



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

VITREK CORPORATION
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CALIBRATION

Valid To: October 31, 2018

Certificate Number: 3678.01

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

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,3} (±)	Comments
DC Voltage – Generate	(0 to 72) V (72 to 140) V (140 to 260) V (260 to 400) V	0.011 % + 16 mV 0.011 % + 32 mV 0.011 % + 60 mV 0.011 % + 100 mV	Fluke 6105A
	(400 to 1000) V	26 µV/V + 100 µV	Valhalla 2701C disciplined by Agilent 3458A
DC Voltage – Measure	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	13 µV/V + 0.3 µV 13 µV/V + 0.3 µV 13 µV/V + 0.5 µV 15 µV/V + 30 µV 26 µV/V + 100 µV	HP 3458A
	(1 to 10) kV (10 to 30) kV (30 to 50) kV (50 to 70) kV (70 to 90) kV	73 µV/V 72 µV/V 98 µV/V 0.016 % 0.024 %	Vitretek 4710

Parameter/Equipment	Range	CMC ^{2,3} (\pm)	Comments
DC Current – Generate	Up to 0.4 A (0.4 to 0.8) A (0.8 to 1.0) A (1.0 to 2) A (2 to 4) A	0.051 % + 200 μ A 0.039 % + 500 μ A 0.05 % + 1000 μ A 0.084 % + 2000 μ A 0.089 % + 2000 μ A	Fluke 6105A
DC Current – Measure	(0 to 0.1) mA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (100 to 1000) mA	38 μ A/A 38 μ A/A 38 μ A/A 51 μ A/A 0.014 %	HP 3458A
Resistance – Generate Fixed Points	0.05 Ω 0.100 Ω 1.0 Ω 10.0 Ω 100.0 Ω 1.0 k Ω 10.0 k Ω 100.0 k Ω 1.0 M Ω 5.0 M Ω 10.0 M Ω 100.0 M Ω 1.0 G Ω	0.066 % 0.015 % 0.072 % 37 $\mu\Omega/\Omega$ 28 $\mu\Omega/\Omega$ 24 $\mu\Omega/\Omega$ 0.018 % 84 $\mu\Omega/\Omega$ 38 $\mu\Omega/\Omega$ 63 $\mu\Omega/\Omega$ 0.014 % 0.021 % 0.06 %	Vitretek 0.05 Ω Vitretek SR502 Vitretek SR502 Vitretek 10 Ω ESI R925C Vitretek 1 k Ω Vitretek 10 k Vitretek 4610 Vitretek 4610 Vitretek CAL 5M Vitretek 4610 Vitretek 4610 Vitretek 4610
Resistance – Measure	Up to 10 Ω (10 to 100) Ω 100 Ω to 1 k Ω (1 to 10) k Ω (10 to 100) k Ω 100 k Ω to 1 M Ω (1 to 10) M Ω (10 to 100) M Ω 100 M Ω to 1 G Ω	0.015 % + 50 $\mu\Omega$ 21 $\mu\Omega/\Omega$ + 500 $\mu\Omega$ 14 $\mu\Omega/\Omega$ + 500 $\mu\Omega$ 14 $\mu\Omega/\Omega$ + 5 m Ω 14 $\mu\Omega/\Omega$ + 50 m Ω 20 $\mu\Omega/\Omega$ + 2.0 Ω 90 $\mu\Omega/\Omega$ + 100 Ω 0.073 % + 1 k Ω 0.62 % + 10 k Ω	HP 3458A

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Voltage – Generate Up to 23 V (23 to 45) V (45 to 90) V (90 to 180) V (180 to 360) V (360 to 650) V (650 to 1008) V 100 V	60 Hz 40 Hz to 100 kHz	1.7 mV 4.0 mV 6.5 mV 13 mV 33 mV 61 mV 95 mV 150 mV	Fluke 6105A Valhalla 2703 disciplined by Agilent 3458A
AC Voltage – Measure (0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (300 to 1000)V (1 to 10) kV (10 to 30) kV (30 to 50) kV (50 to 70) kV	40 Hz to 1 kHz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz 40 Hz to 1 kHz (50 to 60) Hz	83 μV/V + 2.0 μV 83 μV/V + 20 μV 83 μV/V + 2.0 mV 0.024 % + 2.0 mV 0.041 % + 2.0 mV 0.14 % + 2.0 mV 41 μV/V + 2.0 mV 0.028 % 0.019 % 0.016 % 0.022 %	HP 3458A Datron 4920 Vitretek 4710
AC Current – Generate Up to 0.1 A (0.1 to 1.0) A (1.0 to 10.0) A (10.0 to 20.0) A (20.0 to 40.0) A	(50 to 60) Hz	71 μA/A + 2.5 μA 69 μA/A + 10 μA 74 μA/A + 100 μA 73 μA/A + 200 μA 73 μA/A + 500 μA	Fluke 6105A

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Current – Measure (0 to 0.1) mA (0.1 to 1.0) mA (1.0 to 10.0) mA (10.0 to 100.0) mA (100.0 to 1000.0) mA	(45 to 100) Hz	0.14 % + 0.03 μA 0.07 % + 0.2 μA 0.072 % + 2.0 μA 0.072 % + 20 μA 0.095 % + 200 μA	HP 3458A
(1 to 20) A (20 to 40) A	(45 to 100) Hz	0.24 % 0.78 %	HP 3458A with 50 mΩ shunt

¹ This laboratory offers commercial 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 The measurands stated are generated using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure the measurand in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a fraction/percent of the reading plus a fixed floor specification.



Accredited Laboratory

A2LA has accredited

VITREK CORPORATION

Poway, CA

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 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 8 January 2009).



Presented this 28th day of October 2016.

A handwritten signature in blue ink, appearing to read "J. C. Bunt".

Senior Director of Quality and Communications
For the Accreditation Council
Certificate Number 3678.01
Valid to October 31, 2018

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