 12 mA/A + 20 mA 12 mA/A + 20mA	HP 3458 Multimeter With Pearson 411 Coil
Resistance – Source	(0 to 11) Ω (11 to 33) Ω (33 to 330) Ω 330 Ω to 3.3 kΩ (3.3 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ 330 kΩ to 3.3 MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ	0.01 % of reading + 5 mΩ 0.01 % of reading + 0.01 Ω 0.008 % of reading + 0.01 Ω 0.008 % of reading + 0.06 Ω 0.008 % of reading + 0.6 Ω 0.009 % of reading + 6 Ω 0.01 % of reading + 6 Ω 0.013 % of reading + 55 Ω 0.05 % of reading + 0.55 kΩ 0.09 % of reading + 0.55 kΩ 0.4 % of reading + 5.5 kΩ 0.4 % of reading + 17 kΩ	Fluke 5522A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance – Measure	(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	20 µΩ/Ω + 0.5 mΩ 17 µΩ/Ω + 0.5 mΩ 15 µΩ/Ω + 0.5 mΩ 15 µΩ/Ω + 5 mΩ 16 µΩ/Ω + 0.05 Ω 21 Ω/MΩ + 2 Ω 57 Ω/MΩ + 100 Ω 600 Ω/MΩ + 1 kΩ 6 kΩ/MΩ + 10 kΩ	HP 3458A Multimeter
DC Voltage – Source	(0 to 330) mV (0 to 3.3) V (0 to 33) V (33 to 330) V (100 to 1 020) V	48 µV/V + 3 µV 40 µV/V + 5 µV 40 µV/V + 50 µV 48 µV/V + 0.5 mV 48 µV/V + 1.5 mV	Fluke 5522A Multiproduct Calibrator
DC Voltage – Measure	(1 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1 000) V	16 µV/V + 0.3 µV 15 µV/V + 0.3 µV 15 µV/V + 0.5 µV 18 µV/V + 30 µV 15 µV/V + 0.1 mV	HP 3458A Multimeter
DC Voltage – Measure	(0 to 2 000) V (2 000 to 40 000) V	0.7 mV/V + 0.4 V 1 mV/V + 8 V	Vitrek 4640A Voltmeter
AC Voltage – Source	(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	 0.32 % of reading + 20 µV 0.11 % of reading + 20 µV 0.18 % of reading + 20 µV 0.19 % of reading + 20 µV 0.3 % of reading + 33 µV 0.9 % of reading + 60 µV 0.25 % of reading + 50 µV 0.05 % of reading + 20 µV 0.1 % of reading + 20 µV 0.16 % of reading + 40 µV 0.24 % of reading + 0.17 mV 0.7 % of reading + 0.33 mV	Fluke 5522A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Source	(0.33 to 3.3) V		Fluke 5522A Multiproduct Calibrator
	(10 to 45) Hz	0.15 % of reading + 0.25 mV	
	45 Hz to 10 kHz	0.03 % of reading + 60 µV	
	(10 to 20) kHz	0.08 % of reading + 60 µV	
	(20 to 50) kHz	0.14 % of reading + 0.3 mV	
	(50 to 100) kHz	0.24 % of reading + 1.7 mV	
	(100 to 500) kHz	0.5 % of reading + 3.3 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	0.12 % of reading + 2.5 mV	
	45 Hz to 10 kHz	0.04 % of reading + 0.6 mV	
	(10 to 20) kHz	0.08 % of reading + 2.6 mV	
	(20 to 50) kHz	0.15 % of reading + 5 mV	
	(50 to 100) kHz	0.24 % of reading + 17 mV	
	(33 to 330) V		
	45 Hz to 1 kHz	0.05 % of reading + 6.6 mV	
	(1 to 10) kHz	0.08 % of reading + 15 mV	
	(10 to 20) kHz	0.09 % of reading + 33 mV	
	(330 to 1 020) V		
	45 Hz to 1 kHz	0.05 % of reading + 80 mV	
	(1 to 5) kHz	0.2 % of reading + 0.1 V	
	(5 to 10) kHz	0.2 % of reading + 0.5 V	
AC Voltage – Measure	(0 to 10) mV		HP 3458A Multimeter
	40 Hz to 1 kHz	365 µV/V + 1.1 µV	
	(1 to 20) kHz	425 µV/V + 1.1 µV	
	(20 to 50) kHz	1.5 µV/mV + 1.1 µV	
	(10 to 100) mV		
	40 Hz to 1 kHz	200 µV/V + 2 µV	
	(1 to 20) kHz	250 µV/V + 2 µV	
	(20 to 50) kHz	450 µV/V + 2 µV	
	(0.1 to 1) V		
	40 Hz to 1 kHz	200 µV/V + 20 µV	
	(1 to 20) kHz	230 µV/V + 20 µV	
	(20 to 50) kHz	450 µV/V + 20 µV	
	(1 to 10) V		
	40 Hz to 1 kHz	200 µV/V + 0.2 mV	
	(1 to 20) kHz	230 µV/V + 0.2 mV	
	(20 to 50) kHz	450 µV/V + 0.2 mV	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage – Measure	(10 to 100) V 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (100 to 1 000) V 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz	 320 µV/V + 2 mV 320 µV/V + 2 mV 560 µV/V + 2 mV 0.5 mV/V + 20 mV 0.8 mV/V + 20 mV 1.5 mV/V + 20 mV	HP 3458A Multimeter
AC Voltage – Measure	(0 to 2 000) V (40 to 100) Hz (100 to 400) Hz (2 000 to 40 000) V (50 to 60) Hz	 11 mV/V + 2 V 14 mV/V + 4 V 8 mV/V + 60 V	Vitrek 4640A Voltmeter
AC Voltage – Measure	(0.001 to 1) V (0 to 10) MHz (10 to 100) MHz	 1.8 mV/V 18 mV/V	BL 1395B Thermal Converter w/ HP 3458A Multimeter
Electrical Calibration of Thermocouple Indicating Systems-Source/Measure	Type E (-250 to -100) °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 Type K (-200 to -100) °C (-100 to 125) °C (125 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C Type R (0 to 250) °C (250 to 400) °C (400 to 1 000) °C (1 000 to 1 767) °C	 0.39 °C 0.13 °C 0.11 °C 0.13 °C 0.17 °C 0.21 °C 0.13 °C 0.13 °C 0.14 °C 0.18 °C 0.26 °C 0.15 °C 0.13 °C 0.21 °C 0.32 °C 0.45 °C 0.29 °C 0.28 °C 0.32 °C	Fluke 5522A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Electrical Calibration of Thermocouple Indicating Systems-Source/Measure	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	 0.37 °C 0.3 °C 0.31 °C 0.36 °C 0.5 °C 0.2 °C 0.15 °C 0.12 °C	Fluke 5522A Multiproduct Calibrator
Amplitude – DC 50 Ω 1 MΩ Amplitude – Square Wave 50 Ω 1 MΩ Leveled Sine Wave Amplitude Flatness Time Marker [2]	 (-2.2 to 2.2) V (-33 to 33) V 1.8 mV to 2.2 V (p-p) 1.8 mV to 105 V (p-p) 5 mV to 5.5 V 50 kHz reference 5 mV to 5.5 V 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz 5 mV to 5.5 V 50 kHz to 100 MHz (100 to 300) MHz 5 s to 100 µs (50 to 2) µs 1 µs to 2 ns	 0.21 % of reading + 0.1 mV 0.2 % of reading + 0.1 mV 0.23 % of reading + 0.1 mV 0.28 % of reading + 0.1 mV 1.8 % of reading + 0.2 mV 3.4 % of reading + 0.3 mV 3.6 % of reading + 0.3 mV 4.7% of reading + 0.3mV 1.8 % of reading + 0.1 mV 2 % of reading + 0.1 mV (20 + 1 000t) µs/s (20 + 15 000t) µs/s 20 µs/s	Fluke 5522A w/ SC600 Multiproduct Calibrator

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Force – Measure	(0 to 100) lbf	0.2 lbf	Chatillon DFS2-100 Force Gage

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Pressure – Measure	(-0.3 to 0.3) psi (-5 to 5) psi (-10 to 10) psi (-14.7 to 75) psi (-14.7 to 100) psi	0.000 05 psi 0.000 59 psi 0.001 2 psi 0.008 8 psi 0.012 psi	Mensor APC600 Pressure Controller
Torque – Measure	(4 to 50) lbf·in (30 to 400) lbf·in (80 to 1 000) lbf·in (20 to 250) lbf·ft	0.4 % of reading 0.4 % of reading 0.4 % of reading 0.4 % of reading	Snap On Versatest w/ TTC400 Transducer
Torque – Measure	(60 to 600) lbf ft	0.4 % of reading	Snap On Versatest w/ 2000-12-02 Transducer

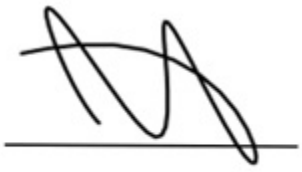
Time and Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Frequency – Source	0.01 Hz to 12 kHz (12 to 120) kHz 120 kHz to 1.2 MHz (1.2 to 2) MHz	63 µHz/Hz + 1 mHz 70 µHz/Hz + 15 mHz 62 µHz/Hz + 15 mHz 290 µHz/Hz + 15 mHz	Fluke 5522A Multiproduct Calibrator
Frequency – Measure	(1 to 40) Hz 40 Hz to 10 MHz	0.6 mHz/Hz 0.2 mHz/Hz	HP 3458A Multimeter

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. t = time in seconds.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. L2299.



Jason Stine, Vice President