



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

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

This is to certify that

Advanced Technical Services NW, Inc.

8612 South 228th Street

Kent Washington 98031

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

ISO/IEC 17025:2005

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1458

Certificate Number


ANAB Approval

Certificate Valid: 06/07/2018-06/10/2020
Version No. 005 Issued: 06/07/2018



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 April 2017).



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
AND ANSI/NCSL Z540-1-1994 (R2002)**

Advanced Technical Services NW, Inc.

8612 South 228th Street
 Kent, Washington 98031
 Cathy Baldwin (253) 850-1208
 Cathy.b@atsnwinc.com

CALIBRATION

Valid to: **June 10, 2020**

Certificate Number: **AC-1458**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage - Source	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1.02 kV	60 μ V/V + 3 μ V 50 μ V/V + 5 μ V 50 μ V/V + 50 μ V 55 μ V/V + 0.50 mV 55 μ V/V + 1.5 mV	Fluke 5500A Multi Product Calibrator
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 330 mV to 3.3 V (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	3.5 mV/V + 20 μ V 1.5 mV/V + 20 μ V 2 mV/V + 20 μ V 2.5 mV/V + 20 μ V 3.5 mV/V + 33 μ V 10 mV/V + 60 μ V 2.5 mV/V + 50 μ V 0.50 mV/V + 20 μ V 1 mV/V + 20 μ V 1.6 mV/V + 40 μ V 2.4 mV/V + 0.17 mV 7 mV/V + 0.33 mV 1.5 mV/V + 0.25 mV 0.30 mV/V + 60 μ V 0.80 mV/V + 60 μ V 1.4 mV/V + 0.30 mV 2.4 mV/V + 1.7 mV 5 mV/V + 3.3 mV	Fluke 5500A Multi Product Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source	(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz 330 V to 1.02 kV 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.5 mV/V + 2.5 mV 0.40 mV/V + 0.60 mV 0.80 mV/V + 2.6 mV 1.9 mV/V + 5 mV 2.4 mV/V + 17 mV 0.50 mV/V + 6.6 mV 0.80 mV/V + 15 mV 0.90 mV/V + 33 mV 0.60 mV/V + 80 mV 2 mV/V + 0.10 V 2 mV/V + 0.50 V	Fluke 5500A Multi Product Calibrator
DC Current - Source	Up to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 2 A (2 to 10) A	0.13 mA/A + 50 nA 0.10 mA/A + 0.15 μA 0.10 mA/A + 3.3 μA 0.30 mA/A + 44 μA 0.60 mA/A + 0.33 mA	Fluke 5500A Multi Product Calibrator
AC Current - Source	(33 to 330) μA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (330 μA to 3.3 mA) (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	2.5 mA/A + 0.15 μA 1.3 mA/A + 0.15 μA 1.3 mA/A + 0.25 μA 4 mA/A + 0.15 μA 12.5 mA/A + 0.15 μA 2 mA/A + 0.30 μA 1 mA/A + 0.30 μA 1 mA/A + 0.30 μA 2 mA/A + 0.30 μA 6 mA/A + 0.30 μA 2 mA/A + 3 μA 1 mA/A + 3 μA 0.90 mA/A + 3 μA 2 mA/A + 3 μA 6 mA/A + 3 μA	Fluke 5500A Multi Product Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 330 mA to 2.2 A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (2.2 to 11) A (45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	2 mA/A + 30 μ A 1 mA/A + 30 μ A 0.90 mA/A + 30 μ A 2 mA/A + 30 μ A 6 mA/A + 30 μ A 2 mA/A + 0.30 mA 1 mA/A + 0.30 mA 7.5 mA/A + 0.30 mA 0.60 mA/A + 3 mA 1 mA/A + 3 mA 3.3 mA/A + 3 mA	Fluke 5500A Multi Product Calibrator
Resistance - Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω	0.12 m Ω / Ω + 6 m Ω 0.12 m Ω / Ω + 10 m Ω 90 μ Ω / Ω + 10 m Ω 90 μ Ω / Ω + 10 m Ω 90 μ Ω / Ω + 60 m Ω 90 μ Ω / Ω + 60 m Ω 90 μ Ω / Ω + 0.60 Ω 90 μ Ω / Ω + 0.60 Ω 0.11 m Ω / Ω + 6 Ω 0.12 m Ω / Ω + 6 Ω 0.15 m Ω / Ω + 55 Ω 0.15 m Ω / Ω + 55 Ω 0.60 m Ω / Ω + 0.55 k Ω 1 m Ω / Ω + 0.55 k Ω 5 m Ω / Ω + 5.5 k Ω	Fluke 5500A Multi Product Calibrator
Resistance Simulation of RTD Indicators	PT 100 Ω , 385 (-180 to 0) $^{\circ}$ C (0 to 360) $^{\circ}$ C (360 to 750) $^{\circ}$ C	0.012 $^{\circ}$ C 0.012 $^{\circ}$ C 0.019 $^{\circ}$ C	Fluke 5500A Multi Product Calibrator
Millivolt Simulation of Thermocouple Indicators	Type K (-200 to -100) $^{\circ}$ C (-25 to 120) $^{\circ}$ C (120 to 1 000) $^{\circ}$ C (1 000 to 1 372) $^{\circ}$ C	0.28 $^{\circ}$ C 0.17 $^{\circ}$ C 0.23 $^{\circ}$ C 0.33 $^{\circ}$ C	Fluke 5500A Multi Product Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Millivolt Simulation of Thermocouple Indicators	Type J		Fluke 5500A Multi Product Calibrator
	(-200 to -100) °C	0.24 °C	
	(-30 to 150) °C	0.16 °C	
	(150 to 760) °C	0.18 °C	
	Type T		
	(-200 to -100) °C	0.24 °C	
(-30 to 150) °C	0.16 °C		
(150 to 760) °C	0.18 °C		

Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Blocks ²	(0.01 to 4) in	$(2.2 + 3.1L) \mu\text{in}$	Pratt & Whitney UMM, Gage Blocks
Calipers ^{1,2}	Up to 60 in	$(640 + 14L) \mu\text{in}$	Gage Blocks
Micrometers ^{1,2}	Up to 20 in	$(66 + L + 0.56R) \mu\text{in}$	Gage Blocks
Indicators ^{1,2} Dial and Digital	Up to 2 in	$0.6R + 18 \mu\text{in}$	Pratt & Whitney UMM, Gage Blocks
Height Gage ^{1,2}	Up to 60 in	$(640 + 14L) \mu\text{in}$	Gage Blocks

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force (Tension) Load Cells	Up to 750 lbf	0.022 lbf	Class F Weights
Force (Tension) Load Cells	(62 to 1 000) lbf	0.15 lbf	Load Cells
	(810 to 10 000) lbf	0.43 lbf	
	(1 472 to 50 000) lbf	2 lbf	
	(12 364 to 100 000) lbf	17 lbf	
Force (Compression) Load Cells	(0 to 190) lbf	0.006 9 lbf	Class F Weights



Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force (Compression) Load Cells	(29.52 to 505) lbf (200 to 10 000) lbf (2 094.8 to 61 000) lbf (23 652 to 400 000) lbf	0.057 lbf 0.55 lbf 3.1 lbf 35 lbf	Load Cells
Pressure	Up to 100) psi (101 to 200) psi (201 to 300) psi (301 to 500) psi (501 to 1 000) psi (1 001 to 10 000) psi	0.2 psi 0.28 psi 0.44 psi 0.67 psi 0.93 psi 5.4 psi	Pressure Calibrator
Scales ¹	1 to 20 g 20 to 210 g 0.46 to 21 lb 21 to 190 lb 190 to 750 lb	0.000 36 g 0.001 2 g 0.001 4 lb 0.006 9 lb 0.02 lb	Class F Weights

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency - Source	0.01 Hz to 10 kHz (10 to 100) kHz	25 µHz/Hz + 1 mHz 25 µHz/Hz + 15 mHz	Fluke 5500A Multi Product Calibrator

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. L = length in inches, P = applied pressure in psi, R = resolution of unit under test.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1458.

Vice President