

Review of New Zealand Certificate in Electricity Supply (Fault Response and Switching) (Level 4) with strands in Distribution Network Switching, Distribution Fault Response, Transmission Switching, and Transmission Switching Control. [Ref: 3586], 85 – 140 credits

This qualification was approved in 2017, replacing the National Certificate in Electricity Supply (Distribution Faultman) (Level 4) with strands in Line Mechanic, and Electrician [Ref: 1624] and the National Certificate in Electricity Supply (Field Switcher) (Level 4) with optional strands in Distribution Networks, Transmission Networks, and Operational and Coordination Planning [Ref: 1117]. These qualifications are shown in Appendices 1-2 for comparison.

The core qualification is 60 credits. The three strands are different sizes: DFR 80 credits, DNS 60 credits, TS 25 credits, TSC 50 credits. The transmission strands have not been used.

Graduates with the Distribution Fault Response strand will be eligible to apply for Electrical Worker's Registration Board class of registration line mechanic endorsement, to carry out fault work as a line mechanic. This could be mentioned in the DFR outcome.

Programme

Connexis and MITA have approved programmes leading to the qualification. Connexis' programme does not include the transmission switching strand. The distribution strands have six unit standards in common (31 credits).

The current programme has unit standards at levels 1-4, including all the unit standards in the NZC ES (Introductory) (Level 2). If the unit standards at levels 1-2 are removed, the core becomes 29 credits.

Unit standards

Some of the credit values of the unit standards are 10-20 credits and may not reflect the tasks involved.

For example: Unit 16285 *Plan for scheduled work on electricity supply power system equipment* is 10 credits and is a pre-requisite to Unit 16280 *Compile and action switching plans to maintain electricity supply power network security*, 9 credits.

Year	2018	2019
Number	15 graduates (NZQA)	181 completed 154 DNS (147 by RCC), 25 DFR, 2 SCP in DNS (Connexis data)

Feedback

- It did align mostly with activities undertaken on a regular basis. Some needed a bit more time to arrange and complete, but it was ok. (graduate/trainee)
- Less repetition would be good, e.g. 16280, 16285 & 20093. (graduate/trainee)
- All went well I learnt heaps and find it helpful daily as I'm a full time fault man, thanks (graduate/trainee)
- The Transmission Switching and Transmission Switching Control strands have not been used and Grid Skills does not intend to use them (Grid Skills)

Current trainees in NZC ES (Fault Response and Switching)

At 16 January 2020, there were 171 people enrolled in this qualification, and a further 67 people enrolled in the Distribution Network Switching strand offered as a Supplementary Credit Programme.

Distribution Network Switching strand				
Type	Number enrolled	RCC	At risk*	Companies
NZC	24	0	1	Delta Utility Services, EA Networks, Horizon Energy, MITA Consulting, Netcon, Network Waitaki, Scanpower
NZA	11	5	0	Downer Power and Gas, Netcon, Northpower, WEL Networks
SCP	35	32	0	Downer Power and Gas, Netcon Northpower, WEL Networks
Distribution Fault Response strand				
Type	Number enrolled	RCC	At risk*	Companies
NZC	33	1	13	Delta Utility Services, Downer Power and Gas, EA Networks, Horizon Energy, Netcon, Telpower Canterbury
NZA	49	34	0	Delta Utility Services, Downer Power and Gas, EA Networks, WEL Networks, Netcon, Northpower, Scanpower, Telpower Canterbury

*At risk of not completing within expected duration

Core		L	Cr	total
10526	Operate ground and structure mounted electrical equipment associated with electric lines or cables up to 66kV	3	4	
12387	Operate electrical switchgear in the electricity supply industry	4	6	
14700	Apply and remove safety measures in an electricity supply environment H&S	3	3	
20091	Read and interpret single line diagrams in the electricity supply industry	3	3	
20421	Demonstrate knowledge of earthing in the electricity supply industry	3	5	
30265	Apply health and safety risk assessment to a job role (Add?) H&S	3	8	29
Distribution common US				
10509	Climb and work on electricity network structures	4	6	
17025	Carry out a rescue from an electrical structure H&S	3	2	
17027	Demonstrate the requirements for holding access permits for work on high voltage electrical lines, cables, and equipment	3	4	
16285	Plan for scheduled work on electricity supply power system equipment	4	10	
23896	Demonstrate knowledge of electrical circuit protection for distribution networks H&S	4	4	
30113	Demonstrate knowledge of three-phase theory in the electricity supply industry	4	5	31
Distribution Fault Response strand				
10522	Install low voltage (LV) electricity network overhead conductors	4	8	
10545	Terminate and joint LV polymeric insulated power cables in the electricity supply industry	3	6	
12295	Apply and remove earths from conductors on electricity supply networks	4	4	
20093	Develop and action an operating sequence in the electricity supply industry	4	4	
28195	Demonstrate knowledge of faults on electricity supply network plant and equipment	4	4	
30111	Locate faults, repair or replace faulty components in a distribution network to a consumer installation	4	20	
30112	Demonstrate knowledge of electrical legislation and installation testing as an endorsed line mechanic	4	10	56
Distribution Network Switching strand				
16276	Respond to electricity supply external system operations communications	4	5	
16280	Compile and action switching plans to maintain electricity supply power network security	4	9	
16283	Remove electricity supply field network equipment from service for access to work	4	8	
20090	Carry out switching operations on metal clad switchgear	4	3	
20095	Respond to substation secondary systems alarms and indications in the electricity supply industry	4	4	
27655	Demonstrate familiarity with common faults, relay systems, and components of diagrams in power system protection systems	3	4	33

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14700	Apply and remove safety measures in an electricity supply environment	3	3	
20091	Read and interpret single line diagrams in the electricity supply industry	3	3	
20421	Demonstrate knowledge of earthing in the electricity supply industry	3	5	
30265	Apply health and safety risk assessment to a job role (Add?)	3	8	29
Transmission Switching Control strand				
27655	Demonstrate familiarity with common faults, relay systems, and components of diagrams in power system protection systems	3	4	
19477	Demonstrate knowledge of the national electricity grid	4	5	
20090	Carry out switching operations on metal clad switchgear	4	3	
20094	Receive and return transfer of control in the electricity supply industry	4	4	
20095	Respond to substation secondary systems alarms and indications in the electricity supply industry	4	4	
30108	Plan and compile an operating sequence in the electricity supply industry	4	6	
30110	Action and report on an operating sequence in the electricity supply industry	4	6	
30114	Remove electricity transmission equipment from service for access to work	4	8	
30115	Describe and apply the issuer's responsibilities for the management of access and test permits and assurances	4	10	50

Alternatively, a certificate could be developed to provide the *additional* skills and knowledge for a transmission switching controller.

National Certificate in Electricity Supply (Field Switcher) (Level 4) with optional strands in Distribution Networks, Transmission Networks, and Operational and Co-ordination Planning [Ref: 1117]

Compulsory

12296 Apply earths to and remove earths from electrical conductors, plant and equipment
12387 Operate electrical switchgear in the electricity supply industry
14287 Use and maintain test instruments used within the high voltage electrical industry
14328 Carry out in-service visual inspections on substation equipment for safe operation
14331 Carry out in-service visual inspection checks on substation auxiliary plant and equipment
14700 Apply and remove safety measures in an electricity supply environment
16281 Maintain and update operating log for electricity supply operational purposes
16283 Remove electricity supply field network equipment from service for access to work
17027 Demonstrate the requirements for holding access permits on high voltage electrical lines
17028 Demonstrate the requirements for holding permits on high voltage electrical equipment
17602 Apply hazard identification and risk assessment procedures in the workplace
18028 Demonstrate knowledge of earthing in HV electricity network installations and works
19323 Demonstrate knowledge of single and three phase transformers used in the ESI
19950 Use test instruments and carry out electrical testing in the electricity supply industry
20090 Carry out switching operations on metal clad switchgear
20091 Read and interpret single line diagrams in the electricity supply industry
20092 Demonstrate knowledge of electricity transmission and distribution plant and equipment
20093 Develop and action an operating sequence in the electricity supply industry
20095 Respond to substation secondary systems alarms and indications in the ESI
And a minimum of 17 credits at Level 4 or above from anywhere on the DAS.

Distribution Networks Optional Strand

10509 Climb and work on electricity network structures
10526 Operate ground and structure mounted electrical equipment associated with electric lines up to 66kV 3 4
12295 Apply earths to and remove earths from overhead electric line conductors

Transmission Networks Optional Strand

14701 Manage electricity supply work control systems
20094 Receive and return transfer of control in the electricity supply industry

Operational and Co-ordination Planning Optional Strand

16276 Respond to electricity supply external system operations communications 4 5
16280 Compile and action switching plans to maintain electricity supply power network security 4 9
16285 Plan for scheduled work on electricity supply power system equipment 4 10
19477 Demonstrate knowledge of the national electricity grid 4 5
27655 Demonstrate familiarity with common faults, relay systems, and components of diagrams in power system protection systems

National Certificate in Electricity Supply (Distribution Faultman) (Level 4) with strands in Line Mechanic, and Electrician [Ref: 1624]

Compulsory

12387 Operate electrical switchgear in the electricity supply industry

20090 Carry out switching operations on metal clad switchgear

20094 Receive and return transfer of control in the electricity supply industry

25074 Locate and repair or replace faulty components or repair faults in a distribution network

27654 Demonstrate knowledge of SCADA systems in the Electricity Supply power system

Line Mechanic Strand

2016 Install earthing systems for multiple earthed neutral installations

2017 Describe and use complex electrical instruments

2031 Demonstrate knowledge of three-phase theory

15847 Demonstrate knowledge of mathematics and mechanics for electrical trades

15853 Demonstrate knowledge of alternating current (a.c.) theory

19323 Demonstrate knowledge of single and three phase transformers used in the electricity supply industry

20190 Conduct introductory insulation resistance testing in the electricity supply industry

20417 Replace or repair single phase electrical components

20418 Replace or repair three phase electrical component

25070 Explain the properties of conductors, insulators, and semiconductors and their effect on electrical circuits

25071 Demonstrate knowledge of electromotive force (e.m.f.) production

25072 Demonstrate knowledge of electromagnetism theory

Electrician Strand

10509 Climb and work on electricity network structures

10510 Use machinery, plant and equipment in an electricity network environment

10511 Develop work plans for construction and servicing of overhead electrical lines and equipment

10512 Joint electricity network overhead conductors

10513 Determine condition of electrical lines

10522 Install low voltage (LV) electricity network overhead conductors

10526 Operate ground and structure mounted electrical equipment associated with electric lines up to 66kV

10529 Dismantle electricity network lines and structures

17027 Demonstrate the requirements for holding access permits on high voltage electrical lines

18272 Operate power-operated elevating work platforms in an electricity supply environment

23899 Carry out phasing tests on HV electricity networks