



Australian Government

MEM10018 Select cable types and sizes to suit loads and electrical installation environment

Release: 2

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Modification History

Release 2. Minor adjustments to reflect ERAC requirements for electrician licensing and revision of Essential Performance Capabilities

Release 1. New unit

Application

This unit of competency has been developed for Engineering Tradesperson – industrial electrician apprenticeship training, and the recognition of trade-level skills in selecting cables for electrical installation work and equipment in areas including consumer mains, submains and final subcircuits for operating voltages up to 1000 V alternating current (AC) or 1500 V direct current (DC).

It covers a comprehensive understanding of the cable selection process of AS/NZS 3000:2007 Electrical Installations (known as the Australian/New Zealand Wiring Rules) and cable selection standards in determining maximum demand, voltage drop limitations, current carrying capacity and short circuit capability.

This unit covers the skills and knowledge required to meet the Electrical Regulatory Authorities Council (ERAC).

Essential Performance Capabilities (EPCs) classified as ‘critical’:

- EPC 21 – Demonstrate the ability to select cables for mains and submains using AS/NZS 3000 and AS/NZS 3008.1 based on current carrying capacity, short circuit capability, maximum demand and voltage drop, for single phase and three phase installations including multiple installations.
- EPC 22 – Demonstrate the ability to select cables for final subcircuits using AS/NZS 3000 and AS/NZS 3008.1 based on current carrying capacity, short circuit capability, maximum demand, earth loop impedance and voltage drop.
- EPC 27 – Demonstrate knowledge of AS/NZS 3000 and local regulatory requirements for the installation of aerial conductors and underground wiring. Including specialist cables.

Some jurisdictions require the holder of this unit to be licensed or certified and users should check with the relevant authorities.

Band: A

Unit Weight: 4

Pre-requisite Unit

Nil

Competency Field

Installation and commissioning

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|--|------|---|
| 1. Determine job requirements | 1.1. | Follow standard operating procedures (SOPs) |
| | 1.2. | Comply with work health and safety (WHS) requirements at all times, including appropriate risk control measures |
| | 1.3. | Use appropriate personal protective equipment (PPE) in accordance with SOPs |
| | 1.4. | Identify job requirements from specifications, drawings, job sheets or work instructions |
| 2. Select wiring systems and cables for electrical installation work and equipment | 2.1. | Select wiring systems to suit loads and electrical installation work environment |
| | 2.2. | Select cable conductor sizes based on current-carrying capacity, short circuit capacity, maximum demand, voltage drop and earth fault-loop impedance in accordance with regulatory requirements |
| | 2.3. | Select circuit protective devices based on current-carrying capacity requirements of the selected cables |
| | 2.4. | Select earthing system parts to meet the multiple earth neutral (MEN) system |
| | 2.5. | Document selection of cable types and sizes and installation requirements in accordance with SOPs |

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Electrical installations include:

- at least one (1) general electrical installations comprising a main switchboard, supplying more than one circuit each for lighting, socket outlets and fixed appliances
- at least one (1) industrial electrical installation comprising a distribution board separate from the main switchboard and at least one (1) circuit supplying a three-phase load and safety system in one of the following industrial environments:
 - factory
 - building
 - off shore platform
 - mine site processing
 - oil and gas installation
 - processing plant
 - workshop
 - underground installation
- three-phase loads include at least one (1) or more of the following:
 - motors – for pumps, conveyors, mills, agitators, crushers and screening plants
 - heaters
 - compressor packages
 - heating, ventilation and air conditioning (HVAC) units
 - facility accommodation units, sea container workshops and storage units, and laboratories
 - workshop equipment, including lathes, milling machines and welders
 - underground dewatering systems and ‘gate end’ boxes for drilling equipment

Regulatory requirements include:

- AS/NZS 3000:2007 Electrical installations (known as the Australian/New Zealand Wiring Rules)
- AS/NZS 3008.1.1:2009 Electrical Installations – Selection of

- Safe working practices include:**
- cables – Cables for alternating voltages up to and including 0.6/1 kV – typical Australian installation conditions
 - demonstration of safe working practices and installation in accordance with industry established safe and sound practices

Unit Mapping Information

Release 2. Equivalent. Minor adjustments to reflect ERAC requirements for electrician licensing and revision of Essential Performance Capabilities.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>