



GUIDELINES FOR COMPETENCY-BASED TRAINING AND ASSESSMENT OF ELECTRICIANS



1. SCOPE

This document contains the guidelines referred to in the ETITO AMAP [Ref: 0003]. They are not a set of guidelines against individual unit standards, but summarise the provisions that have been put in place to ensure that the present competency based qualifications for electrical apprentices will also lead to the necessary registration as electrician by the Electrical Workers Registration Board [EWRB].

2. OUTLINE OF ELECTRICAL TRAINING UNDER NATIONAL QUALIFICATIONS

The vocational training of apprentices in New Zealand is based on unit standards of competency and qualifications on the National Qualifications Framework [NQF] of the New Zealand Qualifications Authority [NZQA]. The qualification for electrical apprentices under this system is the National Certificate in Electrical Engineering [Electrician for Registration] [Level 4] [Ref:1195]. The standard setting body, representing industry training interests, is ETITO.

For reference, Appendix 1 is a summary of the unit standards required for the National Certificate in Electrical Engineering [Electrician for Registration] [Level 4] [Ref:1195].

To work effectively in industry, most electricians need to obtain registration and a practising license at the end of their apprenticeship. Registration and licensing are functions administered by the Electrical Workers Registration Board [EWRB] of the Ministry of Economic Development, under provisions of the Electricity Act 1992. The training requirements necessary for registration are prescribed in Schedule 1 of the Electricity Regulations 1997. They were promulgated at the time of the former time-based apprenticeship system, leading to Trade Certificates; i.e. prior to the arrival of the NQF.

In order to align the requirements of the modern training system on one hand with registration requirements on the other, a number of special conditions apply to the usual assessment and moderation processes associated with competency based training. These are expressed in a memorandum of understanding between EWRB and ETITO.

These guidelines document the registration requirements and the special requirements relating to unit standard assessments and moderation, to facilitate proper implementation of the intent of the EWRB/ETITO memorandum.

3. REGISTRATION AS ELECTRICIAN

The EWRB recognises the National Certificate in Electrical Engineering [Electrician] [Level 4] [Ref:0313] qualification, together with the EWRB Theory examination as meeting the formal training, theory, regulations, and practical assessment requirements of the First Schedule for registration as an electrician. Note that the method of assessment of unit standard 1702 - Demonstrate knowledge of, and apply electrical legislation, codes of practice and standards, is the EWRB written regulations examination.



When applying for registration, applicants are required to:

- Provide a copy of their National Certificate in Electrical Engineering [Electrician] [Level 4] [Ref:0313]
- Provide a copy of the EWRB Theory examination result
- Complete EWRB's application form
- Pay the EWRB registration fee

The EWRB recognises the National Certificate in Electrical Engineering [Electrician for Registration] [Level 4] [Ref:1195] qualification as meeting the formal training, theory, regulations, and practical assessment requirements of the First Schedule for registration as an electrician. Note that the method of assessment of unit standard 1702 - Demonstrate knowledge of, and apply electrical legislation, codes of practice and standards, is the EWRB written regulations examination. The assessment method of unit standard 21766 – Demonstrate knowledge of theory for electricians, is the EWRB theory examination.

When applying for registration, applicants are required to:

- Provide a copy of their National Certificate in Electrical Engineering [Electrician for Registration] [Level 4] [Ref:1195]
- Complete EWRB's application form
- Pay the EWRB registration fee

4. ASSESSMENT AGAINST UNIT STANDARDS

As for all NQF unit standards, training providers must be accredited by NZQA to assess against specific unit standards or groups of unit standards. ETITO is involved in the accreditation process of new providers, and is consulted at the time of re-accreditation.

Assessment of competency is based on a collection of evidence model to support judgement of competence against the unit standards.

Judgement of competence against the unit standards must meet tests of:

- Sufficiency of evidence
- Validity
- Repeatability
- Fairness
- Consistency

Unit standards involved in the training of electricians are designated in a special note as either on-job or off-job. This designation relates to the intended and usual method of training delivery and assessment; i.e. whilst on the job, or away from the job at an accredited training facility.



Assessment of unit standards involving prescribed electrical work must be carried out by assessors who are also Supervisors of Electrical Work. These unit standards are usually, though not exclusively, designated on-job. The terms prescribed electrical work and Supervisor of Electrical Work are defined in the Electricity Act 1992.

Definitions from the Electricity Act 1992, Part I, 2. Interpretations:

‘Prescribed electrical work’ means electrical work prescribed in regulations made under section 169 of the Electricity Act 1992, being work that falls into any of the following categories —

- The construction or maintenance of electrical installations;
- The maintenance of electrical appliances;
- The connection or disconnection of works, electrical installations, and electrical appliances to or from a power supply, other than by means of:
 - A plug; or
 - An appliance inlet; or
 - A pin
 - That is inserted into a socket outlet
- The construction or maintenance of works.

‘Supervisor of electrical work’ means:

- A registered electrical service technician who has had in total not less than 3 years’ qualifying experience;
- A registered line mechanic who has had in total not less than 3 years’ qualifying experience;
- Subject to subsection [2] of this section, a registered electrician who has had in total not less than 3 years’ qualifying experience;
- A qualified engineer who, while registered under the Engineers Registration Act 1924 or the Engineering Associates Act 1961, has had in total not less than 3 years’ qualifying experience;
- A registered electrical inspector.

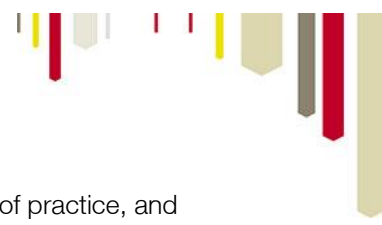
It should be noted that:

The qualifications of training providers are quality assured at the time of accreditation and moderation.

For assessments, training providers are required to follow the undertakings they have set out in their accreditation documentation.

ETITO policy requires that workplace assessors registered to assess unit standards of the National Certificate in Electrical Engineering [Electrician for Registration] [Level 4] [Ref:1195] must qualify as Supervisors of Electrical Work [see para. 4.6], as well as be trained in the use of appropriate assessment tools.

A special condition applies to the assessment of two unit standards



Unit Standard 1702 - Demonstrate knowledge of, and apply electrical legislation, codes of practice, and standards. The only valid assessment tool for this unit is the EWRB Regulations Examination. Training providers may grant credit for this unit standard only after sighting a pass in this examination.

Unit Standard 21766 - Demonstrate knowledge of theory for registration of electricians. The only valid assessment tool for this unit is the EWRB Theory Examination. Training providers may grant credit for this unit standard only after sighting a pass in this examination.

5. INFORMATION ABOUT MODERATION

ETITO operates a moderation system to ensure that assessments against unit standards are fair, valid, and consistent on a national basis. Training providers are expected to engage with this system as a normal condition of their accreditation.

ETITO moderation system covers all of the unit standards in the National Certificate in Electrical Engineering [Electrician for Registration] [Level 4] [Ref:1195], except for the following generic units, which are moderated by other Standard Setting Bodies:

- 1277 Communicate information in a specified workplace
- 1978 Identify basic employment rights and responsibilities, and sources of information and assistance
- 6401 Provide first aid
- 6402 Provide resuscitation level 2
- 3492 Write a short report

6. ADDITIONAL INFORMATION

For further information, please contact

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APPENDIX 1

Unit standards in
National Certificate in Electrical Engineering [Electrician] [Level 4]

Version 3

Level 2 – All off-job unit standards			
Unit no.	Unit title	Level	Credit
750	Demonstrate knowledge of electrical test instruments and take measurements	2	2
1277	Communicate information in a specified workplace	2	3
1978	Identify basic employment rights and responsibilities, and sources of information and assistance	1	2
2780	Operate a personal computer system	2	6
6401	Provide basic first aid	2	1
6402	Provide basic life support	1	1
15843	Demonstrate knowledge of magnetism and electricity	2	15
15844	Select and install flexible cords	2	3
15845	Draw and explain simple electrical diagrams	2	3
15846	Demonstrate knowledge of capacitors, semiconductor diodes, and rectification	2	3
15847	Demonstrate knowledge of mathematics and mechanics for electrical trades	2	4
15848	Demonstrate knowledge of safeguards for use with portable electrical appliances	2	2
15849	Perform manual soldering and de-soldering procedures for electrical work	2	2
15851	Demonstrate knowledge of electrical safe working practices	2	2
15852	Demonstrate knowledge of electrical testing to ensure safety	2	3

Level 3 – All off-job unit standards			
Unit no.	Unit title	Level	Credit
1184	Test, and locate and diagnose faults in electrical machine windings	3	2
1204	Demonstrate knowledge of earthing	3	2
2031	Demonstrate knowledge of three phase theory	4	4
3492	Write a technical report	2	3
6705	Test electrical appliances for safety	3	2
15850	Demonstrate knowledge of single phase transformers	3	3
15853	Demonstrate knowledge of alternating current [a.c.] theory	4	7
15854	Draw and interpret electrical diagrams	3	3
15855	Demonstrate knowledge of circuit protection	3	3
15856	Demonstrate knowledge of the electricity network and the multiple earthed neutral system of supply	3	2
15858	Demonstrate knowledge of a.c. motors	4	5
15859	Demonstrate knowledge of electric cables and accessories	3	7
15860	Demonstrate knowledge of legislation and standards governing the work of electricians	3	2
15861	Demonstrate knowledge of direct current [d.c.] power supplies	3	3
15871	Demonstrate knowledge of electrical installation in damp situations	4	3



Level 3 – On-Job Unit Standards

Unit No.	Unit Title	Level	Credit
1174	Disconnect and reconnect fixed wired electrical appliances or equipment	3	4
1178	Follow safe practices in an electrical workplace	2	3
1192	Fault-find, repair, and test portable electrical tools and appliances	3	4
2016	Install an earthing system for multiple-earthed neutral installation	3	3
2020	Install cable support systems	3	4
15867	Install, wire, and test lights in existing installations	3	5
15868	Install, wire and test power outlets in existing installations	3	5
16407	Use and maintain hand and power tools for electrical work	3	4
16408	Pre-wire electrical installations	3	5
16409	Fit-off electrical installations	3	5
16411	Fault-find, repair and re-commission fixed wired electrical appliances	3	4
16412	Fault-find, repair and re-commission electrical lighting	3	4

Level 4 – Off-job compulsory unit standards			
Unit no.	Unit title	Level	Credit
1205	Demonstrate knowledge of electrical switchboards	3	1
1206	Demonstrate knowledge of a.c. power and power factor	4	3
1702	Demonstrate knowledge of, and apply electrical legislation, codes of practice, and standards. Note: This unit is assessed by EWRB Regulations Examination. Training Providers to arrange credit on proof of exam pass.	4	8
1710	Demonstrate knowledge of electric lighting	4	3
2017	Describe and use complex electrical instruments	4	2
5926	Demonstrate knowledge of programmable logic controllers [PLC]	4	5
5929	Demonstrate knowledge of hazardous areas and their electrical requirements	4	3
5930	Demonstrate knowledge of electrical equipment for use in hazardous areas	4	2
15857	Demonstrate knowledge of three phase transformers	4	3
15862	Demonstrate knowledge of industrial process control	4	3
15863	Demonstrate knowledge of a.c. electric motor connections, starters, and speed controllers	4	4
15864	Demonstrate knowledge of semiconductor power devices	4	4
15866	Demonstrate procedures for examination and testing of electrical installations	4	2

Level 4 – Off-job compulsory unit standards			
Unit no.	Unit title	Level	Credit
2013	Install and commission a.c. rotating machines	4	5
2021	Plan, install, and commission a power supply on a construction or demolition site	4	2
5931	Select and install electric switchboards	3	4
15869	Install electric equipment in damp situations	4	3
15870	Test an installation for compliance with the regulations	4	3
16410	Plan, install, test and commission electrical installations	4	5
16413	Fault-find, repair, and test electric motors	4	8
16414	Carry out planned electrical maintenance work	4	6

Level 4 electives – Choose 25 credits from the list below or at Level 2 or above from any domains in the subfields of Electrical Engineering, Electronics Technology or Industrial Measurement and Control

Unit no.	Unit title	Level	Credit
15865	Demonstrate knowledge of d.c. machines	4	5
1173	Install and commission electrical appliances	4	5
2014	Overhaul a.c. rotating machines and control equipment	4	5
2030	Schedule and manage preventative maintenance for electrical equipment	5	6
5924	Install and commission d.c. rotating machines	4	5
5928	Overhaul d.c. rotating machines and control equipment	4	5
5933	Install and maintain electrical equipment in hazardous areas	4	3
10782	Install, commission and maintain standby supply systems	4	3
10783	Install, commission and maintain standby supply systems	4	3
10784	Overhaul electric space heating systems	4	3
10785	Overhaul electrical systems in air-conditioning and air handling equipment	4	3
10786	Overhaul electromagnetic switching devices	4	3
10787	Install and test transducers	4	2
10788	Operate industrial high voltage distribution systems	4	3
10789	Install, commission and maintain an uninterruptable power supply [UPS] system	4	4
12299	Shift loads in the performance of machinery and equipment installation and maintenance	2	3
16415	Install and commission extra-low voltage equipment	4	3
16416	Service bearings and seals in electrical rotating machines	2	1

APPENDIX 2

National Certificate in Electrical Engineering [Electrician for Registration] [Level 4] [Ref: 1195]

Level 2 – All off-job unit standards			
Unit no.	Unit title	Level	Credit
750	Demonstrate knowledge of electrical test instruments and take measurements	2	2
1978	Identify basic employment rights and responsibilities, and sources of information and assistance	1	2
6401	Provide first aid	2	1
6402	Provide resuscitation level 2	1	1
15843	Demonstrate knowledge of magnetism and electricity	2	15
15844	Select and install flexible cords	2	3
15845	Draw and explain simple electrical diagrams	2	4
15846	Demonstrate knowledge of capacitors and semiconductor diodes	2	3
15847	Demonstrate knowledge of mathematics and mechanics for electrical trades	2	4
15848	Demonstrate knowledge of safeguards for use with portable electrical appliances	2	2
15849	Perform manual soldering and de-soldering procedures for electrotechnology work	2	2
15851	Demonstrate knowledge of electrical safety and safe working practices for electrical workers	2	3
15852	Isolate and test low-voltage electrical sub circuits	2	2
	Total off-job		44