

<b>Title</b>	<b>Demonstrate and apply knowledge of cable coding, colours, characters, applications, and capacity</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>2</b>

<b>Purpose</b>	<p>This unit standard is intended for the training and assessment of people engaged in the manufacture of electric switchboards and covers knowledge of electric switchboard circuits.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– describe the construction, specifications, colour coding, and application of various types of cords and cables;</li> <li>– select cables for mains and submains circuits using AS/NZS 3000 and AS/NZS 3008; and</li> <li>– select cables for final subcircuits using AS/NZS 3000 and AS/NZS 3008.</li> </ul>
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<b>Classification</b>	Electrical Engineering > Core Electrical
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<b>Available grade</b>	Achieved
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### Explanatory notes

- 1 This unit standard has been developed for learning and assessment off-job.
- 2 This unit standard and unit standards 2016, 29419, and 29469 meet the requirements of ERAC's CEPC 21.  
This unit standard and unit standards 29419, and 29469 together meet the requirements of ERAC's CEPC 22.  
This unit standard and unit standards 15870, 29419, and 29480 together meet the requirements of ERAC's CEPC 27.  
This unit standard and unit standards 15844, and 29469 together meet the requirements of ERAC's CEPC 32.  
This unit standard and unit standards 15844, 29427, and 29469 together meet the requirements of ERAC's CEPC 33.  
This unit standard and unit standards 29419, 29469, and 29474 together meet the requirements of ERAC's CEPC 35.
- 3 Definitions  
*a.c.* – alternating current.  
*CEPC* – Critical Essential Performance Capabilities.  
*ERAC* – Electrical Regulatory Authorities Council.  
*EWRB* – Electrical Workers Registration Board.  
*Industry practice* – those practices that competent practitioners within the industry recognise as current industry best practice.  
*Safe and sound practice* – as it relates to the installation of electrical equipment is

defined in AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*.

- 4 References  
AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*.  
AS/NZS 3008.1.2:2010, *Electrical installations - Selection of cables - Part 1.2: Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand conditions*.  
Electricity (Safety) Regulations 2010.  
and all subsequent amendments and replacements.
- 5 Range
- a Candidates may refer to current legislation and Standards during assessment.
  - b Demonstration of safe working practices and installation in accordance with *safe and sound practice* are essential components of assessment of this unit standard.
  - c All activities and evidence presented for all outcomes and evidence requirements in this unit standard must be in accordance with:
    - i legislation;
    - ii policies and procedures;
    - iii ethical codes;
    - iv Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010;
    - v applicable site, enterprise, and industry practice; and,
    - vi where appropriate, manufacturers' instructions, specifications, and data sheets.

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## Outcomes and evidence requirements

### Outcome 1

Describe the construction, specifications, colour coding, and application of various types of cords and cables.

### Evidence requirements

- 1.1 Describe conductor material, stranding, colour coding, sheathing types, and other construction parameters of cords and cables.
- 1.2 Explain permitted cable core colours of active and neutral conductors for installation wiring and give reasons.
- 1.3 Explain colour codes required to identify protective earthing and equipotential bonding conductors and give reasons.
- 1.4 Explain conductor colours permitted for active and neutral conductors in flexible core and equipment wiring and give reasons.
- 1.5 Identify the relationship between AS/NZS colours and European cable identification colours.
- 1.6 Define the application of cables based on their properties of their insulation, sheathing, armouring, and/or screening.

1.7 Describe typical applications of the various cable types and interpret cable manufacturers' data.

Range insulation properties, sheathing, armouring, screening.

## Outcome 2

Select cables for mains and submains circuits using AS/NZS 3000 and AS/NZS 3008.

### Evidence requirements

2.1 Select cables for single-phase and three-phase mains installations including multiple installations.

Range current carrying capacity, short circuit capacity, maximum demand, voltage drop, environment.

2.2 Select cables for single-phase and three-phase submains installations including multiple installations.

Range current carrying capacity, short circuit capacity, maximum demand, voltage drop, environment.

2.3 Select cables for mains and submains circuits based on maximum demand expectations, voltage drop limits, and cable supplier data tables.

2.4 Select the most appropriate cable installation route and installation method to meet the requirements of a given specification and calculate the fault loop impedance.

2.5 Describe the effects of harmonic current on cable current-carrying capacity.

2.6 Describe conditions where short-circuit performance may need to be considered and explain methods to mitigate issues.

## Outcome 3

Select cables for final subcircuits using AS/NZS 3000 and AS/NZS 3008.

### Evidence requirements

3.1 Calculate current requirements using maximum demand methods to ensure voltage drop is within specification.

Range current carrying capacity, short circuit capacity, maximum demand, voltage drop, environment, earth-fault impedance limitations.

<b>Planned review date</b>	31 December 2019
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#### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2016	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

#### Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMRs). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

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#### Comments on this unit standard

Please contact The Skills Organisation [reviewcomments@skills.org.nz](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.