



Trescal (New Zealand) Limited

Client Number 2051

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Authorised Representative

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Programme

Metrology & Calibration Laboratory

Accreditation Number 435

Initial Accreditation Date 21 January 1992

Conformance Standard

ISO/IEC 17025:2017

General requirements for the competence of testing and calibration laboratories

Laboratory Services Summary

5.22	Precision Laboratory Balances
5.23	Industrial Balances
5.24	Industrial Weighing Appliances
5.51	Force Measuring Devices
5.52	Strain Measurement and Displacement Measurement
5.53	Testing Machines
5.54	Mechanical Testing Equipment
5.61	Temperature Measuring Equipment
5.88	Calibrators for Instrumentation
5.89	Indicating Instruments and Recording Instruments

Key Technical Personnel

Mr Michael MacAulay	5.61, 5.88, 5.89
Mr Chris Marlow	5.22, 5.23, 5.24, 5.51, 5.52, 5.53, 5.54
Ms Aarthy Sriram	5.61, 5.88, 5.89
Mr Fred Tiedemann	5.22, 5.23, 5.24, 5.51, 5.52, 5.53, 5.54

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Calibration and Measurement Capabilities (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 at the premises of the accredited laboratory in a controlled environment at 23 °C ±5 °C.

Classes 5.22, 5.23, 5.24, 5.51, 5.52, 5.53 & 5.54 are carried out either on-site at the customer's premises or at a branch laboratory at 28 Homestead Road, Manly, Whangaparaoa, 0930, as applicable.

5.22 Precision Laboratory Balances

Examination of the performance of precision laboratory balances having a nominal measurement uncertainty not exceeding 1 part in 100,000 of maximum capacity to an in-house procedure based on MSL Technical Guide 25.

Ranges and CMC uncertainties as per 5.24 below

5.23 Industrial Balances

Examination of the performance of industrial balances having a nominal measurement uncertainty exceeding 1 part in 100,000 of maximum capacity to an in-house procedure based on MSL Technical Guide 25.

Ranges and CMC uncertainties as per 5.24 below

5.24 Industrial Weighing Appliances

Examination of the performance of industrial weighing appliances having a nominal measurement uncertainty exceeding 1 part in 100,000 of maximum capacity to an in-house procedure based on MSL Technical Guide 25.

Balance reading	CMC uncertainty
10 mg to 10 g	20 µg
Above 10 g to 1 kg	3 µg/g
Above 1 kg to 5 kg	3 µg/g
Above 5 kg to 10 kg	6 µg/g
Above 10 kg to 60 kg	50 µg/g

5.51 Force Measuring Devices

- (a) Proving devices
- (b) Elastic force measuring devices and force dynamometers

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Calibration of force measuring devices, such as proving rings, load cells (whether alone or As part of a testing machine), spring balances and digital force measuring instruments, to an in-house method based on AS 2193 and EN ISO 7500-1.

CMC uncertainty

0.01 N to 10000 kN in compression

0.25 %

0.01 N to 3000 kN in tension

0.25 %

5.52 Strain Measurement and Displacement Measurement

CMC uncertainty

(a) Extensometers in accordance with ISO 9513

12 µm (length)

0.4 µm (extension)

(c) Dial gauges in accordance with AS 2103 except for clauses 2.4.2 and 3.4.2 and BS 907 except clause 9.3

5.53 Testing Machines

CMC uncertainty

(a) Tension and universal machines in tension for forces from 0.01 N to 3000 kN in accordance with ASTM E4, EN ISO 7500-1 and AS 2193 grade A

0.25 %

(b) Compression and universal machines in compression for forces from 0.01 N to 10000 kN in accordance with ASTM E4, EN ISO 7500-1 and AS 2193 grade A

0.25 %

(c) Vickers hardness machines in accordance with EN ISO 6507: Part 2 and AS 1817.2 except clause 4.2

0.5 %

(d) Rockwell hardness and superficial hardness machines in accordance with EN ISO 6508: Part 2 and AS 1815.2 except clauses 4.3 and 4.4 and ASTM E18

0.5 %

(e) Brinell hardness machines in accordance with EN ISO 6506: Part 2 and AS 1816.2 except clause 4.3

HBW (10/3000)

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150	1.1 %
390	1.2 %
570	1.2 %

(f) Charpy impact machines in accordance with ISO 148-2 and ISO 13802 (for plastics)

Machines of nominal capacities ranging from	CMC uncertainty ranging from 1 % at
150 J to 600 J (for metallic materials)	10 % capacity
	to 0.3 % at 80 % capacity

5.54 Mechanical Testing Equipment

(a) Portable Brinell measuring microscopes in accordance with AS 1816.2 and EN ISO 6506: Part 2

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

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-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

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
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(a) DC voltage

0 mV to 100 mV	17 μ V/V + 0.68 μ V
0.1 V to 1 V	8 μ V/V + 0.9 μ V
1 V to 10 V	7 μ V/V + 5.8 μ V
10 V to 100 V	11 μ V/V + 66 μ V
100 V to 1000 V	22 μ V/V + 580 μ V

(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 %

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	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 %
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 μ A to 1 μ A		1.1 % + 0.04 nA
1 μ A to 10 μ A		0.12 % + 0.1 nA
10 μ A to 100 μ A		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 μ A
0.1 A to 1 A		0.018 % + 10 μ A
1 A to 2 A		0.18 % + 0.6 mA
(d) AC current		
30 μ A to 100 μ A	1 kHz	0.13 % + 0.03 μ A
0.1 mA to 1 mA	1 kHz	0.07 % + 0.2 μ A
1 mA to 10 mA	1 kHz	0.07 % + 2 μ A
10 mA to 100 mA	1 kHz	0.07 % + 20 μ A
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 $\mu\Omega/\Omega$ + 50 $\mu\Omega$
10 Ω to 100 Ω		43 $\mu\Omega/\Omega$ + 500 $\mu\Omega$
0.1 k Ω to 1 k Ω		34 $\mu\Omega/\Omega$ + 0.5 m Ω
1 k Ω to 10 k Ω		43 $\mu\Omega/\Omega$ + 5 m Ω
10 k Ω to 100 k Ω		37 $\mu\Omega/\Omega$ + 50 m Ω
0.1 M Ω to 1 M Ω		55 $\mu\Omega/\Omega$ + 2 Ω
1 M Ω to 10 M Ω		200 $\mu\Omega/\Omega$ + 100 Ω
10 M Ω to 100 M Ω		1700 $\mu\Omega/\Omega$ + 1 k Ω

5.89 Indicating Instruments and Recording Instruments

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

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Range		CMC Uncertainty
(a)	DC voltmeters	
	0 V to 330 mV	53 $\mu\text{V/V}$ + 3 μV
	0 V to 3 V	40 $\mu\text{V/V}$ + 5 μV
	0 V to 33 V	40 $\mu\text{V/V}$ + 50 μV
	30 V to 330 V	44 $\mu\text{V/V}$ + 500 μV
	100 V to 1020 V	47 $\mu\text{V/V}$ + 1.5 mV
(b)	AC voltmeters	
	3 mV to 33 mV	10 Hz to 20 Hz
		45 Hz to 10 kHz
		10 kHz to 20 kHz
		20 kHz to 50 kHz
		50 kHz to 100 kHz
		100 kHz to 500 kHz
	33 mV to 330 mV	10 Hz to 45 Hz
		45 Hz to 10 kHz
		10 kHz to 20 kHz
		20 kHz to 50 kHz
		50 kHz to 100 kHz
		100 kHz to 500 kHz
	0.33 V to 3.3 V	10 Hz to 20 Hz
		45 Hz to 10 kHz
		10 kHz to 20 kHz
		20 kHz to 50 kHz
		50 kHz to 100 kHz
		100 kHz to 500 kHz
	3.3 V to 33 V	10 Hz to 20 Hz
		45 Hz to 10 kHz
		10 kHz to 20 kHz
		20 kHz to 50 kHz
		50 kHz to 100 kHz
		100 kHz to 500 kHz
	33 V to 330 V	45 Hz to 1 kHz
		1 kHz to 10 kHz
		10 kHz to 20 kHz
		20 kHz to 50 kHz
		50 kHz to 100 kHz
		100 kHz to 500 kHz
	330 V to 1000 V	45 Hz to 1 kHz

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	1 kHz to 5 kHz	0.07 %
	5kHz to 10 kHz	0.08 %
(c)	DC ammeters	
	0 A to 330 μ A	0.02 % + 0.02 μ A
	0 A to 3.3 mA	0.01 % + 0.05 μ A
	0 A to 33 mA	0.01 % + 0.25 μ A
	0 A to 330 mA	0.02 % + 2.5 μ A
	0 A to 3 A	0.03 % + 44 μ A
	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 μ A to 330 μ A	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 %

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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 %
	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 m Ω
11 Ω to 33 Ω	0.014 % + 1.5 m Ω
33 Ω to 110 Ω	0.008 % + 1.4 m Ω
110 Ω to 330 Ω	0.008 % + 2 m Ω
330 Ω to 1.1 k Ω	0.007 % + 2 m Ω
1.1 k Ω to 3.3 k Ω	0.008 % + 20 m Ω
3.3 k Ω to 11 k Ω	0.008 % + 20 m Ω
11 k Ω to 33 k Ω	0.008 % + 0.2 Ω
33 k Ω to 110 k Ω	0.009 % + 0.2 Ω
110 k Ω to 330 k Ω	0.01 % + 2 Ω
330 k Ω to 1.1 M Ω	0.012 % + 2 Ω
1.1 M Ω to 3.3 M Ω	0.014 % + 30 Ω
3.3 M Ω to 11 M Ω	0.05 % + 50 Ω
11 M Ω to 33 M Ω	0.09 % + 2.5 k Ω
33 M Ω to 110 M Ω	0.39 % + 3 k Ω
110 M Ω to 330 M Ω	0.77 % + 0.1 M Ω
330 M Ω to 1100 M Ω	1.4 % + 0.5 M Ω

Note 1:

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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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