Laboratory Accreditation Programmes

Schedule to

CERTIFICATE OF ACCREDITATION

Celemetrix NZ **Client Number 9759**

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Authorised Representative
Mr Jason Dortmans
Technical Director

Programme
Metrology & Calibration Laboratory

Accreditation Number 1396 **Initial Accreditation Date** 29 October 2021

Conformance Standard
ISO/IEC 17025:2017
General requirements for the competence of testing and calibration laboratories

Laboratory Services Summary

5.61	Temperature Measuring Equipment
5.88	Calibrators for Instrumentation
5.89	Indicating Instruments and Recording Instruments

Key Technical Personnel

Mr Jason Dortmans	5.61, 5.88, 5.89
Mr Michael MacAulay	5.61, 5.88, 5.89

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Calibration and Measurement Capability (CMC) uncertainties are expressed as an expanded uncertainty corresponding to a level of confidence of 95 % Note1.

Measurement results are traceable to the International System of Units (SI) via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

Calibrations are performed in a controlled environment at 23 °C ±5 °C.

5.61 Temperature Measuring Equipment

(o) Indicators, recorders and controllers
(p) Other direct reading temperature measuring equipment

Calibration of thermometers by electrical simulation and measurement to an in-house method based on manufacturer's recommendations

Range	CMC Uncertainty
RTD Simulation	
-200 °C to 0 °C	0.06 °C
0 °C to 100 °C	0.06 °C
100 °C to 400 °C	0.06 °C
400 °C to 630 °C	0.07 °C
630 °C to 800 °C	0.07 °C
RTD Measurement	
-200 °C to 0 °C	0.07 °C
0 °C to 100 °C	0.08 °C
100 °C to 400 °C	0.10 °C
400 °C to 630 °C	0.12 °C
630 °C to 800 °C	0.22 °C
Thermocouple Simulation	
J-Type	
-210 °C to -100 °C	0.58 °C
-100 °C to 760 °C	0.56 °C
760 °C to 1200 °C	0.57 °C
K-Type	
-200 °C to -100 °C	0.60 °C
-100 °C to 120 °C	0.56 °C
120 °C to 1000 °C	0.58 °C
1000 °C to 1372 °C	0.63 °C
Thermocouple Measurement	
J-Type	

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-210 °C to -100 °C	0.58 °C
-100 °C to 760 °C	0.56 °C
760 °C to 1200 °C	0.57 °C
K-Type	
-200 °C to -100 °C	0.59 °C
-100 °C to 120 °C	0.56 °C
120 °C to 1000 °C	0.58 °C
1000 °C to 1372 °C	0.63 °C

5.88 Calibrators for Instrumentation

In accordance with an in-house method based on equipment manufacturer's recommendations.

	Range		CMC Uncertainty
(a)	DC voltage		
	0 mV to 100 mV		17 µV/V + 0.68 µV
	0.1 V to 1 V		8 µV/V + 0.9 µV
	1 V to 10 V		7 µV/V + 5.8 µV
	10 V to 100 V		11 µV/V + 66 µV
	100 V to 1000 V		22 µV/V + 580 µV
(b)	AC voltage		
	10 mV	1 kHz	0.13 %
		20 kHz	0.22 %
		100 kHz	0.31 %
		300 kHz	0.57 %
	10 mV to 0.1 V	1 kHz	0.04 %
		20 kHz	0.10 %
		100 kHz	0.17 %
		300 kHz	1.1 %
	0.1 V to 1 V	1 kHz	0.03 %
		20 kHz	0.10 %
		50 kHz	0.05 %
		100 kHz	0.13 %
		300 kHz	1.2 %
		500 kHz	1.2 %
	1 V to 10 V	40 Hz to 1 kHz	0.04 %
		1 kHz to 50 kHz	0.11 %
		100 kHz	0.13 %

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	10 V to 100 V	1 kHz	0.04 %
		20 kHz	0.15 %
		50 kHz	0.15 %
		100 kHz	0.40 %
	100 V to 700 V	1 kHz	0.06 %
(c)	DC current		
	0 µA to 1 µA		1.1 % + 0.04 nA
	1 µA to 10 µA		0.12 % + 0.1 nA
	10 µA to 100 µA		0.013 % + 0.8 nA
	0.1 mA to 1 mA		0.007 % + 5 nA
	1 mA to 10 mA		0.005 % + 50 nA
	10 mA to 100 mA		0.007 % + 0.5 µA
	0.1 A to 1 A		0.018 % + 10 µA
	1 A to 2 A		0.18 % + 0.6 mA
(d)	AC current		
	30 µA to 100 µA	1 kHz	0.13 % + 0.03 µA
	0.1 mA to 1 mA	1 kHz	0.07 % + 0.2 µA
	1 mA to 10 mA	1 kHz	0.07 % + 2 µA
	10 mA to 100 mA	1 kHz	0.07 % + 20 µA
	0.1 A to 1 A	1 kHz	0.14 % + 0.2 mA
	1 A to 2 A	1 kHz	0.29 % + 1.8 mA
(e)	Resistance		
	0 Ω to 10 Ω		98 µΩ/Ω + 50 µΩ
	10 Ω to 100 Ω		43 µΩ/Ω + 500 µΩ
	0.1 kΩ to 1 kΩ		34 µΩ/Ω + 0.5 mΩ
	1 kΩ to 10 kΩ		43 µΩ/Ω + 5 mΩ
	10 kΩ to 100 kΩ		37 µΩ/Ω + 50 mΩ
	0.1 MΩ to 1 MΩ		55 µΩ/Ω + 2 Ω
	1 MΩ to 10 MΩ		200 µΩ/Ω + 100 Ω
	10 MΩ to 100 MΩ		1700 µΩ/Ω + 1 kΩ

5.89 Indicating Instruments and Recording Instruments

In accordance with an in-house method based on equipment manufacturer's recommendations.

	Range	CMC Uncertainty
(a)	DC voltmeters	
	0 V to 330 mV	53 µV/V + 3 µV

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	0 V to 3 V		40 µV/V + 5 µV
	0 V to 33 V		40 µV/V + 50 µV
	30 V to 330 V		44 µV/V + 500 µV
	100 V to 1020 V		47 µV/V + 1.5 mV
(b)	AC voltmeters		
	3 mV to 33 mV	10 Hz to 20 Hz	0.17 %
		45 Hz to 10 kHz	0.13 %
		10 kHz to 20 kHz	0.17 %
		20 kHz to 50 kHz	0.21 %
		50 kHz to 100 kHz	0.36 %
		100 kHz to 500 kHz	1.1 %
	33 mV to 330 mV	10 Hz to 45 Hz	0.05 %
		45 Hz to 10 kHz	0.03 %
		10 kHz to 20 kHz	0.06 %
		20 kHz to 50 kHz	0.09 %
		50 kHz to 100 kHz	0.23 %
		100 kHz to 500 kHz	0.68 %
	0.33 V to 3.3 V	10 Hz to 20 Hz	0.04 %
		45 Hz to 10 kHz	0.03 %
		10 kHz to 20 kHz	0.06 %
		20 kHz to 50 kHz	0.08 %
		50 kHz to 100 kHz	0.19 %
		100 kHz to 500 kHz	0.64 %
	3.3 V to 33 V	10 Hz to 20 Hz	0.05 %
		45 Hz to 10 kHz	0.03 %
		10 kHz to 20 kHz	0.06 %
		20 kHz to 50 kHz	0.08 %
		50 kHz to 100 kHz	0.19 %
	33 V to 330 V	45 Hz to 1 kHz	0.05 %
		1 kHz to 10 kHz	0.08 %
		10kHz to 20 kHz	0.08 %
		20kHz to 50 kHz	0.12 %
		50 kHz to 100 kHz	0.26 %
	330 V to 1000 V	45 Hz to 1 kHz	0.05 %
		1 kHz to 5 kHz	0.07 %
		5kHz to 10 kHz	0.08 %
(c)	DC ammeters		
	0 A to 330 µA		0.02 % + 0.02 µA

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	0 A to 3.3 mA		0.01 % + 0.05 µA
	0 A to 33 mA		0.01 % + 0.25 µA
	0 A to 330 mA		0.02 % + 2.5 µA
	0 A to 3 A		0.03 % + 44 µA
	0 A to 11 A		0.06 % + 0.5 mA
	11 A to 20 A		0.10 % + 0.75 mA
	Clamp meters using current coil		
	20 A to 150 A		0.68 %
	150 A to 1000 A		0.63 %
(d)	AC ammeters		
	29 µA to 330 µA	10 Hz to 20 Hz	0.18 %
		45 Hz to 1 kHz	0.12 %
		1 kHz to 5 kHz	0.26 %
		5 kHz to 10 kHz	0.29 %
	0.33 mA to 3.3 mA	10 Hz to 20 Hz	0.16 %
		45 Hz to 1 kHz	0.08 %
		1 kHz to 5 kHz	0.16 %
		5 kHz to 10 kHz	0.39 %
	3.3 mA to 33 mA	10 Hz to 20 Hz	0.14 %
		45 Hz to 1 kHz	0.04 %
		1 kHz to 5 kHz	0.07 %
		5 kHz to 10 kHz	0.17 %
		10 kHz to 30 kHz	0.32 %
	33 mA to 330 mA	10 Hz to 20 Hz	0.14 %
		45 Hz to 1 kHz	0.04 %
		1 kHz to 5 kHz	0.09 %
		5 kHz to 10 kHz	0.18 %
		10 kHz to 30 kHz	0.36 %
	0.33 A to 1.1 A	10 Hz to 45 Hz	0.15 %
		45 Hz to 1 kHz	0.05 %
		1 kHz to 5 kHz	0.05 %
		5 kHz to 10 kHz	2.2 %
	1.1 A to 3 A	10 Hz to 45 Hz	0.15 %
		45 Hz to 1 kHz	0.06 %
		1 kHz to 5 kHz	0.49 %
		5 kHz to 10 kHz	2.0 %
	3 A to 11 A	45 Hz to 100 Hz	0.07 %
		100 Hz to 1 kHz	0.10 %

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		1 kHz to 5 kHz	0.10 %
		5 kHz to 10 kHz	2.3 %
	11 A to 20 A	45 Hz to 100 Hz	0.13 %
		100 Hz to 1 kHz	0.15 %
		1 kHz to 5 kHz	2.3 %
	Toroidal-Type Clamps		
	20 A to 150 A	40 to 60 Hz	0.44 %
	150 A to 1000 A	40 to 60 Hz	0.38 %
	Other-Type Clamps		
	20 A to 150 A	40 to 60 Hz	1.3 %
	150 A to 1000 A	40 to 60 Hz	0.76 %
(i)	Ohmmeters		
	0 Ω to 11 Ω		0.018 % + 1 mΩ
	11 Ω to 33 Ω		0.014 % + 1.5 mΩ
	33 Ω to 110 Ω		0.008 % + 1.4 mΩ
	110 Ω to 330 Ω		0.008 % + 2 mΩ
	330 Ω to 1.1 kΩ		0.007 % + 2 mΩ
	1.1 kΩ to 3.3 kΩ		0.008 % + 20 mΩ
	3.3 kΩ to 11 kΩ		0.008 % + 20 mΩ
	11 kΩ to 33 kΩ		0.008 % + 0.2 Ω
	33 kΩ to 110 kΩ		0.009 % + 0.2 Ω
	110 kΩ to 330 kΩ		0.01 % + 2 Ω
	330 kΩ to 1.1 MΩ		0.012 % + 2 Ω
	1.1 MΩ to 3.3 MΩ		0.014 % + 30 Ω
	3.3 MΩ to 11 MΩ		0.05 % + 50 Ω
	11 MΩ to 33 MΩ		0.09 % + 2.5 kΩ
	33 MΩ to 110 MΩ		0.39 % + 3 kΩ
	110 MΩ to 330 MΩ		0.77 % + 0.1 MΩ
	330 MΩ to 1100 MΩ		1.4 % + 0.5 MΩ

Note 1:
Unless stated otherwise the CMC is based on the performance of the best available device and measurement uncertainties achieved for specific calibrations may be greater than the CMC Uncertainty. A laboratory may not report measurement uncertainties lower than its CMC. However, if the device under calibration has a greater accuracy than the device used to calculate the CMC the laboratory may be able to use the calibration data to lower its CMC Uncertainty. Please contact the laboratory to discuss your specific requirements.

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