



Australian Government

MEM10016 Terminate and test electrical wiring and accessories

Release: 3

MEM10016 Terminate and test electrical wiring and accessories

Modification History

Release 3. Prerequisite units updated

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 the termination and testing of electrical cables, cords and accessories using appropriate fixing devices and methods.

It covers the installation requirements for a wide range of typically used electrical cables in a variety of situations and separation from other services, including fire wall penetrations.

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

Essential Performance Capabilities (EPCs):

- EPC 32 – Describe the construction, specifications, colour coding and applications of various types of cords and cables.
- EPC 33 – Demonstrate the skills to prepare and terminate cords and cables.
- EPC 34 – Demonstrate the knowledge and skills for selection and attachment of electrical accessories, using appropriate fixing devices, tools and methods.

And

Essential Performance Capability (EPC) classified as ‘critical’:

- EPC 27 – Demonstrate knowledge of AS/NZS 3000 and local regulatory requirements for the installation of aerial conductors and underground wiring, including specialist cables.
- EPC 35 – Demonstrate the knowledge and skill to install and terminate a variety of electrical cables in a wide range of applications (including final subcircuits) to AS/NZS 3000.

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

MEM10018	Select cable types and sizes to suit loads and electrical installation environment
MEM18001	Use hand tools

Competency Field

Installation and commissioning

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.								
1. Determine job requirements	<table><tr><td>1.1</td><td>Follow standard operating procedures (SOPs)</td></tr><tr><td>1.2</td><td>Comply with work health and safety (WHS) requirements at all times, including appropriate risk control measures</td></tr><tr><td>1.3</td><td>Use appropriate personal protective equipment (PPE) in accordance with SOPs</td></tr><tr><td>1.4</td><td>Identify job requirements from specifications, drawings, job sheets or work instructions</td></tr></table>	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
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2. Prepare to terminate electrical cables and cords	<table><tr><td>2.1</td><td>Inspect accessories to determine the appropriate type and size of cable/cord and termination connectors/lugs, as required</td></tr><tr><td>2.2</td><td>Obtain specialised tools, equipment and test instruments needed for terminating electrical cables and cords</td></tr></table>	2.1	Inspect accessories to determine the appropriate type and size of cable/cord and termination connectors/lugs, as required	2.2	Obtain specialised tools, equipment and test instruments needed for terminating electrical cables and cords				
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3. Terminate electrical cables and cords	<table><tr><td>3.1</td><td>Isolate and tag circuits and equipment in accordance with procedures, where required</td></tr><tr><td>3.2</td><td>Prepare cable/cord end to suit connector/lug without causing any damage to insulation or conductor</td></tr><tr><td>3.3</td><td>Fit and secure specialist cable glands and retaining devices</td></tr></table>	3.1	Isolate and tag circuits and equipment in accordance with procedures, where required	3.2	Prepare cable/cord end to suit connector/lug without causing any damage to insulation or conductor	3.3	Fit and secure specialist cable glands and retaining devices		
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3.3	Fit and secure specialist cable glands and retaining devices								

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	3.4 Ensure terminations/connections are made to specifications, manufacturer requirements, and regulatory and legislative requirements 3.5 Ensure all entry points are sealed using appropriate compounds, including resins, where required 3.6 Mark/tag and label all cables, wires, conductors and connections to specifications
4. Test electrical cables and cords	4.1 Test terminated cables to ensure continuity and insulation resistance readings comply with requirements 4.2 Complete all reports and documentation to the required specifications and 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 cable and cord types include five (%) or more of the following:**
- thermoplastic insulated cable (TPI)
 - flat thermoplastic sheathed (TPS)
 - circular thermoplastic sheathed (TPS)
 - steel wired armoured (SWA)
 - fire rated cable (high tension (HT) or high frequency (HF) or mineral insulated metal sheath (MIMS))
 - cross-linked polyethylene (XLPE) cables
 - neutral screened cables
 - flexible cords and cables
 - aluminium conductor/cable

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.

Termination of cables and cords include two (2) or more of the following connectors and lugs:

connectors:

- screw
- stud
- tunnel

lugs:

- crimp and compression
- soldering
- solderless

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 cables – Cables for alternating voltages up to and including 0.6/1 kV – typical Australian installation conditions

Safe working practices include:

- demonstration of safe working practices and installation in accordance with industry established safe and sound practices

Unit Mapping Information

Release 3. Equivalent. Pre-requisites updated.

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for MEM10016 Terminate and test electrical wiring and accessories

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting circuits, drawings, plans and specifications relevant to the work to be undertaken
- identifying the cables and cords by conductor size, type and rating
- preparing and terminating cable and cords to accessories using appropriate hardware, tools and equipment, including soldering without undue damage to insulation or conductor
- preparing and terminating at least five (5) or more of the following cable and cord types at a device terminal enclosure:
 - thermoplastic insulated cable (TPI)
 - flat thermoplastic sheathed (TPS)
 - circular thermoplastic sheathed (TPS)
 - steel wired armoured (SWA)
 - fire rated cable (high tension (HT) or high frequency (HF) or mineral insulated metal sheath (MIMS))
 - cross-linked polyethylene (XLPE) cables
 - neutral screened cables
 - flexible cords and cables
 - aluminium conductor/cable
- terminating the above selected cable and cord types into two (2) or more of the following connectors and lugs:
 - connectors:
 - screw
 - stud
 - tunnel
 - lugs:

- crimp and compression
- soldering
- solderless
- maintaining/achieving required fire rating
- inspecting and testing terminated cables to ensure they comply with continuity and insulation resistance requirements and are safely intended for use
- using test equipment to locate faults, completing remedial action and retesting to ensure compliance
- documenting termination and testing of electrical cables, cords and accessories in accordance with SOPs.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- different types of electrical cables and cords and their applications
- structural components of cables and their purpose (conductor material, stranding, insulation type, voltage rating, screening, sheathing, armour and serving)
- Australian and International colour standards for cables and cords
- factors affecting cable current-carrying capacity:
 - current requirements for the circuit
 - cable installation method to be used
 - environmental conditions in the vicinity of cable installation
- Australian/New Zealand Wiring Rules requirements for flexible cords, cables and plugs
- Australian Standards and manufacture requirements for the termination of:
 - TPS and TPI cables
 - fire protection and MIMS cables
 - SWA
 - trailing cable and catenary wire systems
- soft soldering process, including the use of liquid petroleum (LP) gases and precautions to be observed
- fire rated cable types, including HT, HF and MIMS and their applications
- types of accessories and their intended use
- support, fixing and protection methods, including:
 - selection and safe application of devices for fixing to timber, metal, hollow structures, masonry and concrete
 - hazards and safety measures when working with adhesives and chemical fixing devices
- safe work methods for:
 - using hand and power tools
 - using powder and compressed gas operated tools

- test requirements to ensure compliant continuity and insulation resistance and documentation to be completed.

Assessment Conditions

- Assessors must:
 - have vocational competency in terminating and testing electrical wiring and accessories at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* and comply with the *National Vocational Education and Training Regulator Act 2011* or equivalent legislation covering VET regulation in a non-referring State as the case requires.
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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