



DE Calibration and Compliance

Client Number 10139

PO Box 642, Timaru, 7940
43 Sunshine Ave, Te Rapa, Hamilton, 3200

Telephone 03 688-6713

www.decalibration.co.nz

Authorised Representative

Kaye Johnston-May
Quality Control Manager & HSR, DE Group

Programme

Metrology & Calibration Laboratory

Accreditation Number 1416

Initial Accreditation Date 1 November 2022

Conformance Standard

ISO/IEC 17025:2017

General requirements for the competence of testing and calibration laboratories

Laboratory Services Summary

5.88	Calibrators for Instrumentation
5.89	Indicating Instruments and Recording Instruments
5.98	Miscellaneous Electrical Tests

Key Technical Personnel

Mr Phillip Jose	5.88, 5.89, 5.98
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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.

ppm is Parts Per Million. For example 100 ppm = 100 μ V/V. Total CMC uncertainties are a combination of the reading uncertainty and the range uncertainty.

Scope of accreditation for measurements carried out in the laboratory only. Site work not accredited.

Measurand/Range	Parameter	CMC Uncertainty
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5.88 Calibrators for Instrumentation

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

(a) DC voltage

100 mV	9 ppm reading + 1.7 ppm range
1 V	6.4 ppm reading + 0.6 ppm range
10 V	6.8 ppm reading + 0.6 ppm range
110 V	9.5 ppm reading + 0.8 ppm range
1000 V	9.5 ppm reading + 1.2 ppm range

(b) AC voltage

100 mV	10 Hz to 40 Hz	0.08 % reading + 0.015 % range
	40 Hz to 200 Hz	0.03 % reading + 0.009 % range
	200 Hz to 1000 Hz	0.03 % reading + 0.008 % range
	1 kHz to 2 kHz	0.03 % reading + 0.008 % range
	2 kHz to 20 kHz	0.04 % reading + 0.01 % range
	20 kHz to 100 kHz	0.09 % reading + 0.05 % range
1 V to 10 V	10 Hz to 40 Hz	0.06 % reading + 0.015 % range
	40 Hz to 200 Hz	0.03 % reading + 0.009 % range
	200 Hz to 1000 Hz	0.02 % reading + 0.008 % range
	1 kHz to 2 kHz	0.02 % reading + 0.008 % range
	2 kHz to 20 kHz	0.04 % reading + 0.01 % range
	20 kHz to 100 kHz	0.09 % reading + 0.05 % range
	100 kHz to 1000 kHz	1.5 % reading + 2.5 % range
	(10 V range limit 200 kHz)	
100 V to 1000 V	10 Hz to 40 Hz	0.08 % reading + 0.015 % range
	40 Hz to 200 Hz	0.03 % reading + 0.009 % range

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	200 Hz to 1000 Hz	0.03 % reading + 0.007 % range
	1 kHz to 2 kHz	0.03 % reading + 0.007 % range
	2 kHz to 20 kHz	0.05 % reading + 0.01 % range
	(1000 V range limit 10 kHz)	
	20 kHz to 50 kHz	0.12 % reading + 0.058 % range
(c)	DC current	
	10 nA	15000 ppm reading + 80 ppm range
	100 nA	3000 ppm reading + 34 ppm range
	1 µA	330 ppm reading + 17 ppm range
	10 µA	50 ppm reading + 10 ppm range
	100 µA	14 ppm reading + 4 ppm range
	1 mA	14 ppm reading + 4 ppm range
	10 mA	14 ppm reading + 4 ppm range
	100 mA	47 ppm reading + 6 ppm range
	1 A	230 ppm reading + 13 ppm range
	10 A	560 ppm reading + 35 ppm range
	30 A	760 ppm reading + 140 ppm range
(d)	AC current	
	100 µA to 10 mA	
	10 Hz to 40 Hz	0.09 % reading + 0.015 % range
	40 Hz to 1000 Hz	0.05 % reading + 0.012 % range
	1 kHz to 10 kHz	0.12 % reading + 0.03 % range
	1 A	
	10 Hz to 40 Hz	0.11 % reading + 0.02 % range
	40 Hz to 1000 Hz	0.07 % reading + 0.015 % range
	1 kHz to 10 kHz	0.13 % reading + 0.05 % range
	10 A to 30 A	
	10 Hz to 40 Hz	0.16 % reading + 0.04 % range
	40 Hz to 1000 Hz	0.12 % reading + 0.03 % range
(e)	Resistance	
	1 Ω	23 ppm reading + 6 ppm range
	10 Ω	15 ppm reading + 3 ppm range
	100 Ω	14 ppm reading + 1 ppm range
	100 Ω low current range	15 ppm reading + 7 ppm range
	1 kΩ	12 ppm reading + 0.8 ppm range
	1 kΩ low current range	14 ppm reading + 3 ppm range
	10 kΩ	14 ppm reading + 0.8 ppm range
	10 kΩ low current range	16 ppm reading + 8 ppm range
	100 kΩ	15 ppm reading + 8 ppm range
	1 MΩ*	18 ppm reading + 2 ppm range
	10 MΩ*	23 ppm reading + 8 ppm range

* 2 – wire only

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5.89 Indicating Instruments and Recording Instruments

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

(a) DC voltmeters

0 mV to 202 mV	30 ppm + 3.6 μ V
0.2 V to 2.02 V	30 ppm + 5 μ V
2 V to 20.2 V	25 ppm + 40 μ V
20.2 V to 202 V	30 ppm + 400 μ V
202 V to 1025 V	30 ppm + 4000 μ V

(b) AC voltmeters

0 mV to 202 mV	10 Hz to <45 Hz	0.2 % + 50 μ V
	45 Hz to <1000 Hz	0.04 % + 20 μ V
	1 kHz to <20 kHz	0.09 % + 35 μ V
	20 kHz to <100 kHz	0.3 % + 70 μ V
	100 kHz to 500 kHz	0.8 % + 380 μ V
0.2 V to 2.02 V	10 Hz to <45 Hz	0.2 % + 350 μ V
	45 Hz to <1000 Hz	0.04 % + 90 μ V
	1 kHz to <20 kHz	0.09 % + 135 μ V
	20 kHz to <100 kHz	0.25 % + 2000 μ V
	100 kHz to 500 kHz	0.45 % + 3800 μ V
2 V to 20.2 V	10 Hz to <45 Hz	0.2 % + 3 mV
	45 Hz to <1000 Hz	0.035 % + 0.9 mV
	1 kHz to <20 kHz	0.07 % + 1.3 mV
	20 kHz to 100 kHz	0.22 % + 33 mV
20 V to 202 V	30 Hz to <45 Hz	0.06 % + 20 mV
	45 Hz to <1000 Hz	0.04 % + 7.5 mV
	1 kHz to 20 kHz	0.09 % + 40 mV
200 V to 1020 V	30 Hz to <45 Hz	0.06 % + 200 mV
	45 Hz to <1000 Hz	0.04 % + 75 mV
	1 kHz to 20 kHz	0.15 % + 400 mV

(c) DC ammeters

0 μ A to 202 μ A	0.01 % + 0.03 μ A
0.2 mA to 2.02 mA	0.008 % + 0.04 μ A
2 mA to 20.2 mA	0.005 % + 0.3 μ A
20 mA to 202 mA	0.008 % + 3 μ A

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(d)	0.2 A to 2.02 A		0.015 % + 35 μ A
	2 A to 30 A		0.04 % + 350 μ A
	AC ammeters		
	20 μ A to 202 μ A	10 Hz to <45 Hz	0.2 % reading + 0.25 μ A
		45 Hz to <1000 Hz	0.07 % reading + 0.25 μ A
		1 kHz to 10 kHz	0.8 % reading + 0.25 μ A
	0.2 mA to 2.02 mA	10 Hz to <45 Hz	0.2 % reading + 5 μ A
		45 Hz to <1000 Hz	0.06 % reading + 4 μ A
		1 kHz to 10 kHz	0.5 % reading + 7 μ A
	2 mA to 20.2 mA	10 Hz to <45 Hz	0.2 % reading + 0.5 μ A
		45 Hz to <1000 Hz	0.06 % reading + 0.4 μ A
		1 kHz to 10 kHz	0.7 % reading + 0.7 μ A
	20 mA to 202 mA	10 Hz to <45 Hz	0.2 % reading + 50 μ A
		45 Hz to <1000 Hz	0.06 % reading + 40 μ A
		1 kHz to 10 kHz	0.6 % reading + 70 μ A
	0.2 A to 2.02 A	10 Hz to <45 Hz	0.2 % reading + 500 μ A
		45 Hz to <1000 Hz	0.09 % reading + 400 μ A
		1 kHz to 5 kHz	0.6 % reading + 700 μ A
	2 A to 30 A	10 Hz to <45 Hz	0.2 % reading + 5000 μ A
		45 Hz to <100 Hz	0.09 % reading + 2000 μ A
		100 Hz to 1000 kHz	0.3 % reading + 4000 μ A
	AC & DC Clamp-on type meters		
	0 A to 60 A (2 turn coil)	Wound clamps	0.36 % + 0.036 A
		Hall effect clamps	0.49 % + 0.09 A
	0 A to 300 A (10 turn coil)	Wound clamps	0.42 % + 0.03 A
		Hall effect clamps	0.60 % + 0.13 A
	0 A to 1500 A (50 turn coil)	Wound clamps	0.26 % + 0.06 A
		Hall effect clamps	0.46 % + 0.44 A
	(i) Ohmmeters		
	0 Ω	0.5 A max current	0.005 Ω
	0.1 Ω	0.5 A max current	0.015 % + 0.005 Ω
	1 Ω	0.4 A max current	0.01 % + 0.005 Ω
	10 Ω	0.3 A max current	0.01 % + 0.005 Ω
	100 Ω	0.1 A max current	0.005 % + 0.005 Ω
	1 k Ω	10 V max voltage	0.04 % + 0.04 Ω

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10 kΩ	50 V max voltage	0.04 % + 0.4 Ω
100 kΩ	100 V max voltage	0.04 % + 4 Ω
1 MΩ*	100 V max voltage	0.01 % + 40 Ω
10 MΩ*	100 V max voltage	0.035 % + 400 Ω
110 MΩ*	100 V max voltage	0.5 % + 4000 Ω
1 GΩ*	100 V max voltage	1 % + 40000 Ω

* 2 – wire only

(q) Other specified devices

Hi Pots

DC Voltage	5 kV to 60 kV	1 %
AC Voltage	5 kV to 140 kV	5 %

5.98 Miscellaneous Electrical Tests

Capacity for the following tests is application of test voltage up to 120 kV and measurement of leakage currents.

(a) Insulating gloves and tools

In service checks on insulating protective equipment including gloves, sleeves, mats, blankets, poles & jumper leads, in accordance with specifications such as those listed below (or technically equivalent) and to demonstrate compliance with EEA Dec 2018:

ASTM D120, D1048, D1049, D1050, D1051, F478, F479, F496, F711, F712

(b) High voltage operating equipment

In service insulation checks on instruments used for HV work to customer specified codes such as: Contact VDD and TransPower TP.SS 07.24

(c) Insulated platform vehicles

In service checks on insulated platform vehicles in accordance with specifications such as AS/NZS 1418.10 and ANSI A92.2

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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