



RULES OF THE ELECTRICAL WORKERS REGISTRATION BOARD

ESSENTIAL CAPABILITIES FOR ELECTRICAL REGISTRATION

Issued by:
N J J Sickels
Registrar
6 August 2010

Introduction

In its Gazette notice which was published on 1 April 2010 the Electrical Workers Registration Board (the Board) set out the requirements/standards for new classes of registration and the limits of work applicable to those classes.

In reaching its decisions in relation to the new classes of registration the Board noted that the system used for the registration for electricians has proved very sound and robust since its introduction eight years ago and has been commended and widely adopted by the electrical industry and Industry Training Organisations.

The Board has used that system as a model for the new classes of registration.

That system has Trans Tasman electrical registration competencies incorporated into the national qualification framework with Board examinations used as measurement tools for specific unit standards.

A key aspect of the approach by the Board to the new classes of registration is the opportunity for people to progress through the electrical registration competencies without the need to undertake a complete retraining when a person wishes to aspire to a different category of registration. This will be achieved by a series of stepping blocks that can be built upon at any time to advance a persons skills and competencies in electrical work.

Matrix showing applicability of Trans Tasman electrical competencies to classes of registration

The attached chart shows the Trans Tasman electrical competencies and how those competencies relate to each of the Board's classes of registration.

There are sixty-six core competencies and of that number thirty-three are critical competencies. The thirty-three critical competencies are included in the subject matter which is examinable in the Board's registration examinations and are shown in red in the matrix.



John Sickels
Registrar
6 August 2010

MATRIX SHOWING HOW TRANS TASMAN ELECTRICAL CAPABILITIES RELATE TO CLASSES OF REGISTRATION

Core Cap No.	Topic subject matter.	Essential Capabilities description	Critical Competencies	1 E	2 EI	3 Eng	4 I	5 EST	6 EAS	7 AT	8 LM	9 C
1	Theory - Electrical and energy concepts	Demonstrate knowledge of basic electrical and energy concepts. Fundamentals of electrical energy, other energy forms, voltage, current and resistance.		☑	☑	-	-	☑	☑	☑	☑	☑
2	Theory - Effects of current	Demonstrate knowledge of the various effects of electric current Physiological effects on humans, heating and other energy conversion effects and principles.	y	☑	☑	-	-	☑	☑	☑	☑	☑
3	Theory - Resistance	Demonstrate knowledge of resistivity and resistors. Ohm's law, material resistivity, resistor parameters and introduction to measuring methods.		☑	☑	-	-	☑	☑	☑	☑	☑
4	Theory - EMF production	Demonstrate knowledge of the various sources of electromotive force (e.m.f.). How electrical energy is produced from various forms of energy, including batteries.		☑	☑	-	-	☑	☑	☑	☑	☑
5	Theory - Simple circuits	Explain the operation of a simple practical circuit. Include current path, circuit control, load, EMF source and conductors.	y	☑	☑	-	-	☑	☑	☑	☑	☑
6 Pract	d.c. - Resistance, voltage, current and power	Determine the resistance, voltage, current and power in any part of a DC circuit using theory and actual measurement methods. Theoretical and <u>practical</u> knowledge of measuring instrument use and safe practises whilst using instruments. Include series and/or parallel circuit analysis.	y	☑	☑	☑		☑	☑	☑	☑	☑
7	d.c. - Capacitance and inductance	Demonstrate knowledge of the theory and application of Capacitors and Inductors. Concepts and characteristics of Capacitors and Inductors and their application in DC circuits.		☑	☑	-	-	☑	☑	-	-	-

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8	Theory – Magnetic theory	Demonstrate knowledge of permanent and electro magnetic theory and applications. Magnetism, magnetic induction, magnetic fields and fundamental magnetic quantities.		☑	☑	-	-	-	-	-	-	-
9	Theory - Electromagnetic induction	Demonstrate knowledge of electromagnetic induction and state practical examples which make use of this principle. Principles of EMF induced in a conductor and its application in electrical machines and devices.		☑	☑	-	-	☑	☑	☑	☑	☑
10	a.c. - Capacitance and inductance	Demonstrate knowledge of Capacitance and Inductance in AC circuits and their effects. To include calculation of capacitive and inductive reactance, effects on V and I phase relationships, resonance and impedance in AC series and parallel circuits.		☑	☑	-	-	☑	☑	-	-	-
11	a.c. Measurements - V, A, P, pf	Demonstrate knowledge of alternating voltage & current generation, phase relationships, energy in an AC circuit, and actual measurement methods. Explain sinusoidal voltage generation and resultant current flow. Define key terms, calculate and apply measuring techniques to derive required parameters. Eg power factor.	y	☑	☑	-	-	☑	☑	☑	☑	☑
12	System theory - 3 –phase systems	Describe Star and Delta three phase AC systems and the reason why three phase is used. Multiphase systems and their advantages – reduced current flow, equipment size etc. Calculation (phase diagrams) of line and phase voltages.		☑	☑	-	-	☑	☑	☑	☑	☑

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13 Pract	Application theory	Demonstrate an understanding of the fundamental safety principles of AS/NZS3000:2007. Definitions, alterations, protection, design, selection and installation of electrical equipment for electrical safety requirements. This includes protection from direct and indirect contact.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14	System theory – pf correction, real and apparent power	Demonstrate knowledge of power factor, power factor improvement principles and power measurement techniques to AC circuits in 1 phase and multiphase systems Consequences of low power factor, value of capacitance required for correction, measurement theory and methods to obtain real power and apparent power values.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	-	-	-	-
15	3ph-Motor/Alternators Theory	Describe the rationale and operating principles and characteristics of three phase induction motors and generators Concept of a rotating magnetic field, stator and rotor construction. Power, torque and speed relationships.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-
16	3ph-Motor/Alternators Selection, starting, protection	Describe methods of electric motor selection, starting, connection and protection Reduced current starting, methods of starting (star-delta etc), typical motor lead terminations and protection (including by electronic devices) of the motor from environmental, overload, internal faults and supply variation conditions.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	-	-	-	-

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17	<u>3ph-Motor/Alternators AS/NZS 3000 Requirements</u>	Describe the AS/NZ 3000:2007 and local Supply Authority requirements for three phase motor installations and starters Design of motor circuits for operator control, isolation, automatic starting and emergency stopping. Starting methods required by the local supply authority to limit the transient current.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-	-	-	-
18 Pract	<u>3ph-Motor/Alternators Fault diagnosis</u>	Describe the possible causes of malfunction of three phase induction motors and demonstrate the tests required for diagnosing faults Common causes of malfunction – starting equipment failure, insulation deterioration, water ingress etc. Common testing methods – voltage, ampere and insulation resistance checks.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	-	-	-	-
19	<u>1ph-Motors Theory</u> -	Describe the operating principles, typical control methods and characteristics of single phase motors and their key components. The rotating magnetic field and components for single phase motors, methods to achieve starting and operating torque. Control methods used including voltage/speed reduction, reversal and impact on performance.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-
20	<u>1ph-Motors Selection, and fault finding</u> -	Describe the suitability of various types of single phase motors for particular applications and describe the fault finding methods. Application of various motor starting/operating torque curves to various mechanical loads. Eg drills, fans and pumps etc.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-

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21 Pract	System theory - Earthing of installations fittings and appliances	Describe and apply in practice the requirements of AS/NZ 3000:2007 in relation to earthing arrangements and fault loop impedance calculations. Earthing arrangements for protective and functional purposes, earthing connections and conductor selection. Calculation of the correct cable size for an installation to achieve protective device and cable co-ordination.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
22 Pract	System theory - MEN systems	Demonstrate a comprehensive knowledge and understanding of the MEN system and its application, including on sub-installations. Multiple Earthed Neutral arrangement, resultant fault current path and magnitude, operation of protective devices and implication of MEN link absence during fault condition.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
23	Transformers Construction	Describe the basic construction of transformers. Design of different types of core lamination styles, winding types and assembly techniques.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
24	Transformers Operating principles	Demonstrate understanding of the principle of operation of transformers. Production of secondary winding induced EMF from primary winding and core. Open circuit and full load parameters.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
25	Transformers Main types	List the main types of transformers. Single and double wound, auto, current and voltage transformers.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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26	<u>Transformers</u> Application and safety issues	List typical applications of various types of transformers and key safety issues. Distribution and transmission systems, large consumers' installations, within electrical equipment, appliances including welders. Safe working procedures when connecting and testing transformers.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
27	<u>Protection and Control</u> Protection characteristics	Describe and apply in practice the requirements for circuit protection using AS/NZS 3000:2007 and other relevant Australian Standards. Causes of excess current (and voltage) within a circuit. Calculation and selection of protective devices to satisfy the required Standards.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
28	<u>Protection and Control</u> RCD characteristics	Demonstrate knowledge of the SELV, PELV and earth leakage current protection systems and their application in accordance with AS/NZS 3000:2007. Protection against both direct and indirect contact using SELV and PELV systems. Protection using Residual Current Device.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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29 Pract	<u>Cables and Cords</u> Selection of mains and submains	Demonstrate the ability to select cables for mains and submains using AS/NZS 3000:2007 and AS/NZS 3008.1.2 based on current carrying capacity, short circuit capacity, maximum demand and voltage drop, for single phase and three phase installations including multiple installations. Determination of maximum demand, voltage drop, interpretation of cable supplier data tables and the impact of various installation methods. Selection of the appropriate cable installation route/method.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	-	-
30 Pract	<u>Cables and Cords</u> Selection of final subcircuits	Demonstrate the ability to select cables for final subcircuits using AS/NZS 3000:2007 and AS/NZS 3008.1.2 based on current carrying capacity, short circuit capability, maximum demand, earth loop impedance and voltage drop. Application of maximum demand methods to calculate current requirements and ensure voltage drop is within specification, evaluation of the installation method.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	-	-
31 Pract	<u>Protection and Control</u> Selection of control and protection equipment	Describe the control and protection requirements for installations and equipment. Demonstrate the ability to select suitable equipment and switchgear for a particular installation or part of an installation. Main board controls, sub-installation control and submain/final subcircuit controls. Assessment of the prospective short circuit current and operating current. Selection of equipment and suitable protection equipment to protect conductors and installed equipment. Inclusion of RCD's where required.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	-	-

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			Critical item	1 E	2 EI	3 Eng	4 I	5 EST	6 EAS	7 AT	8 LM	9 C
32	<u>Switchboards</u>	Demonstrate an understanding of the AS/NZS 3000:2007 and regulatory requirements for the location of switchboards and arrangement of switchboard equipment in installations Suitable locations for switchboards (eg well ventilated and dry) including personnel access requirements. Requirements for metering and equipment positions and the identification of switchboard equipment (and the switchboard).		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	-	-	-	-
33 Pract	<u>Damp and wet areas</u>	Demonstrate an understanding of the AS/NZS 3000:2007 and regulatory requirements for the installation of electrical equipment in given damp situations and wet areas. Damp zones and related equipment requirements. Assessment of the earthing requirements and wiring systems for damp and wet areas as per Section 8 of the AS/NZS 3000:2007 Wiring Rules.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-
34 Pract	<u>Testing - Constuction Sites</u>	Demonstrate the appropriate methods for the installation, modification and testing of electrical installations and equipment for construction and demolition sites, complying with AS/NZS 3012 and applicable workplace safety legislation. Assessment of supply requirements, final circuit protection and socket outlet requirements. Portable tool tagging requirements to AS/NZS 3760 and electrical installation testing requirements.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-

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35 Pract	<u>Cables and Cords Overhead and underground</u>	Demonstrate knowledge of AS/NZS 3000:2007 requirements for the installation of aerial conductors and underground wiring. Various types of aerial conductors and their application/installation methods. Assessment of underground and aerial conductor ratings and selection process. Underground cable installation systems.	y	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>		-	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
36	<u>Hazardous areas</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements for electrical installations in hazardous areas and an awareness of the standards to which it refers (e.g. AS60079.14 and 60079.17) Basics as set out in AS/NZS 3000:2007, awareness of concepts and practices in specialised standards.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-
37	<u>Emergency systems</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements and the standards referenced for special electrical installations including emergency systems, and construction/demolition sites. Standards for special installations eg Movable premises, Caravan parks AS/NZS3001 and Shows and Carnivals AS/NZS 3002, High Voltage Neons AS/NZS 3832, standards for the electrical installations of emergency systems and construction/demolition sites.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	-	-

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38 Pract	<u>Statutory testing and inspection requirements</u>	<p>Describe and perform to AS/NZS 3000:2007 the electrical checks and tests required to ensure electrical installations are safe.</p> <p>Tests to ensure the requirements of the Standards have been met, include: visual checks, testing energised and de energised circuits – earth continuity, insulation resistance, polarity test, fault loop impedance tests etc.</p>	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
39 Pract	<u>Certification, verification, WOEF</u>	<p>Demonstrate the reporting of test results for an electrical installation as typically required to satisfy regulatory requirements.</p> <p>Statutory documentation requirements and the practices necessary to achieve compliance.</p>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
40 Pract	<u>Isolation Equipment and Personal safety</u>	<p>Demonstrate the knowledge and skill to perform effective safe isolation of any equipment, including switch and lock off, circuit isolation, equipment testing and tagging procedures.</p> <p>The sequential steps needed to achieve an isolated, tested and safe work area. Preparation of a written isolation procedure.</p> <p>Demonstrate understanding of the requirements for personal safety in the workplace including safe isolation and application of safety practices</p> <p>Adoption of safe working practices, incident reporting process and responsibility to co-workers. Reference to safe electrical work guidelines issued by regulators, including supervision requirements applying to apprentices and trainees.</p>	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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41 Pract	<u>Cables and Cords Specifications</u>	Describe the construction, specifications, colour coding and application of various types of cords and cables. Conductor material, stranding, colour coding, sheathing types and other construction parameters of cords and cables. Typical application examples of the various cable types and interpretation of cable manufacturers' data.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
42 Pract	<u>Cables and Cords Termination of cords</u>	Demonstrate the skill to prepare and terminate cords and cables. Requirements for cable jointing and termination in a variety of installation situations and accessories.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
43 Pract	<u>Fixing methods for fittings and Appliances</u>	Demonstrate the Selection and attachment of electrical accessories, using appropriate fixing devices and methods. Various fixing devices, methods and the tools which may be used – need for safety whilst performing this work.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
44 Pract	<u>Cables and Cords Install and terminate cables</u>	Demonstrate the knowledge and skill to install and terminate a variety of electrical cables in a wide range of applications (including final subcircuits) to AS/NZS3000:2007. Installation requirements for a wide range of typically used electrical cables in a variety of situations: e.g. thermoplastic, elastomer sheaths, XLPE, high temperature cables. Separation from other services (and fire wall penetrations).	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-
45 Pract	<u>Cables and Cords Support systems</u>	Demonstrate the knowledge and skills for the installation of wiring support systems Steel conduit, PVC conduit, ladder/perforated tray, trough/duct, including ratings, space, etc.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	-	-

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46 Pract	<u>Testing and inspection methods</u>	Describe and perform the circuit tests required for electrical cables in a range of installations, with attention to the final subcircuit tests. Earth continuity, insulation resistance, fault loop impedance, polarity and correct circuit connection tests.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-
47 Pract	<u>Cables and Cords Switchboard terminations</u>	Install final subcircuit wiring into switchboards and connect to switchboard equipment in accordance with AS/NZS 3000:2007 and local supply authority requirements. Termination of subcircuit cabling at switchboards and connection to components.	y	<input checked="" type="checkbox"/>								
48 Pract	<u>Cables and Cords Consumer main termination</u>	Connect consumers mains to an installation, in accordance with AS/NZS 3000:2007 and local supply authority requirements. Installation of consumers' mains in buildings and underground. Termination at pillars, pits and mains connection boxes. Bonding of metallic meter enclosures.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
49	<u>Cables and Cords MIMS cables</u>	Determine and apply AS/NZS 3000:2007 and AS/NZS 3008.1.2 requirements for the installing, terminating and testing of MIMS and Armoured cables. This is to include the cable type selection to AS/NZS60079.14 (or other standards) requirements. Assessment of cable ratings according to installation method and location. Installation and termination of MIMS and armoured cables and accessories and necessary tests.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		part	-	-	-	-

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50	<u>Cables and Cords</u> Catenary and trailing cables	Determine and apply AS/NZS 3000:2007 requirements for the installing, terminating and testing of catenary supported cables, pendant-type socket outlets and trailing cables. Assessment of the requirements for installation of cables and accessories supported by catenary wire, techniques of installing trailing cables.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	-	-
51 Pract	<u>Read and interpret diagrams</u>	Demonstrate ability to read, sketch and interpret electrical diagrams. Purpose and characteristics of schematic, block and wiring diagrams, typical symbols used.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
52 Pract	<u>Design and connect switching circuits</u>	Design and connect switching circuits, including via electronic logic controls, as per AS/NZS 3000:2007. Lighting and equipment control circuits.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	-	-	-	-
53	<u>Statutory safety requirements</u> H&S, Supervision	Describe basic statutory occupational safety and health responsibilities for employers and employees, including supervisory requirements and employees' own "duty of care". Occupational Safety and Health regulations and electrical safety regulations - legal requirements, safety committees and duty of care.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
54 Pract	<u>Application safe working practices including safe isolation.</u>	Adoption of safe working practices, incident reporting process and responsibilities to co-workers, safe working guidelines including supervision of trainees and apprentices.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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55	<u>Hazard assessment</u>	Describe a workplace safety check, identify potential workplace hazards and suggest measures for accident prevention. Workplace safety inspections. Reference to guidelines issued by both electrical safety regulators and general workplace safety regulators including the supervision requirements applying to apprentices/trainees.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
56 Pract	<u>Safe use of equipment</u>	Demonstrate the knowledge and practices that are essential for working safely with electrical equipment and tools and knowledge of testing and tagging procedures to AS 3760. Testing and tagging procedures, common causes and prevention of electric shocks and incidents .Safe use of hand and power tools , including power actuated fastening devices, ladders, elevated work platforms, etc.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
57	<u>Rescue methods from live conductors and equipment</u>	Fundamental principles of emergency rescue procedures.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

MATRIX SHOWING HOW TRANS TASMAN ELECTRICAL CAPABILITIES RELATE TO CLASSES OF REGISTRATION

Core Cap No.	Topic subject matter.	Essential Capabilities description	Critical Competencies	1 E	2 EI	3 Eng	4 I	5 EST	6 EAS	7 AT	8 LM	9 C
58 Pract	<u>CPR and basic first aid</u>	Describe the method of rescuing a person in contact with live electrical conductors or equipment. Fundamental principles of emergency procedures. Describe the emergency first aid requirements for an electric shock victim and demonstrate the knowledge and application skill of EAR and CPR. Application and learning of <u>EAR</u> and CPR procedures to resuscitate and stabilise a victim. Use of fire extinguishers to control electrical fire at accident site.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
59	<u>High Voltage System - Dangers</u>	Demonstrate knowledge and understanding of dangers associated with High Voltage equipment and distribution systems. Step and touch voltages, induced voltages, creepage and clearance requirements. Stored energy and earthing requirements. SWP.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
60	<u>Expert assistance Mechanical</u>	Describe the types of potential operational situations that may be encountered in various areas of industry that will require assistance from more experienced industry personnel. Eg 1. The need to isolate and earth an item of equipment supplied at High Voltage, for repair or maintenance work. Eg 2. The need to sequentially shutdown and isolate a gas fired boiler in preparation for electrical maintenance.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Core Cap No.	Topic subject matter.	Essential Capabilities description	Critical Competencies	1 E	2 EI	3 Eng	4 I	5 EST	6 EAS	7 AT	8 LM	9 C
61	<u>Expert assistance Electrical</u>	Describe the type of assistance that may be needed for operational situations that could be encountered in various areas of industry. Continuing the above examples Eg 1.Consulting experienced local operational personnel to obtain advice on H V Switching procedure and earthing arrangements. Eg 2. Consulting experienced personnel for the advice to shut down the boiler in a safe manner.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
62 Pract	<u>Commission and decommission equipment and appliances</u>	Describe methods of commissioning and/or decommissioning electrical equipment or an installation, using a systems approach. Commissioning: Circuit voltage testing, phase rotation checks, systematic loading up, correct installation functioning and instrumentation/-control parameter checks. Decommissioning: Identification of all circuits, impact on other equipment, isolation, tagging, testing, securing and earthing where required, safe removal of equipment/ conductors.	y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-
63	<u>Circuit operation</u>	Describe the functioning of basic electronic circuits used in common electrical power circuit applications including related hazards and safety requirements. Basic theory and measurement. Common applications are motor starters, lighting dimmers, inverters, line conditioners, smoke alarms, backup supplies, etc. Hazards and safety requirements associated with Static Electricity Discharge from components.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	<input checked="" type="checkbox"/>	-	-	-	-

Legend E = Electrician, EI = Electrical Installer, Eng = Electrical Engineer, (I = Inspector), EST = Electrical Service Technician, EAS = Electrical Appliance Serviceperson, AT = Associated Tradesperson, LM = Line mechanic, C = Cable joiner

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64	<u>d.c. motors</u>	Describe basic control techniques and diagnostic methods for simple DC motor control circuits and applications Understanding of concepts and basic applications in modern plant systems including motor interlocking safety issues.		☑	☑	-	-	☑	☑	-	-	-
65 Pract	<u>Lighting</u>	Demonstrate an understanding of the basic operation of various types of luminaires and the purpose of components and ancillary equipment including related hazards and their safety requirements. HP and LP discharge luminaires, fluorescent luminaires, filament luminaires etc. used in lighting systems together with their respective ancillary equipment and related hazards and safety requirements. Refer to AS/NZS 3000:2007.		☑	☑	☑	-	☑	-	-	-	-
66 Pract	<u>Fault diagnosis</u>	Demonstrate the knowledge and skills for diagnosing and rectifying faults in electrical apparatus and associated circuits. Required for safe working practices with electrical systems and installations. All repairs must be compliant with the relevant standards. This item is crucial as all previous skills are utilised to effectively perform a fault find function.	y	☑	☑	☑		☑	☑	☑	☑	☑
	<u>Areas of additional coverage</u>											

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	<u>Construction sites</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements and the relevant companion standards referenced in Schedule 2 for special electrical installations including emergency systems, and construction/demolition sites.		☑	☑	☑		-	-	-	-	-
	<u>Medical electrical areas</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements and the relevant companion standards referenced in Schedule 2 for specialized electrical installations including emergency systems.		☑	☑	☑		-	-	-	-	-
	<u>Shows and Carnivals</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements and the relevant companion standards AS/NZS3002 referenced in Schedule 2 for special electrical installations including emergency systems.		☑	☑	☑		-	-	-	-	-
	<u>Caravan parks Caravans</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements and the relevant companion standards AS/NZS3001 referenced in Schedule 2 for special electrical installations including emergency systems.		☑	☑	☑		-	-	-	-	-
	<u>Marinas Pleasure vessels</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements and the relevant companion standards AS/NZS3004 referenced in Schedule 2 for special electrical installations including emergency systems.		☑	☑	☑		-	-	-	-	-
	<u>Security Fence Systems</u>	Demonstrate knowledge of the AS/NZS 3000:2007 requirements and the standards referenced for special electrical installations including emergency systems, and construction/demolition sites.		☑	☑	☑		-	-	-	-	-

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