Australian Government

ICTCBL2137B Install, maintain and modify customer premises communications cabling: ACMA Open Rule

Release 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

ICTCBL2137B Install, maintain and modify customer premises communications cabling: ACMA Open Rule

Modification History

Release	Comments
Release 2	This version first released with *ICT10 Integrated Telecommunications Training Package Version 3.0*. Minor additional to critical evidence. Outcomes deemed equivalent.
Release 1	This version first released with *ICT10 Integrated Telecommunications Training Package Version 1.0*.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to safely install, maintain and modify customer premises communications cabling required according to the Australian Communications and Media Authority's (ACMA) 'Open' Cabling Provider Rule.

This rule is associated with small installations connected to sockets and larger commercial and industrial installations involving many lines, multi-pair cables, backbone cabling, multi-story buildings and more complicated termination modules and distributors.

The cabling activity may be a new cable installation or an upgrade of cable capacity for an existing network or subsystem, or cabling infrastructure for convergence to Next Generation Networks (NGN).

Convergence in the telecommunications and IT areas is the emergence of a single infrastructure for a range of telephony and IT services. Telephone, voice over internet protocol (VoIP), internet protocol TV (IPTV) and computer data may all travel over a single metallic customer cable, optical fibre cable or wireless link in a specific location.

Assessment by a TITAB-registered assessor is recommended.

This unit meets the minimum ACMA prescribed level of knowledge and skill that safeguards matters of health, safety and network integrity, and addresses matters of interoperability where customer equipment and standard telephone service are involved only.

Note:

- Completion of this unit does not imply industry competency using specialised cabling, such as coaxial, optical fibre and structured cabling
- Completion of the following six cabling units: ICTCBL2005B, ICTCBL2006B, ICTCBL2008B, ICTCBL2012B, ICTCBL2017B and ICTCMP2022B exceed the requirements of this standard and fulfil the requirements for ACMA Cabling Provider Rules: Open Cabling Category for Cabler Registration
- To be permitted to work with lift cabling, cablers are required to have completed the relevant Electrotechnology qualification, such as the Certificate III in Electrotechnology Electrician or equivalent.

Application of the Unit

This unit applies to customer cabling terminated on distributors. It applies to installation, maintenance and modification of indoor, external, underground cabling on private and public property.

Customer cabling, for the purpose of this standard, may be used to connect devices for a range of applications, including telecommunications, Ethernet, video and multimedia, security and alarms, and fire protection.

The cabling task may be a new cable installation or upgrade of cable capacity for an existing network or subsystem for convergence to NGN applications.

Cabling installers providing services in telephony, VoIP, IPTV and computer data over a single metallic customer cable or optical fibre cable in a specific customer location apply the skills and knowledge in this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

ICTCBL2136B Install, maintain and modify customer premises communications cabling: ACMA Restricted Rule

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements	**Performance Criteria**
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Work within the constraints imposed by customer premises and ACMA regulatory environment	1.1 Prepare for ***open cabling work*** according to the ***regulatory and cabling environment, cable type, cable identification, termination systems, earthing and protection, records*** and according to requirements of ***relevant legislation, codes, regulations and standards*** 1.2 Identify ***building infrastructure*** that places critical constraints on ***cabling*** 1.3 Develop ***strategies to manage other infrastructure*** in relation to cabling 1.4 Notify appropriate personnel of identified ***safety hazards*** at cabling work site
2. Manage remote power feed	2.1 Identify and avoid the risks posed by contact with remote power feeding services when performing cabling activity 2.2 Make site safe, identifying remote power feeding services that operate at above telecommunications network voltage (TNV) inside customer premises
3. Install and modify cable support, earthing and termination infrastructure	3.1 Install fixings and ***cable support structures*** of adequate strength safely and aligned with the environment according to manufacturer and customer specifications 3.2 Secure catenary supports to building structure and tension, where necessary, to ensure cable weight can be carried in operating conditions with interference and safety segregation maintained, including adherence to AS/CA TS009:2013 3.3 Install protective earthing of metal work to industry standards where required 3.4 Inspect installed support structure to ensure cable will not be exposed to damage during installation and general operation 3.5 Position terminating equipment and fixing to accepted industry codes of practice, standards and customer requirements 3.6 Inspect back-mount and outlet layout for compliance to manufacturer specifications and allow adequate work space for ease of access and avoid overlaying 3.7 Segregate incoming and outgoing cables for ease of access and avoid overlaying
4. Install cables and earth wires	4.1 Install cables according to manufacturer's application specifications, including tension and bending stress requirements 4.2 Identify and avoid sources of possible damage to cable,

	including hot pipes, sharp edges and cable burn 4.3 Allow sufficient excess at cable ends to facilitate ***termination*** 4.4 Label telecommunication outlet ends of cable uniquely to match identifier at originating location 4.5 Place and secure cable to maintain safety and interference segregation according to legislative and industry standards 4.6 Install cable ties with correct tension to prevent cable sheath damage or transmission impairment and trimmed flush to prevent risk of personal damage 4.7 Install aerial cables supported by catenaries in external environment to meet minimum above ground clearances and clearances from hazardous electrical services according to AS/CA TS009:2013 4.8 Install underground cables to minimum depth of cover and segregation from hazardous electrical and other services according to AS/CA TS009:2013 4.9 Install cables underground (excluding blown fibre tube systems) to incorporate a blocking agent within the cable to prevent the ingress of water 4.10 Install over-voltage protection devices to all cable pairs, where required, according to AS/CA TS009:2013, to suppress voltage surges with the devices protectively earthed 4.11 Conduct a visual inspection to verify telecommunications reference conductor (TRC)/ communications earthing system (CES)/ earth wire insulation is protected against damage and TRC/CES/protective earth is segregated according to relevant industry and legislative standards and AS/CA TS009:2013
5. Terminate and test cables and earth wires	5.1 Remove cable sheath to allow for correct termination length and without damage to underlying conductors and their insulation 5.2 Install terminating modules according to manufacturer specifications and with cable pairs neatly and sequentially fanned for termination 5.3 Terminate conductors according to recommended colour code sequence using appropriate termination tools in the manufacturer's specified manner 5.4 Earth cable shield, if applicable, to manufacturer specifications, relevant industry codes of practice and AS/CA TS009:2013 5.5 Conduct visual inspection to confirm termination colour

	code sequence has been followed prior to end-to-end testing of wire and pair termination integrity 5.6 Terminate TRC/CES/earth wires with connectors recommended by manufacturers according to accepted industry codes of practice and AS/CA TS009:2013 5.7 Maintain TRC/CES/earth wire continuity throughout to meet interface requirements with electrical systems 5.8 Test TRC/CES/earthing installation for continuity, insulation resistance and conductive resistance according to accepted industry standards, including AS/CA TS009:2013 5.9 Confirm compatibility of alterations with existing systems and test new work both in isolation and when integrated with existing systems 5.10 Test cable according to performance specifications
6. Inspect cable route to ensure correct separations	6.1 Inspect ***separations*** along the entirety of the cable route and rectify separations that do not comply with regulations 6.2 Install barriers to achieve separations where sufficient spatial separation cannot be met
7. Evaluate earthing needs for cable systems on customer premises	7.1 Locate existing earthing systems in customer premises and analyse the earthing needs of cable systems in a range of building types 7.2 Calculate the upper and lower limits of resistance for a variety of cable system earths using relevant cable characteristics
8. Label earthing systems	8.1 Identify label requirements for all types of earthing systems 8.2 Attach label to earthing systems according to industry regulations
9. Create or update cable plans and records	9.1 Document ***installation details*** on record sheets and plans and store according to customer requirements 9.2 Label cable pairs clearly to provide an accurate identification according to manufacturer, industry and client standards 9.3 Record ***cabling details*** in cable pair record books to provide an accurate record according to industry codes of practice and AS/CA TS009:2013 9.4 Complete telecommunications cabling advice (TCA) form
10. Monitor work activity	10.1 Maintain close supervision of cablers not holding appropriate registration for the task to ensure installation and maintenance activity is strictly according to legislative

	requirements and industry standards for safety and network integrity including AS/ACIF S008:2006 and AS/CA TS009:2013

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to liaise with team members, supervisors and customers on technical and operational matters
- interpersonal skills related to work associates, supervisors, team members and clients
- literacy skills to interpret:
  - requirements of relevant legislation, codes, regulations and standards
  - technical documentation, such as equipment manuals and specifications
- numeracy skills to take and analyse measurements
- planning and organising skills to organise and maintain equipment
- problem-solving skills to solve equipment and logistics problems
- safety awareness skills to:
  - check environmental conditions are suitable for installation
  - make site safe and secure for cable installation
  - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- task-management skills to:
  - apply work practices that avoid cable damage
  - conform to work specifications and relevant industry standards
- technical skills to:
  - check cable route for obstructions and make clear, using suitable methods
  - handle cable according to manufacturer specifications so that conductors, sheath and insulation are not damaged during installation
  - read and interpret drawings related to:
    - cable coding system, identifiers and distributor locations
    - cable layouts
    - outlet location
  - select cabling system to meet customer performance needs and conform to work specifications and relevant industry standards
  - terminate copper twisted pair, including indoor, external, aerial and underground cabling
  - use diagnostic equipment
  - use hand and power tools.
  -

Required knowledge

- ACMA cabling provider rules, cabler registration rules, regulations and standards
- features and operating requirements of recognised cabling specific industry test equipment
- information required to operate equipment according to a test specification
- manufacturer requirements for safe operation of equipment
- protection earthing

- requirements of legislation, codes of practice and other formal agreements that impact on the work activity
- specific occupational health and safety (OHS) requirements relating to the activity and site conditions
- test methods and performance requirements
- typical issues and challenges that occur on site.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to: • terminate systems at both distributor and outlet locations • install and terminate one jumperable distributor (campus distributor or building distributor) with a capacity of 100 pair or greater • terminate one non-jumperable distributor (LD) and a patch panel • terminate at least one 50 pair, one 4 pair and one Ethernet cable, including accurate completion of installation records, drawing alterations and compliance forms • place cables on support structures and building faces for both internal and external locations • secure methods for the above locations • demonstrate work practices that avoid cable damage • install the three common types of earthing system used in customer premises for cabling systems • read and interpret drawings related to cable layouts, outlet location, cable coding system, and identifiers and distributor locations • conduct and interpret cable test results • interpret and apply requirements of relevant legislation, codes, regulations and standards • comply with all OHS requirements and work practices • meet ACMA knowledge test requirements.
Context of, and specific resources for assessment	Assessment must ensure: • a site on which communications cabling activities may be carried out • use of cabling and field equipment currently used in industry • licensing requirements and other site-related documentation.

Methods of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:
	
	• direct observation of the candidate terminating:
	  • systems at both distributor and outlet locations
	  • one jumperable distributor (campus distributor or building distributor) with a capacity of 100 pair or greater
	  • one non-jumperable distributor (LD) and a patch panel
	  • at least one 50 pair, one 4 pair and one Ethernet cable
	• review of completed documentation prepared by the candidate, including accurate completion of installation records, drawing alterations and compliance forms
	• oral or written questioning to assess required knowledge.

Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: ICTCBL2138B Install, maintain and modify customer premises communications cabling: ACMA Lift Rule. Aboriginal people and other people from a non-English speaking background may have second language issues. Access must be provided to appropriate learning and assessment support when required. Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed. In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. Where applicable, physical resources should include equipment

	modified for people with special needs.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Open cabling work refers to:	• aerial and underground cabling work on private and public property • customer cabling that terminates directly at the network boundary on a socket, network termination device (NTD)or a distributor.
Regulatory environment refers to:	• accredited registrars and registration • ACMA • Certified Components List (CCL) • Communications Alliance • labelling requirements • Telecommunications Act 1997.

Cabling environment may refer to:	• indoor environments, including concealed locations:
	  • ceilings and false ceilings
	  • internal wall space
	  • modular workstations
	  • under floor
	• outdoor environments, including cable installations:
	  • aerial telecommunications cabling for restricted cabling work, which does not include installations on poles shared with low voltage (LV) or high voltage (HV) electrical power cables or terminations
	  • external walls
	  • underground cabling in an exclusive trench or shared trench with electrical LV cables and other utilities.

Cable type may include:	• aerial • coaxial • copper twisted pair • data cables: Category 5, 6, 6A, 7 or 7A • external • indoor • optic fibre cable • underground.
Cable identification	• cable conductor identification codes: • banded

refers to:	• colour coded • lettered • numbered.
Termination systems may include:	• jumperable distributor (campus distributor or building distributor) • non-jumperable distributor (local distributor) and a patch panel.
Earthing and protection may include:	• earthing of screened cable, barriers and cable trays for the reduction or elimination of interference from electromagnetic, radio frequency (RF) and power sources • equipotential bonding conductors to multiple earth neutral (MEN) and use of earth stakes • functional earths, including TRC and CES types to provide customer switching system facilities • protective earth barriers for segregation, cable tray, duct and metal equipment enclosures • protective earths for over-voltage and surge or spike suppression according to AS/CA TS009:2013.

Records may include:	• building, cabling and equipment location plans
	• labelling of:
	  • distributor pairs
	  • distributor verticals
	  • equipment closets
	  • NTD record cards
	  • patch panels
	  • rooms
	  • telecommunication outlets
	• record books and cards:
	  • building distributors (BD)
	  • campus distributors (CD)
	  • floor distributors (FD)
	  • local distributors (LD)
	• TCA forms (TCA1 andTCA2).

Relevant legislation, codes, regulations and standards may include:	• accredited registrars and registration • AS Communications Cabling Manual (CCM) – Open • Australian Communications Industry Forum (ACIF) standards and codes • ACMA technical standards • AS/ACIF S008:2006 • AS/CA TS009:2013 • AS/NZS 3000:2007

	• cabling security codes and regulations • CCL • labelling • overview of Telecommunications Act 1997.
Building infrastructure may include:	• availability and suitability of existing cabling trays and fixing systems • building hazards • elevated working • HV power • restricted access.
Cabling may include:	• aerial customer • external customer • indoor customer • underground customer.
Strategies to manage other infrastructure may include:	• appropriate separations • correct use of cable trays and support systems • fastening techniques.

Safety hazards may refer to:	• access points that may contain:
	  • hazardous light or non-visible laser
	  • RF emission
	• electrical supply and areas of earth potential rise (EPR) that require mandatory separation from communications cable
	• hazardous conduit as according to AS 1345:1995 conduit colours associated with a hazardous service.

Cable support structures may include:	• cable ducts may be closed or open
	• cable trays may be:
	  • galvanised steel or PVC
	  • perforated with low or high side
	  • single or multi-channel
	• line poles
	• pits and pipes
	• suspension catenary wire
	• wall and island mounted patched and jumperable distributors:
	  • BD
	  • CD
	  • FD
	  • LD.

Termination may include:	• Australian modular socket • Ethernet connectors terminated at both ends of an Ethernet

	cable • jumperable distributor (campus distributor or building distributor) with a capacity of 100 pair or greater • Mode 3 alarm socket • NTD • non-jumperable distributor (local distributor) and a terminated patch panel • United States modular socket.

Separations refer to:	• correct separations between communications cable and other services:
	  • LV
	  • HV single core
	  • HV multi-core
	  • open terminations
	• separations covered by AS/CA TS009:2013.

Installation details may include:	• cable infrastructure • cable location and type.
Cabling details may include:	• interconnections • pair locations • pair numbering and labelling.

Unit Sector(s)

Telecommunications - Cabling