



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Antibus Scales & Systems, Inc.
4310 Technology Drive
South Bend, IN 46628

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.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 11 May 2024
Certificate Number: L2253.01



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)

Antibus Scales & Systems, Inc.

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South Bend, IN 46628
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574-233-3160

CALIBRATION

Valid to: **May 11, 2024**

Certificate Number: **L2253.01**

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Current Measure and Source ¹	4 mA 10 mA 20 mA	0.004 mA 0.005 mA 0.006 mA	Fluke Series Process Calibrator
Resistance Source and Measure ¹	(0 to 55) Ω (56 to 250) Ω (251 to 680) Ω	0.11 Ω 0.74 Ω 1.0 Ω	Fluke Series Process Calibrator
Electrical Simulation of RTD Indicating Devices Pt 385 100 Ω ¹	(-180 to 750) $^{\circ}\text{C}$	0.62 $^{\circ}\text{C}$	Fluke Series Process Calibrator
DC Voltage – Source	(0 to 10) mV (11 to 100) mV (0 to 0.15) V (0.16 to 1.0) V (0 to 1.5) V (1.6 to 10) V (11 to 15) V	0.006 3 mV 0.015 mV 0.000 067 V 0.000 15 V 0.000 87 V 0.001 6 V 0.002 1 V	Fluke Series Process Calibrator

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Voltage - Measure	(0.0) mV (0.1 to 100) mV (0.0) V (0.1 to 1.0) V (1.1 to 2.0) V (2.1 to 3.0) V (0.0) V (0.1 to 10) V (11 to 30) V (0.0) V (0.1 to 100) V (101 to 300) V	0.006 7 mV 0.026 mV 0.000 071 V 0.000 26 V 0.000 45 V 0.000 65 V 0.000 57 V 0.002 5 V 0.006 5 V 0.051 V 0.11 V 0.21 V	Fluke Series Process Calibrator
Electrical Simulation of Thermocouple Indicating Devices ¹	Type K (-195 to 1 260) °C Type J (0 to 760) °C Type T (-195 to 370) °C	0.87°C 0.87°C 0.87°C	Fluke Series Process Calibrator

Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) ²	Reference Standard, Method and/or Equipment
End Standards	(Up to 12) in	36 µin	Gage Blocks and P & W LMU 175
Rules and Scales	(0 to 72) in	0.013 in	Gage Blocks and magnifier
Plug / Pin Gages ¹	Up to 4 in	28 µin	P&W LMU 175 and Gage Blocks
Thread Wires (80 to 6) TPI	(0.007 to 0.097) in	19 µin	P&W LMU 175 and Gage Blocks
Gage Blocks	(0.005 to 4) in (4 to 12) in	(3 + 1.6L) µin (7.8 + 0.66L) µin	Comparator and Gage Blocks
OD Cylinder Gages	(0 to 1) in (1 to 10) in	(10 + 1.5L) µin (11 + 6L) µin	P&W LMU 175 and Gage Blocks

Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) ²	Reference Standard, Method and/or Equipment
Ring Gages	(0.04 to 1) in (1 to 12) in	(10 + 1.5L) μin (11 + 6L) μin	P&W LMU 175 and Gage Blocks
Thread Plugs ¹ Pitch Diameter (80 to 6) TPI Major Diameter	(0.007 to 0.097) in Up to 4 in	(121 + 0.12L) μin (42 + 0.33L) μin	P&W LMU 175 Gage Blocks Thread Wires
Root Radius & Minor Diameter	(0.06 to 4) in	(216 + 0.05L) μin	Optical Comparator
Almen Kit Step Blocks Depth Flatness	(0.005 to 0.025) in (0.2 to 0.6) mm (0 to 2) inD	40 μin 1 μm 0.05 μm	Gage Blocks and Electronic Indicator Optical Flat
Height Gages ¹ 0.000 1 in resolution 0.001 in resolution	(0 to 24) in	79 μin (577 + 0.07L) μin	Gage Blocks
Indicators ¹ 0.000 05 in resolution 0.000 1 in resolution 0.000 5 in resolution 0.001 in resolution	(0 to 6) in	(29 + 0.28L) μin (58 + 0.14L) μin (289 + 0.04L) μin (577 + 0.02L) μin	Gage Blocks
Calipers ¹ 0.000 5 in resolution 0.001 in resolution	(0 to 40) in	(289 + 0.26L) μin (577 + 0.13L) μin	Gage Blocks
OD Micrometers ¹ 0.000 05 in resolution 0.000 1 in resolution 0.001 in resolution	(0 to 4) in (0 to 12) in (0 to 24) in	(29 + 0.4L) μin (58 + 0.46L) μin (578 + 0.1L) μin	Gage Blocks
Bore Gages ¹	(0.25 to 6) in	586 μin	Master Ring and Gage Blocks
Almen Gauges Indicator Accuracy	(0.005 to 0.025) in (0.2 to 0.6) mm	80 μin 2 μm	Step Blocks
Depth Gages ¹ 0.000 1 in resolution 0.001 in resolution	(0 to 12) in	(289 + 0.05L) μin (577 + 0.03L) μin	Depth Standard/Gage Blocks
Optical Comparators ¹ Linear Travel Angle	(0 to 10) in Angle 0° to 90°	141 μin 0.1 °	Gage Blocks/Gage Balls/Sine Bar
Protractors Angle	(0 to 90) °	0.10 °	Gage Blocks and Sine Bar
Angle	(0 to 90) °	0.81 °	Optical Comparator

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Force Gages & Cells ^{1,6} : UUTs with accuracies $\leq 0.1\%$	(0 to 10 000) lbf	1d + 0.033% load	Class F/6 Weights
Force Gages & Cells ^{1,6} : UUTs with accuracies $> 0.1\%$	(0 to 30 000) lbf	1d + 0.1% load	Class F/6 Weights
Force – Tension and Compression: UUTs with accuracies $\leq 0.1\%$ ⁶	(0 to 4 999) lbf (5 000 to 9 999) lbf (10 000 to 100 000) lbf	1d + 0.072% load 1d + 0.051% load 1d + 0.035% load	Morehouse Precision Test Stand
Force – Tension and Compression: UUTs with accuracies $> 0.1\%$ ⁶	(0 to 1 000) lbf (1 001 to 100 000) lbf	1d + 0.18% load 1d + 0.17% load	Morehouse Precision Test Stand
Force – Tension and Compression ^{1,6}	(0 to 100 000) lbf	1d + 0.2% load	Load Cells
Durometers (Type A & D) Spring Force Indenter Dimensions Length Diameter Radius Angel	(20 to 90) Duro (10 to 90) Duro (0 to 0.2) in (0 to 35) Deg	1.1 Duro 1.8 Duro 0.000 49 in 0.56 Deg	Direct Verification via ASTM D 2240 Balance Durometer Calibrator Optical Comparator Optical Comparator

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Rockwell Hardness Testers (Regular) ¹	HRA High Middle Low	1.4 HRA	Indirect Verification per ASTM E 18 Hardness Test Blocks
	HRBW High Middle Low	1.9 HRBW	
	HRC High Middle Low	1.4 HRC	
Rockwell Hardness Testers (Superficial) ¹	HR15N High Middle Low	1.4 HR15N	Indirect Verification per ASTM E 18 Hardness Test Blocks
	HR15TW High Middle Low	1.9 HR15TW	
	HR30N High Middle Low	1.4 HR30N	
	HR30TW High Middle Low	1.9 HR30TW	

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Brinell Hardness Tester ¹	HBW 10/3 000 High Diameter Hardness HBW 10/3 000 Low Diameter Hardness HBW 10/1 500 High Diameter Hardness HBW 10/1 500 Low Diameter Hardness HBW 10/500 High Diameter Hardness HBW 10/500 Low Diameter Hardness	0.089 mm 33 HBW 0.089 mm 11 HBW 0.089 mm 23 HBW 0.089 mm 9.9 HBW 0.089 mm 11 HBW 0.089 mm 4.3 HBW	Indirect Verification per ASTM E10-14
Class F,6 and lower Mass Standards	20 lb 25 lb 50 lb 500 lb 1 000 lb 10 kg 20 kg 25 kg	0.000 42 lb 0.000 52 lb 0.001 lb 0.011 lb 0.021 lb 0.23 g 0.41 g 0.51 g	Modified Substitution
Lab Balances ^{1,6} Five & Six Place Balances	(0 to 500) g	1d + 0.0041% of load	Class 1 Weights and NIST Handbook 44 utilized for the Calibration of Weighing Systems
Four Place and Class 1 Equivalent Balances	(0 to 8 000) g	1d + 0.000 3% of load	
Class 2 & High Precision Scales	(0 to 8 000) g	0.6d + 0.000 07% of load	
Lab Balances and High Precision Scales ^{1,6}	(0 to 150) kg	1d + 0.001 2% of load	Class 2 and/or 3 Weights with Substitution to range of use Systems

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
High Resolution Unmarked Scales ^{1,6}	(0 to 5 000) kg (0 to 50 000) lb	1d + 0.012% of load 1d + 0.012% of load	Class F,6 Weights with Substitution to range of use
Industrial and Commercial Scales ^{1,4,6}	(0 to 5 000) kg (0 to 200 000) lb	1d + 0.004% of load 1d + 0.004% of load	Class F,6 Weights and NIST Handbook 44 utilized for the Calibration of Weighing Systems
Torque Analyzers – Fixed Points	(1 to 10) ozf·in (10 to 50) ozf·in (4 to 50) lbf·in (30 to 400) lbf·in (80 to 1 000) lbf·in (20 to 250) lbf·ft (60 to 600) lbf·ft (200 to 2 000) lbf·ft	0.096 % of reading 0.061 % of reading 0.076 % of reading 0.062 % of reading 0.071 % of reading 0.062 % of reading 0.070 % of reading 0.074 % of reading	Torque Arm and Class F/6 Weights
Torque Wrench ¹ With Accuracies of 0 to 1.5% With Accuracies > 1.5%	(1 ozf·in to 2 000 lbf·ft) (1 ozf·in to 2 000 lbf·ft)	1.2 % of reading 2.6 % of reading	Torque Analyzer
Pressure - Pneumatic ^{1,6}	(0 to 30) psi (31 to 500) psi (501 to 1 000) psi (1 001 to 5000) psi (5 000 to 10 000) psi	0.5d + 0.13 psi 0.5d + 0.39 psi 0.5d + 1.6 psi 0.5d + 4.0 psi 0.5d + 8.5 psi	Pressure Transducer
Vacuum ^{1,6}	(-15 to 0) psi	0.5d + 0.039 psi	Vacuum Transducer

Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Humidity Indicators ^{1,6}	11%RH 33 %RH 75 %RH 97%RH	0.98 %RH 1.1 %RH 1.4 %RH 1.6 %RH	Saturated Salts & Capacitive Probe
	(0 to 80) %RH	1.9 %RH	Rotrotronic Hygropalm ¹

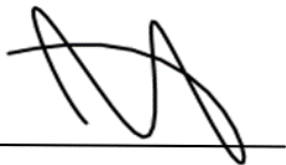
Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Temperature indicators, probe systems and environmental data loggers ¹ (UUTs reading by 0.01 °C) (UUTs reading by 0.1 °C) (UUTs reading by 1.0 °C)	 (-80 to 300) °C (-80 to 300) °C (-80 to 300) °C	 0.052 °C 0.079 °C 1.2 °C	Temperature Chamber and Fluke Temperature Indicator
Temperature Indicators and probe systems ¹ (UUTs reading by 0.01 °C) (UUTs reading by 0.1 °C) (UUTs reading by 1.0 °C)	 (35 to 300) °C (35 to 375) °C (35 to 375) °C	 0.052 °C 0.53 °C 0.78 °C	Fluke Drywell and Temperature Calibrator
Temperature Indicators and probe systems ¹ (UUTs reading by 0.01 °C) (UUTs reading by 0.1 °C) (UUTs reading by 1.0 °C)	 (-5 to 125) °C (-5 to 125) °C (-5 to 125) °C	 0.052 °C 0.74 °C 0.93 °C	Fluke Temperature Bath and Temperature Calibrator
Temperature – Measure ¹ (Ovens and Freezers)	(-195 to 1 260) °C	1.3 °C	Fluke Series Process Calibrator, Thermocouples
Infrared Thermometers ¹	(0 to 35) °C (36 to 100) °C (100 to 350) °C (350 to 500) °C (500) °C (501 to 800) °C (801 to 1 000) °C (1 001 to 1 150) °C	0.62 °C 1.0 °C 2.2 °C 2.9 °C 7.3 °C 9.6 °C 12 °C 13 °C	Fluke 4181 IR Calibrator $\lambda = (8 \text{ to } 14) \mu\text{m}$ $\varepsilon = (0.9 \text{ to } 1.0)$ Cyclops 160L IR Calibrator $\lambda = (8 \text{ to } 14) \mu\text{m}$ $\varepsilon = (0.98 \text{ to } 1.0)$
Uniformity Survey of Furnaces & Ovens	(0 to 250) °F (251 to 800) °F (801 to 1300) °F	3.2 °F 4.1 °F 6.9 °F	In accordance with AMS2750 using a data logger and Type J Thermocouples

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, D = Diameter in inches
3. High Resolution Unmarked Scales include high resolution scales not complying with the accuracy class parameters of Table 3 of NIST Handbook 44.
4. Industrial Scales include but are not limited to lab balances, bench scales, floor scales, tank and hopper scales, and vehicle scales.
5. Antibus Scales & Systems, Inc has resident technicians located in Bowling Green, OH.
6. When the uncertainty of measurement is significantly impacted by the UUT's resolution, then the uncertainty may be expressed as a formula using the UUT's resolution, represented by "d"
7. This scope is formatted as part of a single document including Certificate of Accreditation No. L2253.01.



Jason Stine, Vice President

