CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

A&P Calibrations LLC
6920 Koll Center Parkway, Suite 223
Pleasanton, CA 94566

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: 28 April 2025
Certificate Number: AC-1540

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)

A&P Calibrations LLC

6920 Koll Center Parkway, Suite 223
Pleasanton, CA 94566
Cara Rich 925-417-6608

CALIBRATION

Valid to: **April 28, 2025** Certificate Number: **AC-1540**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source [1]	Up to 330 mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1 000) V	0.83 mV 13 µV 0.4 mV 6 mV 0.52 V	Comparison to Fluke 5522A Multiproduct Calibrator
DC Voltage – Measure [1]	Up to 100 mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1 000) V	52 µV 16 µV 10 µV 0.13 mV 0.41 mV	Comparison to Agilent 3458A 8.5 Digit Multimeter
DC Current – Source [1]	Up to 330 µA (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1) A	0.12 mA 0.19 mA 0.21 mA 2.2 mA 12 mA	Comparison to Fluke 5522A Multiproduct Calibrator
DC Current – Measure [1]	Up to 100 nA (0.1 to 1) µA (1 to 100) µA (0.1 to 1) mA (1to 10) mA (10 to 100) mA (0.1 to 1) A	0.89 nA 59 nA 25 µA 11 µA 68 µA 0.23 mA 0.12 mA	Comparison to Agilent 3458A 8.5 Digit Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source/Measure [1]	10 Hz to 500 kHz Up to 33 mV (33 to 330) mV (0.33 to 3.3) V 10 Hz to 100 kHz (3.3 to 33) V (33 to 330) V 45 Hz to 10 kHz (330 to 1 000) V	 1.4 mV 13 mV 0.12 V 0.25 V 0.81 V 1.2 V	Comparisons to Fluke 5522A Multiproduct Calibrator, Agilent 3458A 8.5 Digit Multimeter
AC Current – Source/Measure [1]	10 Hz to 30 kHz (30 to 330) µA (0.33 to 3.3) mA (3.3 to 33) mA 10 Hz to 13 kHz (33 to 330) mA 10 Hz to 10 kHz (0.33 to 1) A	 5.8 µA 47 µA 0.28 mA 8 mA 39 mA	Comparisons to Fluke 5522A Multiproduct Calibrator, Agilent 3458A 8.5 Digit Multimeter
AC Current – Source/Measure [1]	(10 to 60) Hz (1 to 3) A (45 to 60) Hz (3 to 11) A	 0.22 A 0.28 A	Comparison to Fluke 5522A Multiproduct Calibrator, Fluke 321 AC Clamp Meter, 50-turn Coil
Resistance – Source/Measure [1]	1 Ω to 1 kΩ 1 kΩ to 1 MΩ 1 MΩ to 1 GΩ	0.13 Ω 2 mΩ 2.7 Ω	Comparisons to Fluke 5522A Multiproduct Calibrator, Agilent 3458A 8.5 Digit Multimeter
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure [1]	Type J (-196 to 1 000) °C Type K (-196 to 1 000) °C Type T (-100 to 400) °C	0.44 °C 0.37 °C 0.63 °C	Comparison to Fluke 5522A Multiproduct Calibrator

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Balances [1,2]	Up to 1 g (1 to 10) g (10 to 60) g	3.7 µg 4.9 µg/g 9.2 µg/g	ASTM E617 Class 1 Weights and ASTM E898-20 utilized in the calibration of the weighing system.
Balances [1,2]	60 g to 1 kg (1 to 5) kg (5 to 10) kg (10 to 25) kg (25 to 30) kg	0.34 mg 0.12 mg 0.74 mg 2.2 mg 0.25 g	NIST Class F Weights And ASTM E898-20 utilized in the calibration of the weighing system.
Pressure Devices [1]	(0.1 to 300) psig (300 to 1 000) psig	0.015 % of reading + 0.008 6 psi 0.015 % of reading + 0.012 psi	Comparison to Ruska Fluke 7252i Dual Channel Pressure Controller/Calibrator
Pipettes and Other Volumetric Devices [1]	10 µl 20 µl 50 µl 100 µl 200 µl 300 µl 1 ml 2 ml 5 ml 10 ml 20 ml	0.86 µl 1.8 µl 0.96 µl 1.7 µl 1.7 µl 1.2 µl 2.7 µl 2.5 µl 2.5 µl 2.5 µl 2.6 µl	Gravimetric Method per ISO 8655-2 using Mass Balances and Mettler Toledo Calibry Software.
Volumetric Liquid Flow	1 lpm 2 lpm 3 lpm 5 lpm	0.35 lpm 0.62 lpm 0.84 lpm 0.76 lpm	CAL-021 based on ISO 4185 using Mass Balance, Digital Stopwatch, Endress+Hauser Flow Meter

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Devices [1]	-80 °C 100 °C	0.03 °C 0.03 °C	Comparison to PRT, Hart 1521 Thermometer, Hart 2562 and 2565 Black Stacks, Scanner Module

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Devices [1]	(-196 to 400) °C	0.07 °C	Comparison to Hart 5628 SPRT, Hart 1594A Super Thermometer
Humidity Devices [1]	(10 to 95) %RH	0.25 % of reading + 1.1 %RH	Comparison to Rotronic HC2S Humidity Probe

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. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
3. Unless otherwise specified in the far-right column, the laboratory is utilizing an in-house developed calibration procedure.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1540.

Jason Stine, Vice President