Laboratory Accreditation Programmes

Schedule to

CERTIFICATE OF ACCREDITATION

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PowerLab Ltd **Client Number 32**

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Telephone **021 046-0445** **www.powerlab.co.nz**

Authorised Representative
Mr Ian Dix
Laboratory Quality Manager

Programme
Electrical Testing Laboratory

Accreditation Number 42 **Initial Accreditation Date** 3 November 1976

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

Laboratory Services Summary

3.01	Conductors and Resistance Alloys
3.02	Resistors, Resistance Boxes and Potential Dividers
3.03	Insulators and Insulating Materials
3.30	Electric Machines and Auxiliary Apparatus
3.31	Circuit Switching and Rupturing Devices
3.35	Cables and Feeders
3.36	Power Supply Equipment and Systems
3.40	High Voltage Testing
3.45	High Power and High Current Testing
3.60	Environmental Tests
3.80	Approval Tests on Electrical Appliances
5.97	High Voltage

Key Technical Personnel

Mr Ian Dix	3.01, 3.02, 3.03, 3.36, 3.40, 3.60, 3.80, 5.97
Mr Keith Manson	3.01, 3.02, 3.03, 3.30, 3.31, 3.35, 3.36, 3.40, 3.45, 3.60, 3.80, 5.97

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Measurement Uncertainties are expressed as an expanded uncertainty corresponding to a level of confidence of 95 %.

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.

Unless stated elsewhere in this schedule, measurements are performed at the premises of the accredited laboratory.

Measurand/Range	Parameter	Measurement Uncertainty

3.01 Conductors and Resistance Alloys

Refer to 3.02 for range

3.02 Resistors, Resistance Boxes and Potential Dividers

The measurement of resistance for testing purposes (not calibration)

	100 µΩ to 1 GΩ	0.5 % of reading

3.03 Insulators and Insulating Materials

Tests to published specifications

(a) Electrical strength tests

Up to 6.6 kV	1 % of reading
Above 6.6 kV	3 % of reading
Up to 15 kV, short-circuit current >200 mA	
Above 15 kV refer to 3.40	

(b) Insulation resistance tests

Refer to 3.02 for range

(c) Surface and volume resistivity tests

Resistivity tests	5 % of reading

Includes testing of liquids to ASTM D1125

(f) Direct voltage tests

Refer to 3.40

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(g) Alternating voltage tests

Refer to (a)

(i) Dielectric dispersion coefficient

Dielectric tests Refer to 3.40

Test of ac 50 Hz or dc equipment to published specifications

3.30 Electric Machines and Auxiliary Apparatus

(a) Motors, generators and other rotating machines

Comparative measurements of insulation tan o, capacitance and partial discharge measurements on rotating machines

3.31 Circuit Switching and Rupturing Devices

(a) Circuit breakers and controllers
(c) Switches and isolators
(e) Fuses and fuse links (semi-enclosed)

Measurement capabilities in (a), (c) and (e) above as for 3.45

3.35 Cables and Feeders

(a) Conductor resistance tests
(b) Insulation resistance tests
(c) Capacitance tests
(d) Direct voltage tests
(e) Alternating voltage tests
(g) Partial discharge tests
(h) Dielectric tests

Refer to 3.02, 3.03 and 3.40 for range of measurements and uncertainties

3.36 Power Supply Equipment and Systems

The following tests on power and distribution transformers

(a) Electrical parameters

As per 3.03, 3.40 and 3.45 in accordance with:
IEC (AS/NZS, BS EN) 60076.3 Insulation levels, dielectric tests and external clearances in air
IEC (BS EN) 62631-3-3 Determination of resistive properties (DC methods) - Insulation resistance

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(b) Waveform characteristics

As per 3.40

(c) Power system disturbances

As per 3.40 and 3.45 in accordance with:
IEC (AS/NZS, BS EN) 60076-1 and IEC (AS/NZS) 60076.3 Alternating current tests
IEC (AS/NZS, BS EN) 60076-3 Impulse voltage tests
IEC (AS/NZS, BS EN) 60076-3 and IEC (AS) 60270 Partial discharge tests
IEC (BS EN) 61620 Determination of the Dielectric Dissipation Factor by Measurement of the Conductance and Capacitance

(d) Temperature rise and thermal rating tests

As per 3.45 in accordance with:
IEC (AS/NZS, BS EN) 60076.2 Temperature rise for liquid-immersed transformers

(e) Other tests

Determination of sound level in accordance with:
IEC (AS/NZS, BS EN) 60076-10

30 dB to 130 dB (20 Hz to 8 kHz)	1 dB

Determination of frequency response in accordance with:
IEC (AS/NZS, BS EN) 60076-18

5 Hz to 45 MHz	0.05 dB

Tests in accordance with:
IEC (AS/NZS, BS EN) 60076.1 Power transformers General requirements

Voltage ratio and phase displacement

8 V to 80 V (Turns ratio 0.8 to 1000)	1 % to 3 %

Phase displacement

±90°	3 minutes

Winding resistance

0.1 µΩ to 2 kΩ	0.5 % reading + 0.5 digit
5 mA to 60 A	0.3 % reading + 0.5 digit

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No load loss, load loss and currents

0 V to 2500 V	0.24 V
0 A to 150 A	0.031 A
0 kW to 36 kW	6.0 W

Zero sequence impedances in accordance with AS 2374

0 V to 1500 V	0.16 %
0 Hz to 400 Hz	0.15 %

3.40 High Voltage Testing

Tests to published specifications, including CISPR 18-2

General Capabilities
0 kV ac to 300 kV ac, 10 A short circuit current, Impulse generation up to 600 kV @ 150 kV, 50 Hz peak and 30 kJ

(a) Direct voltage tests

Up to 100 kV	3 % of reading

(b) Alternating voltage tests

Up to 300 kV	3 % of reading

(c) Impulse voltage tests

Up to 600 kV	3 % of reading

(d) Impulse current tests

Up to 40 kA	3 % of reading

(e) Partial discharge tests

Comparative partial discharge

Up to 200 kV	3 % of test voltage

(f) Dielectric tests

Comparative dielectric tests, comparative partial discharge

Up to 200 kV	3 % of test voltage

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Capacitance from 100 pF to 22,000 µF
Dissipation factor from 1/10,000 to 11

3.45 High Power and High Current Testing

Including high current tests on energy meter for the standards listed in 3.80

(a) Short time withstand and peak withstand current tests

Temperature rise tests	0.5 %
Short circuit tests	4 %
Power factor	4 %

(i) Temperature rise tests

Temperature (ambient plus equipment)

Liquid in glass thermometry for liquids and ambient	
-5 °C to 50 °C	0.2 °C
Thermocouple thermometry:	
-15 °C to 100 °C	3 °C
100 °C to 200 °C	3 % of reading
Change in resistance thermometry	1 % of reading

3.60 Environmental Tests

(a) Cold tests
(b) Dry heat tests
(c) Damp heat tests
(d) Impact tests
(k) Change of temperature tests

Over the range -25 °C to 100 °C and 30 %rh to 95 %rh in accordance with the following standards (or national variations, such as BS EN, etc.):

IEC 60068-2-1 / AS 60068.2.1	Test A: Cold
IEC 60068-2-2 / AS 60068.2.2	Test B: Dry heat
IEC 60068-2-14 AS 60068.2.14	Test N: Change of temperature
IEC 60068-2-30 AS 60068.2.30	Test Db: Damp heat, cyclic (12 h + 12 h cycle)
IEC 60068-2-75 / AS 60068.2.75	Test Eh: Hammer tests

3.80 Approval Tests on Electrical Appliances

Excluding tests for flammable refrigerants using capillary tube and gas bottle and gas concentration measurement equipment, and tests that require water pressure, water vapour, vacuum pressure, UV luminance measurement, measurement of radiation energy, and crushing or abrasion tests of current carrying hoses.

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Australian Standards

AS 1299:2022	Electrical equipment for mines and quarries - Explosion-protected three-phase restrained and bolted cable coupling devices for working voltages up to and including 11 kV; clauses 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12, 3.3.14, 3.3.15 only (excluding explosion protection, thermal endurance and mechanical tests)
AS 60529	Degrees of protection provided by enclosures (IP Code) excluding above IP44, except IPX7 and IPX8
AS 60947.3	Switches, disconnectors, switch-disconnectors and fuse-combination units
AS 61010.1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements (excluding clauses 9.3.1/14.7 Flammability tests, 10.5.3 Vicat test of insulating materials, 11.7 Fluid pressure and leakage, 12.2.1 Ionizing radiation, 12.3 UV radiation, 12.4 Microwave radiation, 12.5.2 Ultrasonic pressure, 12.6 Laser sources, 13.2.3 High vacuum devices and Annex H Qualification of conformal coating for protection against pollution)
AS 62040.1-2003 (R2013)	Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS
AS 62477.1	Safety requirements for power electronic converter systems and equipment – Part 1: General (excluding clauses for testing sonic pressure and vibration tests)

Australian / New Zealand Standards

AS/NZS 1299:2009	Electrical equipment for mines and quarries - Explosion-protected three-phase restrained plugs and receptacles for working voltages up to and including 3.3 kV; clauses 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11 only (excluding explosion protection, thermal endurance and mechanical tests)
AS/NZS 1300:2009	Electrical equipment for mines and quarries - Bolted explosion-protected three-phase cable coupling devices; clauses 3.3.6, 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.13, 3.3.14 only (excluding explosion protection, thermal endurance and mechanical tests)
AS/NZS 3100	General requirements
AS/NZS 3105	Electrical portable outlet devices
AS/NZS 3127	Cord-line switches
AS/NZS 3133	Air-break switches
AS/NZS 3190	Residual current devices (current-operated earth-leakage devices)
AS/NZS 3191	Electric flexible cords
AS/NZS 3199	Cord extension sets
AS/NZS 5000.1	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
AS/NZS 5000.2	Electric cables - Polymeric insulated - For working voltages up to and including 450/750 V
AS/NZS 60335.1	Safety of household and similar electrical appliances – General requirements
AS/NZS 60335.2.29	Battery chargers
AS/NZS 60335.2.30	Room heaters
AS/NZS 60335.2.76	Electric fence energisers

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AS/NZS 60598.1	Luminaires – General requirements and tests
AS/NZS 60598.2.1	Fixed general purpose luminaires
AS/NZS 60598.2.2	Recessed luminaires
AS/NZS 60598.2.3	Road and street lighting
AS/NZS 60598.2.4	Portable general purpose luminaires
AS/NZS 60598.2.5	Floodlights
AS/NZS 60669.2.1	Electronic switches
AS/NZS 60695.1.1	Fire hazard testing – Guidance for assessing the fire hazard of electrotechnical products – General guidelines
AS/NZS 60695.2.10	Fire hazard testing – Glowing/hot wire based test methods – Glow wire apparatus and common test procedure
AS/NZS 60695.2.11	Fire hazard testing – Glowing/hotwire based test methods – Glow wire flammability test method for end-products
AS/NZS 60695.2.12	Fire hazard testing – Glowing/hot wire based test methods – Glow wire flammability test method for materials
AS/NZS 60695.2.13	Fire hazard testing – Glowing/hot wire based test method – Glow wire ignitability test method for materials
AS/NZS 60695.10.2	Method for testing products made from non-metallic materials for resistance to heat using the ball pressure test
AS/NZS 60695.11.5	Fire hazard testing – Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance
AS/NZS 60947.1	Low-voltage switchgear and controlgear
AS/NZS 60947.4.2	Contactors and motor-starters – AC semiconductor motors controllers and starters
AS/NZS 60947.6.1	Low-voltage switchgear and controlgear – Multiple function equipment – Transfer switching equipment
AS/NZS 60947.7.1	Low-voltage switchgear and controlgear – Ancillary equipment – Terminal blocks for copper conductors
AS/NZS 60950.1	Safety of information technology equipment – General requirements
AS/NZS 61008.1	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) General Rules
AS/NZS 61347.1	Lamp control gear – General and safety requirements (excluding clause 18.5 for resistance to tracking)
AS/NZS 61347.2.11	Miscellaneous electronic circuits used with luminaires
AS/NZS 61439.1	Low-voltage switchgear and control gear assemblies – General requirements
AS/NZS 61439.3	Distribution boards intended to be operated by ordinary persons (DBO)
AS/NZS 61347.2.13	DC or AC supplied electronic control gear for LED modules
AS/NZS 62368.1	Audio/video, information and communication technology equipment – Part 1: Safety requirements
AS/NZS 62560	Self-ballasted LED-lamps for general lighting services by voltage > 50 V – Safety specifications

Testing conducted in accordance with the following IEC Standards or with equivalent BS EN, UL, etc. Standards

IEC 60335-1	Safety of household and similar electrical appliances – General requirements
IEC 60335-2-29	Battery chargers

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IEC 60335-2-30	Room heaters
IEC 60335-2-76	Electric fence energisers
IEC 60529	Degrees of protection provided by enclosures (IP Code) excluding above IP44, except IPX7 and IPX8
IEC 60598-1	Luminaires – General requirements and tests
IEC 60598-2-1	Fixed general purpose luminaires
IEC 60598-2-2	Recessed luminaires
IEC 60598-2-3	Road and street lighting
IEC 60598-2-4	Portable general purpose luminaires
IEC 60598-2-5	Floodlights
IEC 60669-2-1	Electronic switches
IEC 60695-1-1	Fire hazard testing – Guidance for assessing the fire hazard of electrotechnical products – General guidelines
IEC 60695-2-10	Fire hazard testing – Glowing/hot wire based tests methods – Glow wire apparatus and common test procedure
IEC 60695-2-11	Fire hazard testing – Glowing/hot wire based test methods – Glow wire flammability test method for end-products
IEC 60695-2-12	Fire hazard testing – Glowing/hot wire based test methods – Glow wire flammability test method for materials
IEC 60695-2-13	Fire hazard testing – Glowing/hot wire based test methods – Glow wire ignitability test method for materials
IEC 60695-10-2	Method for testing products made from non-metallic materials for resistance to heat using the ball pressure test
IEC 60695-11-5	Fire hazard testing – Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance
IEC 60947-1	Low-voltage switchgear and controlgear
IEC 60947-3	Switches, disconnectors, switch-disconnectors and fuse-combination units
IEC 60947-4-2	Contactors and motor-starters – AC semiconductor motors controllers and starters
IEC 60947-6-1	Low-voltage switchgear and controlgear – Multiple function equipment – Transfer switching equipment
IEC 60947-7-1	Low voltage switchgear and controlgear – Terminal blocks for copper conductors
IEC 60950-1	Safety of information technology equipment – General requirements
IEC 61008-1	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) General Rules
IEC 61008-2-1	Applicability of the general rules to RCCB's functionally independent of line voltage
IEC 61008-2-2	Applicability of the general rules to RCCB's functionally dependent on line voltage
IEC 61010-1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements (excluding clauses; 9.3.1/14.7 Flammability tests, 10.5.3 Vicat test of insulating materials, 11.7 Fluid pressure and leakage, 12.2.1 Ionizing radiation, 12.3 UV radiation, 12.4 Microwave radiation, 12.5.1 Sound pressure level, 12.5.2 Ultrasonic pressure, 12.6 Laser sources, 13.2.3 High vacuum devices and Annex H Qualification of conformal coating for protection against pollution)
IEC 61010-2-030	Testing and measuring circuits

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IEC 61010-2-120	Machinery aspects of equipment
IEC 61010-2-201	Control equipment
IEC 61347-1	Lamp control gear – General and safety requirements
IEC 61347-2-11	Miscellaneous electronic circuits used with luminaires
IEC 61347-2-13	DC or AC supplied electronic control gear for LED modules
IEC 61439-1	Low-voltage switchgear and control gear assemblies – General requirements
IEC 61439-3	Distribution boards intended to be operated by ordinary persons (DBO)
IEC 61851-1	Electric vehicle conductive charging system – Part 1: General requirements
IEC 62040-1:2008+A1	Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS
IEC 62262	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
IEC 62368-1	Audio/video, information and communication technology equipment - Part 1: Safety requirements
IEC 62384	DC or AC supplied electronic control gear for LED modules – Performance requirements
IEC 62477-1	Safety requirements for power electronic converter systems and equipment – Part 1: General (excluding clauses for testing sonic pressure and sound level testing, impulse voltage tests, vibration tests and salt mist tests)
IEC 62560	Self-ballasted LED-lamps for general lighting services by voltage > 50 V – Safety specifications
ANSI/UL 69	Electric-Fence Controllers

Electricity metering equipment (a.c.) high current tests

IEC 62052-31	General requirements, tests and test conditions – Product safety requirements and tests: Clauses 6.10.6.4 Endurance, 6.10.6.5 Surge voltage, 6.10.6.6 Rated safe short-time current, 6.10.6.7 Rated operational sort time current and 6.10.6.8 Rated short-circuit making capacity only
IEC 62053-11	Electromechanical meters for active energy (classes 0,5, 1and 2): Clause 7.2 Influence of short-time overcurrents only
IEC 62053-21	Static meters for active energy (classes 1 and 2): Clause 7.2 Influence of short-time overcurrents only
IEC 62053-22	Static meters for active energy (classes 0,2 S and 0,5 S): Clause 7.2 Influence of short-time overcurrents only
IEC 62053-23	Static meters for reactive energy (classes 2 and 3): Clause 7.2 Influence of short-time overcurrents only
IEC 62055-11	Payment systems - Particular requirements - Static payment meters for active energy (classes 1 and 2): Clauses C.3 Electrical endurance, C.5 Fault current making capacity, C.6 Short-circuit current carrying capability, C.7 Minimum switched current and C.8 Dielectric tests only
NMI M 6-1	Electrical Meters: Metrological and Technical Requirements: Clause A.2.16 Short-time overcurrents (in accordance with AS 1284.1, AS 62053.21 and AS 62053.22) only
EN 50470-3	Electricity metering equipment (a.c.). Particular requirements. Static meters for active energy (class indexes A, B and C): Clauses 8.6 and 8.7.8 only

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SANS 1524-1	Payment meters: Clauses 7.4 and 7.9 only
SANS 62055-31	Static payment meters for active energy (classes 1 and 2): Annex C only

5.97 High Voltage

(a) Direct voltage
(b) Alternating voltage
(c) Impulse voltage

Calibration of DC, AC 50 Hz, and Impulse Voltage measuring equipment using sphere gaps to IEC 60052 and equivalent national standards over the following ranges

DC voltage either polarity 8 kV to 99 kV	5 %
50 Hz ac voltage (peak) 8 kV to 150 kV	3 %
Negative impulse 8 kV to 366 kV	3 %
Positive impulse 11.2 kV to 395 kV	3 %

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