



Australian Government

Department of Education, Employment and Workplace Relations

ICTTC137C Install, maintain and modify customer premises communications cabling: ACMA Open Rule

Release: 1

ICTTC137C Install, maintain and modify customer premises communications cabling: ACMA Open Rule

Modification History

Not applicable.

Unit Descriptor

This unit defines the level of competence* that is required for the purpose of the Australian Communications Authority's "Open" Cabling Provider Rule. This rule is associated with small installations connected to sockets and larger commercial and industry installations involving many lines, multi-pair cables, backbone cabling, multi-story buildings and more complicated termination modules and distributors.

This unit applies to customer cabling terminated on distributors. It applies to the installation, maintenance and modification of indoor, external, underground cabling at the levels stated in the range of variables.

Customer cabling, for the purpose of this standard, may be used to connect devices for a range of applications including for example: telecommunications (phones and facsimile), data including video and multimedia, security and alarms, and fire protection.

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

Note 1: This does not imply industry competency using specialised cabling such as: Coaxial, Optical Fibre and Structured cabling.

Note 2: Completion of the following 6 cabling units: ICTTC005D, ICTTC006D, ICTTC008D, ICTTC012D, ICTTC017D and ICTTC022D exceeds the requirements of this standard and fulfils the requirements for ACMA Cabling Provider Rules: Open Cabling Category for Cabler Registration.

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Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

ICTTC136C Install, maintain and modify customer premises communications cabling:
ACMA Restricted Rule

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Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

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.

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Elements and Performance Criteria

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Element	Performance Criteria
1 Work within the constraints imposed by customer premises	1.1 Identify building infrastructure which places critical constraints on cabling 1.2 Develop strategies to manage other infrastructure in relation to cabling
2 Manage Remote Power Feed	2.1 Identify the risks posed by contact with Remote Power Feeding services 2.2 Identify Remote Power Feeding services in a range of commonly encountered circumstances inside

customer premises

3 Install/modify cable support, earthing and termination infrastructure

- 3.1 Ensure site is free of telecommunication hazards
- 3.2 Fixings and cable support structures of adequate strength are installed safely, aligned with the environment and in accordance with manufacturer's and customer's specifications
- 3.3 Catenary supports are secured to building structure and tensioned where necessary to ensure cable weight can be carried in operating conditions with interference and safety segregation maintained including adherence to AS/ACIFS009:2006
- 3.4 Protective earthing of metal work is installed to industry standards where required
- 3.5 Installed support structure is checked to ensure cable will not be exposed to damage during installation and general operation
- 3.6 Terminating equipment positioning and fixing follows accepted industry codes of practice, standards and customer requirements
- 3.7 Back-mount and outlet layout conforms to manufacturer's specifications and allows adequate work space for ease of access and avoid overlaying
- 3.8 Incoming and outgoing cables are segregated to ensure ease of access and avoid overlaying

4 Install/alter cables and earth wires

- 4.1 Cables/wires handled in accordance with manufacturer's application specifications including tension and bending stress requirements
- 4.2 Sources of possible damage to cable/wires are identified and avoided including hot pipes, sharp edges and cable burn
- 4.3 Sufficient excess is allowed at cable ends to facilitate termination
- 4.4 Telecommunication outlet ends of cable is uniquely labelled to match identifier at originating location
- 4.5 Cable is placed and secured to maintain safety and interference segregation in accordance with

legislative and industry standards

- 4.6 Cable ties not tightened to the point of causing cable sheath damage or transmission impairment and trimmed flush to prevent risk of personal damage
- 4.7 Cables installed as catenaries or supported by catenaries in external environment shall meet minimum above ground clearances and clearances from hazardous electrical services as per AS/ACIFS009:2006
- 4.8 Cables installed underground shall meet minimum depth of cover and segregation from hazardous electrical and other services as per AS/ACIFS009:2006
- 4.9 In accordance with AS/ACIFS009:2006, over-voltage protection devices are fitted to all cable pairs, where required, to suppress voltage surges with the devices protectively earthed
- 4.1 TRC/CES/Earth wire insulation is protected against damage and TRC/CES and protective earths segregated in accordance with relevant industry and legislative standards AS/ACIFS009:2006

5 Terminate and test cables and earth wires

- 5.1 Cable sheath removed to allow for correct termination length and without damage to underlying conductors and their insulation
- 5.2 Terminating modules are installed in accordance to manufacturer's specifications and cable pairs neatly and sequentially fanned for termination
- 5.3 Conductors are terminated in accordance with recommended colour code sequence using appropriate termination tools in the manufacturer's specified manner
- 5.4 Cable shield (if applicable) is earthed to manufacturer's specifications and relevant industry codes of practice including AS/ACIFS009:2006
- 5.5 Visual inspection is undertaken to confirm termination colour code sequence has been followed prior to end to end testing of wire and pair termination integrity

- 5.6 TRC/CES /Earth wires are terminated with connectors recommended by manufacturers in accordance with relevant industry codes of practice including AS/ACIFS009:2006
 - 5.7 TRC/CES /Earth wire continuity is maintained through out and interface requirements with electrical systems are observed
 - 5.8 TRC/CES /Earthing installation shall be tested for continuity, insulation resistance and conductive resistance as per relevant industry standards including AS/ACIFS009:2006
 - 5.9 Compatibility of alterations with existing systems is confirmed and new work tested both in isolation and when integrated with existing systems
- 6 **Inspect cable route to ensure correct separations**
 - 6.1 Check separations along the entirety of the cable route
 - 6.2 Rectify separations which do not comply with regulations
 - 6.3 Install barriers to achieve separations where spatial separation can't be met
- 7 **Evaluate earthing needs for cable systems on customer premises**
 - 7.1 Identify the role of functional, protective and CES earthing systems in customer premises
 - 7.2 Recognise existing earthing systems in customer premises
 - 7.3 Analyse the earthing needs of cable systems in a range of building types
 - 7.4 Identify cable characteristics relevant to the calculation of earthing requirements
 - 7.5 Calculate the upper and lower limits of resistance for a variety of cable system earths
- 8 **Label earthing systems**
 - 8.1 Identify label requirements for all types of earthing systems
 - 8.2 Label earthing systems in accordance with industry regulations

9 Create/update cable plans and records

- 9.1 Record sheets and plans of cable location, type and infrastructure are accurately created or updated and stored in accordance with customer requirements
- 9.2 Cable pairs are clearly labelled to provide an accurate identification in accordance with manufacturer's, industry and client standards
- 9.3 Cable pair record books are created or updated to provide an accurate record of pair locations, inter-connections and usage in accordance with industry codes of practice and AS/ACIFS009:2006
- 9.4 Complete Cabling Completion Advice/TCA form

10 Monitor work activity

- 10.1 Close supervision of cablers not holding appropriate registration for the task is maintained to ensure installation/maintenance activity is strictly in accordance with legislative requirements and industry standards for safety and network integrity including AS/ACIFS008:2006 and AS/ACIFS009:2006

Required Skills and Knowledge

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

Required skills

Select from the following list to suit the learning and assessment context

Codes refer to the Skills and Knowledge Register in Volume 3 of this Training Package that has detailed content guidelines for each code outlined.

CA200 Cable Installation: Open

CA201 Cable Termination Products

CA202 Cable Conductor Identification Codes

CA210 Cable Support Systems

CA220 Cable Types

PS212 Read Plans and Specifications: General

PS213 Cable Record Systems: General

RE210 ACMA Cabling Provider Rules, Cabler Registration, Rules and Regulations

SW210 Basic Switching Systems

TE210 Basic Telephony

Topics not covered in Skill and Knowledge Register

Telecommunication hazard awareness

Required knowledge

The relevant required knowledge is articulated in the above guidelines contained in the Skills and Knowledge Register included in this Training Package.

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.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the following is essential:

- Demonstration of termination systems at both distributor and outlet locations and at least one 50 pair copper cable, including accurate completion of installation records, drawing alterations and compliance forms
- Placement of cables on support structures and building faces for both internal and external locations
- Securing methods for above locations
- Work practices which avoid cable damage such as crushing, burning, kinking, sheath twist, cutting and nicking, bending radius
- Ability to read and interpret drawings related to cable layouts, outlet location, cable coding system and identifiers, distributor locations
- Conduct and interpret cable test results
- Correct interpretation and application of standards and regulations

Context of and specific resources for assessment

Assessment must ensure:

- A workplace conducting the operations covered by this competency unit, equipment and resources relevant to the context of the work (See Range Statement) and support from a competent supervisor or mentor.

OR

- A simulated environment with similar provisions which conforms to the Assessment Guidelines.

Guidance information for assessment

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 underpinning knowledge.

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.

This unit applies to the ACMA Open Cabling Rule coverage for communications cabling installations applications to include larger commercial and industry installations involving many lines, multi-pair cables, backbone cabling, multi-story buildings and more complicated termination modules and distributors.

Building infrastructure

Includes but not limited to High Voltage power, other services, availability and suitability of existing cabling trays and fixing systems

Strategies to manage infrastructure

Include appropriate separations, fastening techniques, correct use of cable trays and support systems

Remote Power Feed	Applies to telecommunications services which operate at above TNV (Telecommunications Network Voltage)
Regulatory environment	Is defined by the Overview Telecommunications Act 1997 , and includes, ACMA, ACIF/CA, Labelling, Certified Components List (CCL) accredited registrars and registration
Cabling environment	May include: Indoor environments include locations such as: ceilings, false ceilings, riser shafts, internal wall space, under floor, damp situations and within workstations. Outdoor environments include cable installations on external walls and underground and/or aerial cabling on private and public property. Underground cabling including shared trenches with electrical LV cables and/or other utilities. Aerial cabling installations which may include the sharing of poles with LV/HV electrical power cables/terminations.
Cable support systems	May be: suspension catenary wire, ducts, cable tray, line poles, pipes, pits, wall and island mounted patched and jumperable distributors including CDs, BDs, FDs, LDs. NB: Cable trays may be galvanised steel or PVC: perforated low or high sided, single or multi channel Cable ducts may be closed, open, PVC, metal, single or multiple channel

Cable types	Includes: copper twisted pair from 2 pair upwards but must include 2 and 4 pair and at least one larger cable (50 pair or greater). NB: Cable and topology may be chosen to suit a range of applications including analogue voice (3.4 kHz bandwidth), digital voice (64 kB/s) and digital (2 MB/s ISDN).
Cable identification	Refers to cable conductor identification codes and may be: Colour coded, banded, numbered, lettered
Cable Termination systems	Includes termination of at least one jumperable distributor (CD/BD) with a capacity of 100 pairs or greater. Termination of a non-jumperable distributor (LD). Termination of a patch panel
Earthing and protection systems	Includes: Installation of protective earth(s) for over voltage and surge/spike suppression. Installation of protective earth barriers for segregation, cable tray, duct and metal equipment enclosures. Running of equi-potential bonding conductors to MEN (Multiple Earth Neutral) and use of earth stakes. Installation of functional earth(s) including TRC and CES types to provide customer switching system facilities. Earthing of screened cable, barriers and cable trays for the reduction/elimination of interference from electromagnetic, radio frequency and power sources.

Records	Include: - Cabling Completion Advice/TCA (sign off form) - Building, cabling and equipment location plans - BD/CD and FD record books, LD record cards - Labelling of patch panels, distributor verticals, distributor pairs, equipment closets and rooms - Labelling of telecommunication outlets And in the future possibly NTD record cards NB: Record books and cards may be hard copy or software versions but must conform with AS/ACIFS009:2006
Functional, protective and CES earthing	Refers to the three common types of earthing system used in customer premises for cabling systems. Cablers must understand the features and application of each type
Cable characteristics	Includes the electrical performance of the cable and its' physical characteristics. Cabers must be able to identify the critical characteristics for each type of cable they use
Label requirements	Are defined in detail by the Industry regulations. Cablers must meet these requirements whenever installing earthing
Clearances and segregation:	Refers to clearances and segregation requirements as defined in AS/ACIFS009:2006 (or its replacement)

Separations	Is the distance between communications cable and other services. This includes Low Voltage (LV), High Voltage (HV) - Single core and HV Multi-core, Open terminations
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Spatial separations	Is the distance between communications cable and other required by regulations where no barrier is installed
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Barriers	Are physical barriers installed when there is not enough space to achieve spatial separations
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Relevant legislation, codes, regulations and standards (or their replacements)	Include relevant components of: ACMA Technical Standards AS/ACIFS008:2006, AS/ACIFS009:2006 SAA Communications Cabling Manual (Open) AS/NZS 3000 Building Codes
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Unit Sector(s)

Not applicable.