



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

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

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

and national standard

ANSI/NCSL Z540-1-1994

while demonstrating technical competence in the field(s) of
CALIBRATION

Refer to the accompanying Scope(s) of Accreditation for information regarding the types of calibrations and/or tests to which this accreditation applies.

AC-1540

Certificate Number

ANAB Approval



Certificate Valid To: 04/28/2017
Version No. 001 Issued: 05/13/2015



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 January 2009).



ANSI-ASQ National Accreditation Board

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

A&P Calibrations, Inc.

6920 Koll Center Parkway Suite 223 Pleasanton, CA 94566
 Doug Willoughby www.apcalibrations.com
dwilloughby@apcalibrations.com Phone: 925-417-6608

CALIBRATION

Valid to: April 28, 2017

Certificate Number: AC-1540

I. Electromagnetic - DC/Low Frequency

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION & MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage - Source ²	Up to 330 mV 330 mV to 3.3V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	0.83 mV 13 µV 0.40 mV 6.0 mV 0.52 V	Fluke 5520A	Direct Measurement by Comparison, CAL-024
DC Voltage - Measure ²	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	52 µV 16 µV 10 µV 0.13 mV 0.41 mV	Agilent 3458A Opt 002	
DC Current - Source ²	Up to 330 µA 330 µA to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1 A	0.12 mA 0.19 mA 0.21 mA 2.2 mA 12 mA	Fluke 5520A	
DC Current - Measure ²	Up to 100 nA 100 nA to 1 µA (1 to 100) µA 100 µA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	0.89 nA 59 nA 25 µA 11 µA 68 µA 0.23 mA 0.12 mA	Agilent 3458A Opt 002	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION & MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Source & Measure ² 10 Hz to 500 kHz 10 Hz to 500 kHz 10 Hz to 500 kHz 10 Hz to 100 kHz 10 Hz to 100 kHz 45 Hz to 10 kHz	Up to 33 mV (33 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	1.4 mV 13 mV 0.12 V 0.25 V 0.81 V 1.2 V	Fluke 5520A with Agilent 3458A	Direct Measurement by Comparison, CAL-024
AC Current - Source & Measure ³ 10 Hz to 30 kHz 10 Hz to 30 kHz 10 Hz to 30 kHz 10 Hz to 13 kHz 10 Hz to 10 kHz (10 to 60) Hz (45 to 60) Hz	(30 to 330) µA 330 µA to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1 A (1 to 3) A (3 to 11) A	5.8 µA 47 µA 0.28 mA 8.0 mA 39 mA 0.22 A 0.28 A	Fluke 5520A with Agilent 3458A Fluke 5520A with Fluke 321 AC Clamp and 50 Turn Coil	
Electrical Simulation of Thermocouples - Source & Measure ² Type J Type K Type T	(-196 to 1 000) °C (-196 to 1 000) °C (-100 to 400) °C	0.44 °C 0.37 °C 0.63 °C	Fluke 5520A	Direct Measurement by Comparison, CAL-003

II. Time and Frequency

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION & MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Frequency - Measure ²	Up to 10 Hz (10 to 100) Hz 100 Hz to 1 MHz (1 to 10) MHz	6.4 mHz 10 mHz 0.15 kHz 0.15 kHz	HP 3325B	Direct Measurement by Comparison, CAL-024

III. Thermodynamic

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION & MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature ²	(-196 to 400) °C	0.07 °C	Hart Scientific 5628 SPRT, Hart Scientific 1590 Super-Thermometer, Hart 2562 Black Stack, Scanner Module, PRT Hart Scientific 1521 Meter Triple Point	Direct Measurement by Comparison, CAL-003

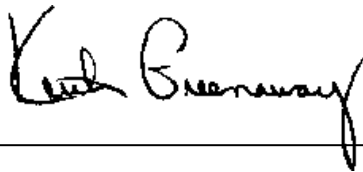
IV. Mechanical

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION & MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Pressure ²	(0.1 to 300) psig (300 to 1 000) psig	0.015 % + 0.0086 psig 0.015 % + 0.012 psig	Ruska Fluke 7252i Dual Channel Pressure Controller/Calibrator	Direct Measurement by Comparison, CAL-005
Pipettes and Other Volumetric Devices ²	2 µl 5 µl 10 µL 20 µL 50 µL 100 µL 200 µL 300 µL 1 mL 2 mL 5 mL 10 mL 20 mL	0.04 µL 0.06 µL 0.06 µL 0.08 µL 0.08 µL 0.22 µL 0.29 µL 0.58 µL 2.9 µL 4.1 µL 8.3 µL 11 µL 32 µL	Volumetric and Gravimetric Calibration Referenced to Mass Balances, ANSI/ASTM E617 Mass Standards, and Pipette Checker Software	Direct Measurement by Comparison, CAL-022

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION & MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Balances ²	Up to 10 mg (10 to 100) mg 100 mg to 1 g (1 to 10) g (10 to 30) g (30 to 40) g (40 to 60) g	0.19 mg 0.19 mg 0.19 mg 0.38 mg 0.19 mg 0.19 mg 0.19 mg	Class 1 Weights	Verification with Class 1 Weights, CAL-004

Notes:

1. Calibration and Measurement Capabilities (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of k=2.
2. This laboratory offers these parameters in its laboratory and on-site at customer-designated locations. 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.
3. This scope is formatted as part of a single document including the Certificate of Accreditation No. AC-1540.



Vice-President