



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

**Instech Calibration Services cc
5 Marignane Drive, Bonaero Park
Kempton Park, South Africa, 1619**

Fulfills the requirements of

ISO/IEC 17025:2017

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 horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU
Expiry Date: 25 September 2024
Certificate Number: L2428



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

Instech Calibration Services cc

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CALIBRATION

Valid to: **September 25, 2024**

Certificate Number: **L2428**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Measure ¹	(1 to 20) nF	23 pF	Fluke 8588A Reference Multimeter
	(20 to 200) nF	0.16 nF	
	200 nF to 2 μ F	1.6 nF	
	(2 to 20) μ F	0.10 μ F	
	(20 to 200) μ F	1.1 μ F	
	200 μ F to 2 mF	11 μ F	
Capacitance – Source ¹	(2 to 10) mF	51 μ F	Fluke 5502A Multiproduct Calibrator
	(220.0 to 399.9) pF	12 pF	
	(0.4 to 10.999) nF	3 pF	
	(11 to 32.999) nF	0.15 nF	
	(33 to 109.99) nF	0.29 nF	
	(110 to 329.99) nF	1 nF	
	(0.33 to 1.099 9) μ F	2.9 nF	
	(1.1 to 3.299 9) μ F	10 nF	
	(3.3 to 10.999) μ F	29 nF	
	(11 to 32.999) μ F	0.14 μ F	
	(33 to 109.99) μ F	0.45 μ F	
	(110 to 329.99) μ F	1.5 μ F	
	(0.33 to 1.099 9) mF	4.3 μ F	
	(1.1 to 3.299 9) mF	0.01 mF	
	(3.3 to 10.999) mF	0.04 mF	
(11 to 32.999) mF	0.22 mF		
(33 to 110.00) mF	0.93 mF		



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DC Current – Measure ¹	(0 to 200) μ A 200 μ A to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A	2.5 pA 24 pA 0.32 μ A 13 μ A 0.36 mA	Fluke 8588A Reference Multimeter	
	(2 to 10) A (10 to 20) A	2.8 mA 16 mA		
DC Current – Measure ¹	(10 to 1 025) A	2.3 % of Reading	Fluke 376 Clamp Meter	
	(10 to 600) A	0.22 % of reading	Fluke 8846A Multimeter with DC Shunt	
	(0 to 329.999) μ A (330 to 3.299 99) mA (3.3 to 32.999 9) mA (33 to 329.999) mA (0.33 to 1.099 99) A (1.1 to 2.999 99) A (3.3 to 10.999 9) A (11 to 20.5) A	0.05 μ A 0.32 μ A 2.8 μ A 28 μ A 0.4 mA 10 mA 5.1 mA 17 mA	Fluke 5502A Multiproduct Calibrator	
DC Current – Simulate ¹ Clamp Meters	(20.5 to 1 025) A	0.48 % of output		Fluke 5502A Multiproduct Calibrator & Current Coil
AC Current – Measure ¹	10 Hz to 5 kHz (0 to 100) μ A (0.1 to 1) mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 10) A (10 to 20) A	2.1 μ A 2.4 μ A 7.7 μ A 66 μ A 0.72 mA 11 mA 20 mA		Fluke 8588A Reference Multimeter
	(10 to 1 025) A (10 to 100) Hz	2.3 % of reading	Fluke 376 Clamp Meter	
	(10 to 1 500) A (10 to 100) Hz	0.38 % of reading	Current Transformer with Fluke 8846A Multimeter	
AC Current – Generate ¹	(0.03 to 0.33) mA (10 to 20) Hz (20 to 45) Hz (45 Hz to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.58 μ A 0.46 μ A 0.39 μ A 0.87 μ A 2.2 μ A 4.4 μ A	Fluke 5502A Multiproduct Calibrator	

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AC Current – Generate ¹	(0.33 to 3.3) mA		Fluke 5502A Multiproduct Calibrator
	(10 to 20) Hz	5.2 μ A	
	(20 to 45) Hz	3.3 μ A	
	(45 Hz to 1) kHz	2.7 μ A	
	(1 to 5) kHz	5.2 μ A	
	(5 to 10) kHz	13 μ A	
	(10 to 30) kHz	26 μ A	
	(3.3 to 33) mA		
	(10 to 20) Hz	47 μ A	
	(20 to 45) Hz	24 μ A	
	45 Hz to 1 kHz	12 μ A	
	(1 to 5) kHz	22 μ A	
	(5 to 10) kHz	53 μ A	
	(10 to 30) kHz	0.11 mA	
	(33 to 330) mA		
	(10 to 20) Hz	0.47 mA	
	(20 to 45) Hz	0.24 mA	
	(45 Hz to 1) kHz	0.12 mA	
	(1 to 5) kHz	0.34 mA	
	(5 to 10) kHz	0.58 mA	
	(10 to 30) kHz	1.2 mA	
	(0.33 to 1.1) A		
	(10 to 45) Hz	1.6 mA	
	(0.45 to 1) Hz	0.51 mA	
	(1 to 5) kHz	5.8 mA	
	(5 to 10) kHz	25 mA	
	(1.1 to 3) A		
	(10 to 45) Hz	4.2 mA	
	(0.45 to 1) Hz	1.5 mA	
	(1 to 5) kHz	15 mA	
(5 to 10) kHz	61 mA		
(3 to 11) A			
45 to 100 Hz	6.3 mA		
100 Hz to 1 kHz	9.3 mA		
1 kHz to 5 kHz	0.23 A		
(11 to 20.5) A			
45 to 100 Hz	0.02A		
100 Hz to 1 kHz	0.16A		
1 kHz to 5 kHz	0.47A		



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Simulate ¹ Clamp Meters	(20.5 to 1025) A (45 to 65) Hz (65 to 440) Hz	0.3 % of reading 0.7 % of reading	Fluke 5502A Multiproduct Calibrator & Current Coil
DC Power – Generate ¹	33 mV to 1 020 V 3.3 mA to 20.5 A	0.1 % of reading	Fluke 5502A Multiproduct Calibrator
AC Power – Generate ¹ PF = 1	33 mV to 1 020 V 3.3 mA to 20.5A (45 to 65) Hz	0.2 % of reading	Fluke 5502A Multiproduct Calibrator
Resistance – Measure ¹	(0 to 20) Ω (20 to 200) Ω (0.2 to 2) kΩ (2 to 20) kΩ (20 to 200) kΩ (0.2 to 2) MΩ (2 to 20) MΩ (20 to 200) MΩ (0.2 to 2) GΩ	0.62 mΩ 2.2 mΩ 22 mΩ 0.24 Ω 6.1 Ω 40 Ω 2.1 kΩ 40 kΩ 4.5 MΩ	Fluke 8588A Reference Multimeter
HV Resistance Measure ¹	(1 to 20) MΩ (20 to 200) MΩ (0.2 to 2) GΩ (2 to 20) GΩ	5.3 kΩ 20 kΩ 1.4 MΩ 30 MΩ	Fluke 8588A Reference Multimeter
Resistance – Generate ¹	(0.001 to 33) Ω (33 to 330) Ω 330 Ω to 3.3 kΩ (3.3 to 33) kΩ (33 to 330) kΩ 330 kΩ to 3.3 MΩ (3.3 to 33) MΩ (33 to 330) MΩ (330 to 1 100) MΩ	0.013 % of reading 0.007 % of reading 0.007 % of reading 0.007 % of reading 0.01 % of reading 0.012 % of reading 0.08 % of reading 0.4 % of reading 1.2 % of reading	Fluke 5502A Multiproduct Calibrator
	(0.1 to 100) MΩ 1 GΩ 10 GΩ	1.4 % of reading 12 MΩ 28 MΩ	High Voltage Reference Resistance Box
Temperature Simulation for RTD Temperature Indicators ¹	PT385, 100 Ω (-200 to 100) °C (100 to 630) °C (630 to 800) °C PT385, 1 000 Ω (-200 to 100) °C (100 to 600) °C	0.05 °C 0.09 °C 0.18 °C 0.03 °C 0.05 °C	Fluke 5502A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Measure ¹	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1 000) V	3.1 μ V 14 μ V 0.15 mV 1.6 mV 7.6 mV	Fluke 8588A Reference Multimeter
DC Voltage – Measure ¹	(1 to 40) kV	1.6 % of reading	Fluke 80k-40 High Voltage Probe with Multimeter
DC Voltage – Generate ¹	(0 to 330) mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (100 to 1 020) V	18 μ V 0.13 mV 1.3 mV 14 mV 44 mV	Fluke 5502A Multiproduct Calibrator
DC Voltage – Generate ¹	(1 to 30) kV	1.6 % of reading	Fluke 80k-40 with Multimeter and Power Supply
AC Voltage – Measure ¹	10 Hz to 30 kHz (0 to 10) mV (10 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1 000) V 30 kHz to 100 kHz (0 to 10) mV (10 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V 100 kHz to 300 kHz (0 to 10) mV (10 to 100) mV (0.1 to 1) V (1 to 10) V	7.8 μ V 27 μ V 0.25 mV 2.5 mV 25 mV 0.31 V 32 μ V 0.06 mV 0.59 mV 5.9 mV 0.06 V 0.11 mV 0.24 mV 2.4 mV 31 mV	Fluke 8588A Reference Multimeter
AC Voltage – Measure ¹	(1 to 28) kV 50 Hz	4 % of reading	Fluke 80k-40 High Voltage Probe with Multimeter



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Generate ¹	(1 to 33) mV		Fluke 5502A Multiproduct Calibrator
	(10 to 45) Hz	53 μ V	
	45 Hz to 10 kHz	36 μ V	
	(10 to 20) kHz	53 μ V	
	(20 to 50) kHz	66 μ V	
	(50 to 100) kHz	0.11 mV	
	(100 to 500) kHz	0.32 mV	
	(33 to 330) mV		
	(10 to 45) Hz	0.14 mV	
	45 Hz to 10 kHz	0.09 mV	
	(10 to 20) kHz	0.2 mV	
	(20 to 50) kHz	0.28 mV	
	(50 to 100) kHz	0.71 mV	
	(0.33 to 3.3) V		
	(10 to 45) Hz	1.34 mV	
	45 Hz to 10 kHz	0.81 mV	
	(10 to 20) kHz	1.8 mV	
	(20 to 50) kHz	2.6 mV	
	(50 to 100) kHz	6 mV	
	(100 to 500) kHz	134 mV	
	(3.3 to 33) V		
(10 to 45) Hz	13 mV		
45 Hz to 10 kHz	8.1 mV		
(10 to 20) kHz	18 mV		
(20 to 50) kHz	26 mV		
(50 to 100) kHz	60 mV		
(33 to 330) V			
45 Hz to 1 kHz	0.13 V		
(1 to 10) kHz	0.21 V		
(10 to 20) kHz	0.23 V		
(20 to 50) kHz	0.31 V		
(50 to 100) kHz	0.67 V		
(330 to 1 020) V			
45 Hz to 1 kHz	0.41 V		
(1 to 5) kHz	0.64 V		
(5 to 10) kHz	0.72 V		
AC Voltage – Generate ¹	(1 to 20) kV 50 Hz	4.6 % of reading	Fluke 80k-40 High Voltage Probe with Multimeter and Power Supply

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Simulation for Thermocouple Temperature Indicators, Controllers, Recorders, and Simulators ¹	Type K (-100 to 1 000) °C	0.22 °C	Fluke 5502A Multiproduct Calibrator
	(1000 to 1 372) °C	0.32 °C	
	Type J (-100 to 600) °C	0.16 °C	
	Type T (-250 to 0) °C	0.5 °C	
	(0 to 400) °C	0.16 °C	
	Type S (0 to 1 767) °C	0.37 °C	
Type R (0 to 250) °C	0.45 °C		
	(250 to 1 767) °C	0.32 °C	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thickness Gauges ^{1,4}	11 µm	2 µm	Calibration Foils
	21 µm	2 µm	
	49 µm	2 µm	
	75 µm	2 µm	
	128 µm	2.1 µm	
	189 µm	2.1 µm	
	475 µm	2.4 µm	
	603 µm	3 µm	
	1 045 µm	2.5 µm	
1 570 µm	3.6 µm		
Thickness Gauges ^{1,2} (Ultrasonic, Magnetic and Eddy Current)	(2 to 25) mm	0.004L mm	Grade 1 Gauge Blocks and Micrometer

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pneumatic Absolute Pressure ¹	(0 to 200) kPa	0.48 mbar	Druck Vacuum Gage and Vacuum Pump

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pneumatic Gauge Pressure ¹	(-80 to 0) kPa (0 to 20) kPa (20 to 700) kPa (0.7 to 6) MPa	0.12 kPa 6 Pa 0.16 kPa 1 kPa	Wika & Druck Pressure Gages and Pneumatic Pump
Hydraulic Gauge Pressure ¹	(-80 to 0) kPa (0 to 700) kPa (0.7 to 7) MPa (7 to 60) MPa (60 to 70) MPa	0.12 kPa 0.16 kPa 1.3 kPa 0.2 bar 0.29 bar	Wika & Druck Pressure Gages and Comparator
Autoclave Gauge Pressure ¹	(0 to 700) kPa	0.15 kPa	Wika & Druck Pressure Gages and Pneumatic Pump
Mass Pieces ¹	(0.1 to 1) g (1.000 1 to 10) g (10.000 1 to 50) g (50.000 1 to 100) g (100.000 1 to 200) g (200.000 1 to 500) g (500.01 to 2 000) g (2 000.01 to 3 000) g (3 000.01 to 5 000) g (5.01 to 20.000) kg (20.01 to 100.000) kg (100.01 to 200.00) kg (200.01 to 300.00) kg (300.01 to 400.00) kg	0.16 mg 0.27 mg 0.39 mg 0.63 mg 1.3 mg 8.8 mg 15 mg 21 mg 0.24 g 10 g 48 g 58 g 72 g 87 g	OIML Class F1 and M2 Mass Standards by Substitution
Scales and Balances ^{1,3}	(0 to 100) g (0 to 200) g (0 to 500) g (0 to 1 000) g (0 to 3 000) g (0 to 5 000) g	0.63 mg 1.3 mg 8.8 mg 11 mg 21 mg 0.24 g	OIML Class F1 Mass Standards
Scales and Balances ^{1,3}	(0 to 10) kg (0 to 20) kg (0 to 100) kg (0 to 200) kg (0 to 300) kg (0 to 400) kg	9 g 9.2 g 48 g 58 g 72 g 87 g	OIML Class M2 Mass Standards
Torque Screwdrivers and Wrenches ^{1,2} (CW Only)	(1 to 10) N·m (10 to 50) N·m (50 to 1 000) N·m	0.15 N·m 0.68 N·m 0.0047 N·m	Torque Analyser, Torque Transducer with Display

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermo-Hygrometers - Loggers and Indicators	(11, 33, 53, 75, 90) %RH (18 to 28) °C	1.1 %RH 0.4 °C	Reference Hygrometer and Chambers
Humidity and Temperature Indicators ¹	(11 to 90) %RH (10 to 50) °C	2.7 %RH 1.1 °C	Reference Datalogger
Radiation (IR) Temperature Measurement Equipment ¹	50 °C 100 °C 150 °C 200 °C 250 °C 300 °C 350 °C 400 °C 450 °C 500 °C	2.2 °C 2.3 °C 2.7 °C 2.7 °C 5.8 °C 5.9 °C 5.9 °C 6.6 °C 6.6 °C 6.6 °C	Portable IR Calibrator $\epsilon = 0.95, \lambda = (8 \text{ to } 14) \mu\text{m}$
Liquid in Glass Thermometers ¹	0 °C	0.31 °C	PRT with Multimeter and ice point
	(10 to 90) °C	0.31 °C	PRT with Multimeter and water bath
Digital and Mechanical Thermometers and Temperature Measuring Systems ¹	(- 15 to -20) °C	0.07 °C	PRT and Alcohol NaCl slurry
	0 °C	0.07 °C	PRT and ice point
	(10 to 90) °C	0.08 °C	PRT and water bath
	(50 to 400) °C	0.08 °C	PRT and dry block
	(400 to 1 200) °C	3.3 °C	Type R TC and dry block
Temperature Uniformity Survey ¹	(-70 to 1 000) °C	2.6 °C	Type K TC and display unit
	(-20 to 200) °C	0.4 °C	RTD and display unit
System Accuracy Test ¹	(-70 to 1 000) °C	2.6 °C	Type K TC and display unit
Autoclave Temperature Uniformity Survey & Accuracy Test ¹	(0 to 200) °C	2.6 °C	Type K TC and display unit


Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Measure ¹	(0.1 to 10) Hz 10 Hz to 100 MHz	0.06 % of reading 0.01 % of reading	Fluke 8588A Reference Multimeter
Frequency – Generate ¹	(0.01 to 120) Hz (0.12 to 1.2) kHz (1.2 to 12) kHz (12 to 120) kHz (0.12 to 1.2) MHz (1.2 to 2) MHz	4 mHz 31 mHz 0.3 Hz 3 Hz 30 Hz 50 Hz	Fluke 5502A Multiproduct Calibrator
Stopwatches ¹	(1 to 86 400) s	0.2 s	HP 5228A Counter
Autoclave Timers ¹	(1 to 120) minutes	1 s	Stopwatch
Tachometers ¹ Contact Type	(10 to 500) rpm (501 to 2 999) rpm	0.5 rpm 1 rpm	VSD Motor with rpm indicator
Tachometers ¹ Non-Contact Type	(10 to 500) rpm (501 to 2 999) rpm (3 000 to 6 000) rpm	0.5 rpm 1 rpm 1.7 rpm	

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 mm, T = Torque in N-m.
3. The uncertainties for scales and balances is highly dependent upon the resolution of the unit under test. The uncertainties 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.
4. The nominal values listed are approximate.
5. This scope is formatted as part of a single document including Certificate of Accreditation No. L2428.



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