



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.

A handwritten signature in black ink, appearing to read 'R.D.L.', is positioned above a solid horizontal line.

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.

4310 Technology Drive
South Bend, IN 46628
Brent Amor
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) °C	0.62 °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	0.006 7 mV	Fluke Series Process Calibrator
	(0.1 to 100) mV	0.026 mV	
	(0.0) V	0.000 071 V	
	(0.1 to 1.0) V	0.000 26 V	
	(1.1 to 2.0) V	0.000 45 V	
	(2.1 to 3.0) V	0.000 65 V	
	(0.0) V	0.000 57 V	
	(0.1 to 10) V	0.002 5 V	
	(11 to 30) V	0.006 5 V	
	(0.0) V	0.051 V	
(0.1 to 100) V	0.11 V		
(101 to 300) V	0.21 V		
Electrical Simulation of Thermocouple Indicating Devices ¹	Type K (-195 to 1 260) °C	0.87°C	Fluke Series Process Calibrator
	Type J (0 to 760) °C	0.87°C	
	Type T (-195 to 370) °C	0.87°C	

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	(2.7 + 1.3L) μin	Comparator and Gage Blocks
	(4 to 12) in	(7.8 + 0.66L) μin	
OD Cylinder Gages	(0 to 1) in	(10 + 1.5L) μin	P&W LMU 175 and Gage Blocks
	(1 to 10) in	(11 + 6L) μin	

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

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
ASTM D 2240, Direct Verification of Types A, D, & Durometers, Force Indenter Extension Indenter Diameter Indenter Tip Radius Indenter Tip Angle	(20 to 90) Duro (0 to 0.2) in (0 to 35) Deg	0.60 Duro 190 μ in 0.10 Deg	Balance Optical Comparator Optical Comparator



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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	0.089 mm 33 HBW	Indirect Verification per ASTM E10-14	
	HBW 10/3 000 Low Diameter Hardness	0.089 mm 11 HBW		
	HBW 10/1 500 High Diameter Hardness	0.089 mm 23 HBW		
	HBW 10/1 500 Low Diameter Hardness	0.089 mm 9.9 HBW		
	HBW 10/500 High Diameter Hardness	0.089 mm 11 HBW		
	HBW 10/500 Low Diameter Hardness	0.089 mm 4.3 HBW		
	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 0 lb 0.011 lb 0.021 lb 0.23 g 0.41 g 0.51 g		Modified Substitution
	Class F,6 and lower Mass Standards			
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 + 0.00030% of load		
Class 2 & High Precision Scales	(0 to 8 000) g	0.6d + 0.000070% of load		
Lab Balances and High Precision Scales ^{1,6}	(0 to 150) kg	1d + 0.0012% of load	Class 2 and/or 3 Weights with Substitution to range of use Systems	



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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 + 0.0040% of load 1d + 0.0040% 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 ^{1,5,6}	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	Rotronic 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	0.62 °C 1.0 °C 2.2 °C 2.9 °C	Fluke 4181 IR Calibrator $\lambda = (8 \text{ to } 14) \mu\text{m}$ $\epsilon = (0.9 \text{ to } 1.0)$
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.



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