

<b>Title</b>	<b>Demonstrate and apply knowledge of switchboard components and their representation in documentation</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>12</b>

<b>Purpose</b>	<p>This unit standard is for people engaged in the manufacture of switchboards in the electrotechnology industry.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– demonstrate knowledge of layout and physical enclosure requirements of switchboards from documentation;</li> <li>– demonstrate knowledge of switchgear components excluding cables and busbars;</li> <li>– explain the function of different cable types used in the manufacture of switchboards;</li> <li>– demonstrate knowledge of switchgear busbars;</li> <li>– demonstrate knowledge of switchboard drawings; and</li> <li>– create GA or SLD switchboard schematics using CAD.</li> </ul>
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<b>Classification</b>	Electrical Engineering > Electric Switchboards
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<b>Available grade</b>	Achieved
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**Explanatory notes**

- 1 This unit standard may be used for learning and assessment on-job.
- 2 Reference  
 Accident Compensation Act 2001;  
 AS/NZS 3000:2007, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*;  
 AS/NZS 3439.4:2009, *Low-voltage switchgear and control gear assemblies – Particular requirements for assemblies for construction sites (ACS)*;  
 Electricity Act 1992;  
 Electricity (Safety) Regulations 2010;  
 Health and Safety at Work Act 2015;  
 The New Zealand Electrical Codes of Practice, available from [WorkSafe New Zealand](#);  
 and all subsequent amendments and replacements.
- 3 Definitions  
 CAD – Computer Aided Drafting package.  
 GA – General Assembly.  
*Industry practice* – those practices that competent practitioners within the industry recognise as current industry best practice.  
*Safe and sound practice* – this relates to the installation of electrical equipment and is

defined in AS/NZS 3000:2007.

*SLD* – Single Line Diagram.

*Symbols and components* – items commonly used in switchboard manufacture and interfacing equipment.

#### 4 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 For assessment purposes, candidates must demonstrate competence with documentation systems used in their particular workplace. Documentation may include but is not limited to – drawings, manuals, and procedure sheets.
- d All evidence presented for assessment against 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.

## Outcomes and evidence requirements

### Outcome 1

Demonstrate knowledge of layout and physical enclosure requirements of switchboards from documentation.

#### Evidence requirements

- 1.1 Establish size, shape, and layout of the switchboard and explain considerations for selection.

Range includes but is not limited to – installation, space, equipment, assembly, thermal characteristics, access to switchboard, entry and exit cables.

- 1.2 Establish material used for switchboard enclosures.

- 1.3 Identify and explain components required to produce a switchboard, and discuss hardware configuration.

Range may include but is not limited to – arc fault containment, form factor.

### Outcome 2

Demonstrate knowledge of switchgear components excluding cables and busbars.

#### Evidence requirements

- 2.1 Identify components and explain their function on a switchboard assembly.
- Range 10 components selected by the candidate and 10 components selected by the assessor.
- 2.2 Provide alternative component symbols with reference to other international standards.
- Range 10 components selected by the candidate and 10 components selected by the assessor.
- 2.3 Explain the function of special component mounting provisions.
- 2.4 Locate and explain circuit connection points on the components.

### **Outcome 3**

Demonstrate knowledge of the function of different cable types used in the manufacture of switchboards.

#### **Evidence requirements**

- 3.1 Identify and explain the function of five different cable types.
- 3.2 Provide and explain typical applications with reference to the identified five cables.
- 3.3 Explain the purpose and need for cable/core identification.

### **Outcome 4**

Demonstrate knowledge of switchgear busbars.

#### **Evidence requirements**

- 4.1 Identify and explain two different applications of busbars on a switchboard assembly.
- 4.2 Identify and explain busbar mounting provisions.
- 4.3 Identify and explain busbar connection points, joints, and main entry tabs.

### **Outcome 5**

Demonstrate knowledge of switchboard drawings.

#### **Evidence requirements**

- 5.1 Identify different types of diagrams and explain unique features and purpose of each type of diagram with reference to a particular application.
- Range GA, schematic, SLD, busbar layout.

5.2 Identify and explain five component details in each set of diagrams for a particular switchboard.

Range GA, schematic, SLD.

### Outcome 6

Create GA or SLD switchboard schematic using CAD.

### Evidence requirements

6.1 Produce two sets of drawings using CAD.

6.2 Provide at least five industry recognised symbols per drawing.

6.3 Confirm drawing accuracy meets job specifications.

<b>Replacement information</b>	This unit standard replaced unit standard 14970.
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<b>Planned review date</b>	31 December 2021
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### Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	17 November 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 (CMR). 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 to [reviewcomments@skills.org.nz](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.