



Australian Government

Department of Education, Employment and Workplace Relations

ICTTC137B Install, maintain and modify customer premises communications cabling: ACA Open Rule

Release: 1

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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 ACA "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: This does not imply industry competency using specialised cabling such as: Co-axial, Optical Fibre and Structured cabling.

Prerequisite Unit: ICTTC136B Install, maintain and modify customer premises communications cabling: ACA Restricted Rule.

Equivalent Unit/s: Note: Completion of the following 6 cabling units: ICTTC005B, ICTTC006B, ICTTC008B, ICTTC012B, ICTTC017B and ICTTC022B exceeds the requirements of this standard and fulfils the requirements for ACA 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

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Work within the constraints imposed by commercial 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/ACIF009
- 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/ACIF009
- 4.8 Cables installed underground shall meet minimum depth of cover and segregation from hazardous electrical and other services as per AS/ACIF009
- 4.9 In accordance with AS/ACIF009, 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 TS 009
- 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/ACIF009
- 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/ACIF009
- 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/ACIF009
 - 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/ACIF009

9.4 Complete Cabling Completion Advice/TCA1 form

10 Monitor work activity

10. Close supervision of cablers not holding
- 1 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/ACIF008 and AS/ACIF009

Required Skills and Knowledge

Not applicable.

Evidence Guide

Assessment location and resources

Either

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.

Critical evidence

Assessment candidates should produce evidence of the following:

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.

Skills and knowledge

Codes refer to the Skill and Knowledge Register included in this training package:

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 ACA 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

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Topics not covered in Skill and Knowledge Register:

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Range Statement

The following statements cover a wide range of circumstances. Assessment of candidates should be within the range that applies to the candidate's particular role or workplace. This unit applies to the ACA 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

Overview **Telecommunications Act 1997**, ACA, ACIF, Labelling, Certified Components List (CCL) accredited registrars and registration.

Cabling environment

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 include:

suspension catenary wire

ducts

cable tray

line poles

pipes

pits

wall and island mounted patched and jumperable distributors including CDs, BDs, FDs, LDs.

Note: 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

Copper twisted pair from 2 pair upwards but must include 2, 3 and 4 pair and at least one larger cable (20 pair or greater).

Note: 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

Cable conductor identification codes may be:

colour coded

banded

numbered

lettered.

Cable termination systems

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

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/TCA1 (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.

Note: Record books and cards may be hard copy or software versions but must conform with AS/ACIF009.

Functional, protective and CES earthing

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

This 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

Industry regulations define the labelling requirements in detail. Cablers must meet these requirements whenever installing earthing.

Clearances and segregation:

Clearances and segregation requirements is defined in AS/ACIF009 (or its replacement).

Separations

The distance between communications cable and other services. This includes:

Low Voltage (LV)

High Voltage (HV) - Single core and HV Multi-core

Open terminations.

Spatial separations

The distance between communications cable and other required by regulations where no barrier is installed.

Barriers

Physical barriers installed when there is not enough space to achieve spatial separations.

Relevant legislation, codes, regulations and standards (or their replacements) include relevant components of:

ACA Technical Standards

AS/ACIF008, AS/ACIF009

SAA Communications Cabling Manual (Open)

AS/NZS 3000

Building Codes

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Unit Sector(s)

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