

**FIELD            ENGINEERING AND TECHNOLOGY****Review of *Electrical Engineering* unit standards**

<b>Subfield</b>	<b>Domain</b>	<b>Id</b>
Electrical Engineering	Core Electrical	750, 1174, 1178, 1206, 2017, 2031, 5907-5911, 5926, 5929, 5930, 5932, 5933, 6626, 15843-15854, 15856, 15857, 15861, 15862, 15864, 16407
	Electrical Appliance Servicing	6705
	Electrical Installation and Maintenance	1181, 1196, 1204, 1205, 1710, 2013, 2016, 2020, 2021, 2030, 5917, 5919-5922, 5924, 5925, 5931, 10782-10789, 15855, 15859, 15863, 15866-15871, 16408-16410, 16412, 16414, 16415
	Electrical Machines	1184, 2014, 5928, 15858, 15865, 16413, 16416
	Electrical Standards and Statutes	1702, 15860

The ElectroTechnology Industry Training Organisation has completed the review of the unit standards listed above that were registered between 1996 and 1999.

<b>Date new versions published</b>	<b>May 2005</b>
<b>New comments by date</b>	<b>May 2009</b>
<b>Expiry date of new versions of the unit standards</b>	<b>December 2010</b>

**Summary of review and consultation process**

The main driver for the review of these unit standards was the introduction of significant changes to the legislation and technical standards governing electrical work in Australasia. The opportunity was also taken to incorporate feedback from training providers and workplace assessment, moderation, and new documentation of industry safety and supervision practices. The changes were endorsed by the Electrical Engineering Advisory Group on 6 April 2004.

**Main changes resulting from the review**

- update of legislation, technical standards, and other references;
- numerous changes reflecting recent changes to legislation, technical standards, and guidelines;
- standardisation of special notes and terminology;
- standardisation of terms *current regulations and standards*, *safe and sound practice*, and *safe working practices*;

- unit standard 750 now includes digital instruments;
- unit standard 1702 updated to clarify and reflect changes in format of regulations examination;
- unit standard 1710 now includes an element on recessed lighting and expanded range statements;
- unit standard 15845 now includes block and wiring diagrams;
- unit standard 15849 title changed to make this standard more universally applicable;
- unit standard 15851 re-written in accordance with EWRB manual and supervision guidelines;
- unit standard 15852 re-written to better meet industry requirements;
- unit standard 15854 includes additional diagrams frequently required by industry;
- unit standard 15863 replaced with unit standard 20962, which now includes motor installation;
- unit standard 5933 is designated as expiring; on-job hazardous area standards are available in the domain *Electrical equipment in hazardous areas*;
- unit standards 1181, 1196, 5908, 5919-5921 are designated as expiring as they are no longer required by the industry;
- units 5910 and 5917 are designated as expiring as more appropriate standards are available;
- changes to titles and credits to better reflect usage;
- one new unit standard 20961 is introduced.

**Unit standards categorised as category C or D expire at the end of December 2006.**

### Impact on existing provider accreditations

Current Accreditation for			Accreditation extended to		
Nature of accreditation	Classification or Id	Level	Nature of accreditation	Classification or Id	Level
Subfield	Electrical Engineering	4	Standards	10783, 17056, 17058	5
Subfield	Electrical Engineering	2	Standard	15867	3
Domain	Core Electrical	4	Standards	17056, 17058	5
Domain	Electrical Installation and Maintenance	4	Standard	10783	5

### Impact on Accreditation and Moderation Action Plan (AMAP)

AMAP 0003 has been updated to reflect the changes made to the standards.

### Impact on existing qualifications

Qualifications that contain the reviewed standards or classifications are tabled below.

<b>Affected</b>	The qualification lists a reviewed classification (domain or subfield) in an elective set The qualification lists a standard that has changes to level or credits The qualification lists a C or D category standard
<b>Not materially affected</b>	The qualification lists a standard that has a new title The qualification lists a standard that has a new classification

The following ETITO qualifications are affected by the outcome of this review and will be revised/reviewed to take account of the changes in 2005/2006.

Qualification Title	Standards in the qualification
National Certificate in electrical appliance servicing [Ref: 0827]	15849, <b>15851</b> , 15856
National Certificate in Electrical Engineering (Level 2) [Ref: 0174]	<b>15845</b> , <b>15851</b> , <b>15852</b> , 15846, 15849
National Certificate in Electrical Engineering (Level 3) [Ref: 0223]	2031, <b>6705</b> , <b>15845</b> , 15846, 15849, 15850, <b>15851</b> , <b>15852</b> , 15856, <b>15858</b>
National Certificate in Electrical Engineering (Electrician) (Level 4) [Ref: 0313]	<b>1205</b> , <b>1206</b> , 2031, <b>5933</b> , 6705, <b>10783</b> , <b>15845</b> , 15846, 15849, 15850, <b>15851</b> , <b>15852</b> , 15856, 15857, <b>15858</b> , <b>15863</b>
National Certificate in Electrical Engineering (Motor Rewinding and Repair) [Ref: 0412]	<b>1206</b> , 15850, 15857, <b>15858</b> , <b>15863</b>
National Certificate in Electronic Engineering (Level 2) [Ref: 1092]	15849, <b>15851</b>
National Certificate in Electronic Engineering (Level 3) [Ref: 1093]	15849, <b>15851</b>
National Certificate in Telecommunications (Level 2) [Ref: 0338]	<b>15845</b> , 15846, 15849

The following ETITO qualifications are not materially affected by the changes. They will be updated when they are next reviewed or revised.

Qualification Title	Standard in qualification
National Certificate in Industrial Measurement and Control (Level 4) [Ref: 0410]	15849

The following qualifications are also affected by the outcome of this review. The standard setting bodies (SSBs) have been advised that they require revision.

Qualification Title	Classification or Id	SSB Name
National Certificate in Aeronautical Engineering (Related Technology) [Ref: 0381]	<b>5910</b> , <b>15845</b>	Aviation, Tourism and Travel TO
National Certificate in fire detection and alarm systems (Level 4) [Ref: 0569]	<b>15845</b> , 15846, 15849, <b>15851</b> , <b>15852</b>	Competenz
National Diploma in fire detection and alarm systems (Level 5) [Ref: 0866]	<b>5933</b>	
National Certificate in Fire Detection and Alarm Systems (Testing) (Level 3) [Ref: 0862]	<b>15845</b> , 15849	
National Diploma in Fire Protection Systems Technology (Certification of Fire Safety Systems) (Level 5) [Ref: 0867]	<b>15845</b> , 15846, 15849, <b>15851</b> , <b>15852</b>	
National Certificate in fire protection systems technology (Inspection and Testing) (Level 4) [Ref: 0864]	<b>15845</b> , 15849, 15851, <b>15852</b> , 15864	
National Certificate in Fixed Fire Protection Systems (Level 5) [Ref: 0865]	<b>15845</b> , 15849	
National Certificate in Fixed Fire Protection Systems (Level 3) with strands in Installation, and Testing [Ref: 0863]	<b>15845</b> , 15849	
National Certificate in Locksmithing (Level 4) [Ref: 0452]	<b>15845</b>	

Qualification Title	Classification or Id	SSB Name	
National Certificate in Electricity Supply (Electrical) (Level 3) with strands in Electrical Fitter, and Electrician [Ref: 0888]	<b>1205</b> , 2031, <b>6705</b> , 15850, 15856, <b>15858</b>	Electricity Supply ITO	
National Certificate in Electricity Supply (Electrical) (Level 2) with optional strands in Electrical Fitter, and Technician [Ref: 0887]	<b>15845</b> , 15846, 15849, <b>15851</b> , <b>15852</b>		
National Certificate in Electricity Supply (Operator) (Level 3) with strands in Hydro Operations, and Networks Operations [Ref: 0889]	<b>1205</b> , 2031, 15850, 15856, 15857		
National Certificate in Electricity Supply (Technician) (Level 3) with strands in Control and Instrumentation, Power Technician, and HVDC Technician [Ref: 0922]	<b>1205</b> , <b>6705</b> , 15850, 15856		
National Certificate in Extractive Industries (Introductory Skills) with strands in Surface Extraction, and Underground Extraction [Ref: 0247]	<b>15851</b>	NZ Extractive ITO	
National Certificate in Extractive Industries (Mineral Processing - Alluvial Gold) [Ref: 0641]	<b>15851</b> , <b>15852</b>		
National Certificate in Extractive Industries (Mineral Processing - Lime Mill Processing) [Ref: 0474]	<b>15851</b>		
National Certificate in Extractive Industries (Operations) with strands in Surface extraction, and Underground extraction [Ref: 0248]	<b>15851</b>		
National Certificate in Extractive Industries (Supervision) with strands in Surface Extraction, and Underground Extraction [Ref: 0249]	<b>15851</b>		
National Certificate in Gas Measurement (Level 3) [Ref: 0399]	<b>15845</b> , 15851, 15852		
National Certificate in Cablemaking (Level 2) with strands in Wiredrawing, Conductor Assembly, Extrusion, Cable Assembly, and Cable Testing [Ref: 0566]	15849, <b>15851</b>		PaMPITO
National Certificate in Cablemaking (Level 3) with strands in Wiredrawing, Conductor Assembly, Extrusion, Cable Assembly, and Cable Testing [Ref: 0738]	15849, <b>15852</b>		

The following qualification is not materially affected by the changes. It will be updated when it is next reviewed.

Qualification Title	Classification or Id	SSB Name
National Certificate in lifts and escalators (Level 4) with strands in Installation, and Servicing [Ref: 0662]	15849	Competenz

## Summary of main changes to standards' Ids, classification, titles, levels, and credits

The following summary shows the changes made to the standards as a result of the review. All changes are in **bold**. For D category unit standards suggested alternatives are in italics.

Key to review category	
<b>A</b>	Dates changed, but no other changes are made - the replacement standard carries the same Id and a new version number
<b>B</b>	Changes made, but the overall outcome remains the same - the replacement standard carries the same Id and a new version number
<b>C</b>	Major changes that necessitate the registration of a replacement standard with a new Id
<b>D</b>	Standard will expire and not be replaced

Subfield      Electrical Engineering  
Domain        Core Electrical

Id	Title	Level	Credit	Review Category
750	Demonstrate knowledge of electrical test instruments and take measurements	2	2	B
1174	Disconnect and reconnect fixed wired electrical appliances or equipment	3	4	B
1178	Follow safe practices in an electrical workplace	2	3	B
1206	Demonstrate knowledge of a.c. power and power factor	4	3 <b>4</b>	B
2017	Describe and use complex electrical instruments	4	2	B
2031	Demonstrate knowledge of three phase theory <b>Demonstrate knowledge of three-phase theory</b>	4	4	B
5907	Work safely with electrical equipment	2	1	B
5908	Recognise the impact of electrical regulations and codes of practice on consumers and users	2	1	D
5909	Explain basic atomic principles as applied to the electrotechnology industry	1	1	B
5910	Explain basic electrolytic action as applied to the electrotechnology industry	1	1	D
15843	<i>Demonstrate knowledge of magnetism and electricity</i>	2	15	
5911	Explain basic magnetism and electromagnetism as applied to the electrotechnology industry	1	1	B
5926	Demonstrate knowledge of programmable logic controllers (PLC) <b>Demonstrate knowledge of programmable logic controllers (PLCs)</b>	4	5	B
5929	Demonstrate knowledge of hazardous areas and their electrical requirements	4	3	B
5930	Demonstrate knowledge of electrical equipment for use in hazardous areas	4	2	B
5932	Protect circuits from static electricity and magnetic interference <b>Demonstrate knowledge of protection of circuits from static electricity and magnetic interference</b>	2	2	B

Id	Title	Level	Credit	Review Category
5933 17056 17058	Install and maintain electrical equipment in hazardous areas <i>Install explosion-protected electrical equipment in hazardous areas</i> <i>Maintain electrical equipment in hazardous areas</i>	4 5 5	3 9 9	D
6626	Demonstrate knowledge of electrical and electronic components	2	3	B
15843	Demonstrate knowledge of magnetism and electricity	2	15	B
15844	Select and install flexible cords	2	3	B
15845	Draw and explain simple electrical diagrams	2	3 4	B
15846	Demonstrate knowledge of capacitors, semiconductor diodes, and rectification <b>Demonstrate knowledge of capacitors and semiconductor diodes</b>	2	3	B
15847	Demonstrate knowledge of mathematics and mechanics for electrical trades	2	4	B
15848	Demonstrate knowledge of safeguards for use with portable electrical appliances	2	2	B
15849	Perform manual soldering and de-soldering procedures for electrical work <b>Perform manual soldering and de-soldering procedures for electrotechnology work</b>	2	2	B
15850	Demonstrate knowledge of single phase transformers <b>Demonstrate knowledge of single-phase transformers</b>	3	3	B
15851	Demonstrate knowledge of electrical safe working practices <b>Demonstrate knowledge of electrical safety and safe working practices for electrical workers</b>	2	2 3	B
15852	Demonstrate knowledge of electrical testing to ensure safety <b>Isolate and test low-voltage electrical subcircuits</b>	2	3 2	B
15853	Demonstrate knowledge of alternating current (a.c.) theory	4	7	B
15854	Draw and interpret electrical diagrams	3	3	B
15856	Demonstrate knowledge of the electricity network and the multiple earthed neutral system of supply <b>Demonstrate knowledge of the New Zealand electricity supply system</b>	3	2	B
15857	Demonstrate knowledge of three phase transformers <b>Demonstrate knowledge of three-phase transformers</b>	4	3	B
15861	Demonstrate knowledge of direct current (d.c.) power supplies	3	3	B

Id	Title	Level	Credit	Review Category
15862	Demonstrate knowledge of industrial process control	4	3	B
15864	Demonstrate knowledge of semiconductor power devices	4	4	B
16407	Use and maintain hand and power tools for electrical work	3	4	B
<b>20961</b>	<b>Demonstrate knowledge of special electrical installations</b>	<b>4</b>	<b>4</b>	<b>NEW</b>

## Domain Electrical Appliance Servicing

Id	Title	Level	Credit	Review Category
6705	Test electrical appliances for safety	3	2 3	B

## Domain Electrical Installation and Maintenance

Id	Title	Level	Credit	Review Category
1181	Replace water-heating elements and thermostats	2	2	D
1196	Service electrical control components	3	3	D
1204	Demonstrate knowledge of earthing	3	2	B
1205	Demonstrate knowledge of electrical switchboards	3	1 3	B
1710	Demonstrate knowledge of electric lighting	4	3	B
2013	Install and commission a.c. rotating machines	4	5	B
2016	Install earthing systems for multiple-earthed neutral installations <b>Install earthing systems for multiple earthed neutral installations</b>	3	3	B
2020	Plan and install cable support systems	3	4	B
2021	Plan, install, and commission a power supply on a construction or demolition site	4	2	B
2030	Schedule and manage preventative maintenance for electrical equipment	5	6	B
5917	Install and commission luminaries	2	2	D
15867	<i>Install, wire, and test lights in existing installations</i>	3	5	
5919	Install and repair pipe-work in the performance of electrical installation and maintenance	3	3	D
5920	Carry out gas welding procedures in the performance of electrical installation and maintenance	2	2	D
5921	Carry out welding procedures in the performance of electrical installation and maintenance	2	2	D
5922	Use cutting tools and machines in the performance of electrical installation and maintenance	2	2	B
5924	Install and commission d.c. rotating machines	4	5	B
5925	Recognise the requirements of routine maintenance for electrical equipment	2	2	B
5931	Select and install electric switchboards	3	4	B

Id	Title	Level	Credit	Review Category
10782	Install, commission, and maintain battery-backup and emergency lighting systems <b>Install, commission, and maintain battery backup and emergency lighting systems</b>	4	3	B
10783	Install, commission, and maintain standby supply systems <b>Install, commission, and maintain generating sets driven by combustion engines</b>	4 5	3 10	B
10784	Overhaul electric space heating systems <b>Overhaul electric space heating systems up to 10 kilowatts rating</b>	4	3	B
10785	Overhaul electrical systems in air-conditioning and air handling equipment	4	3	B
10786	Overhaul electromagnetic switching devices	4	3	B
10787	Install and test transducers	4	2	B
10788	Operate industrial high voltage distribution systems	4	3	B
10789	Install, commission, and maintain an uninterruptible power supply (UPS) system	4	4	B
15855	Demonstrate knowledge of circuit protection	3	3	B
15859	Demonstrate knowledge of electrical cables and accessories	3	7	B
15863 <b>20962</b>	Demonstrate knowledge of a.c. electric motor connections, starters, and speed controllers <b>Demonstrate knowledge of a.c. electric motor control and installation</b>	4	4 8	C
15866	Demonstrate procedures for examination and testing of electrical installations	4	2	B
15867	Install, wire, and test lights in existing installations	3	5	B
15868	Install, wire, and test power outlets in existing installations	3	5	B
15869	Install electrical equipment in damp situations	4	3	B
15870	Test an electrical installation for compliance with the regulations <b>Inspect and test an electrical installation for compliance with AS/NZS 3000:2000</b>	4	3	B
15871	Demonstrate knowledge of electrical installation in damp situations	4	3	B
16408	Pre-wire electrical installations <b>Pre-wire an electrical installation</b>	3	5	B
16409	Fit-off electrical installations <b>Fit-off an electrical installation</b>	3	5	B
16410	Plan, install, test, and commission small electrical installations	4	5	B
16412	Fault-find, repair, and re-commission electric lighting	3	4	B
16414	Carry out planned electrical maintenance work <b>Carry out planned electrical maintenance work of electrical equipment</b>	4	6	B

<b>Id</b>	<b>Title</b>	<b>Level</b>	<b>Credit</b>	<b>Review Category</b>
16415	Install and commission extra-low voltage equipment	4	3	B

## Domain Electrical Machines

<b>Id</b>	<b>Title</b>	<b>Level</b>	<b>Credit</b>	<b>Review Category</b>
1184	Test, and locate and diagnose faults in electrical machine windings	3	2	B
2014	Overhaul a.c. rotating machines and control equipment	4	5	B
5928	Overhaul d.c. rotating machines and control equipment	4	5	B
15858	Demonstrate knowledge of a.c. motors	4	5 7	B
15865	Demonstrate knowledge of direct current (d.c.) machines	4	5	B
16413	Fault-find, repair, and test electric motors	4	8	B
16416	Service bearings and seals in electrical rotating machines	2	1	B

## Domain Electrical Standards and Statutes

<b>Id</b>	<b>Title</b>	<b>Level</b>	<b>Credit</b>	<b>Review Category</b>
1702	Demonstrate knowledge of, and apply electrical legislation, codes of practice, and standards	4	8	B
15860	Demonstrate knowledge of legislation and standards governing the work of electricians	3	2	B