Revision of the Communications Alliance customer cabling product and installation Standards

AS/CA S008 and AS/CA S009

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Why read this?

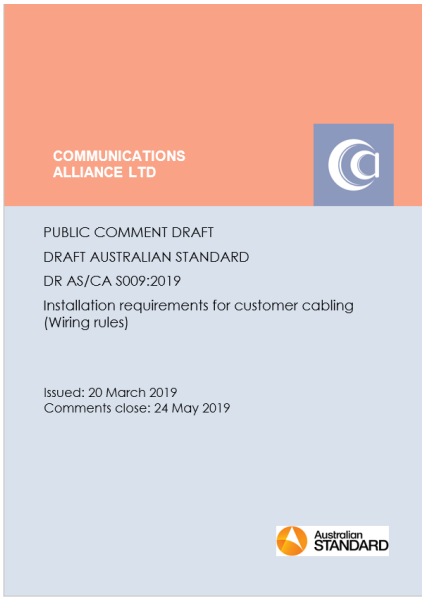
This Background Paper has been developed in conjunction with the release of the DR AS/CA S008:2019 and DR AS/CA S009:2019 public comment drafts to assist readers in identifying the major changes being proposed in these two draft revisions.

The revision

Communications Alliance is revising AS/CA S008:2010 and AS/CA S009:2013 following a scheduled five-year review of these two Standards. The review highlighted changes in cabling practices and an evolving technology-driven environment that led to the establishment of the WC80 ***Customer cabling installation and cabling products*** Working Committee, chaired by Murray Teale, VTI Services.

The committee has drawn upon the most currently available cabling industry information to review and update the two Standards, particularly in relation to the distribution of hazardous voltages over communications cabling, the new electrical energy classifications and catering for the growth in connectivity of devices used in customer premises.

Details of these proposed changes are provided on the following pages. References to the clauses that have been amended or introduced into the two Public Comment Drafts are provided in the left-hand column, indicated by the labels **S008** and **S009**.



Commenting

Communications Alliance invites comments on DR AS/CA S008:2019 and DR AS/CA S009:2019 by **24 May 2019**.

The drafts and further information can be found at http://www.commsalliance.com.au/Documents/public-comment.

Hazardous voltages

One of the fundamental aims of AS/CA S009 is to prevent the exposure of carrier personnel, cabling providers, customers or other persons to hazardous voltages. Historically, this hazard derived from mains electrical cabling installed near communications cabling. Safety was achieved through design, installation practices and using products which were fit-for-purpose.

However, in DR AS/CA S009, a new classification of electrical energy sources of **ES1, ES2 and ES3** has been introduced, derived from the new AS/NZS 62368.1 equipment safety Standard, which is replacing the existing AS/NZS 60950.1 Standard. AS/NZS 62368.1 introduces a new 'hazards-based standards engineering' approach using a three-stage risk model against potentially increasing risks from rising energy levels, and a new model for safety using safeguards between hazardous energy sources and body parts.

The ES1, ES2 and ES3 electrical energy sources have been defined in DR AS/CA S009, while a new Appendix P provides information on the equivalence of the terms used in this draft Standard and the terms **ELV, SELV and TNV** used in AS/CA S009:2013. The requirements in this draft Standard have been revised around these new electrical energy source definitions.

Important: ES3 is considered hazardous and represents the equivalent level of safety to hazardous energies as specified in AS/NZS 60950.1. Previously, to address requirements where voltages exceed TNV limits on customer cabling, a type of circuit referred to as an **LV Telecommunications circuit** was used, for example, in a typical EWIS, which is classified as a hazardous service.

Limiting the scope of AS/CS S009

DR AS/CA S009 has been developed to support an **ES3 circuit** over generic cabling. However, the maximum voltage is limited to 400 V and the maximum current is limited to 750 mA per conductor (1,500 mA per pair). An ES3 circuit exceeding 400 V or 750 mA per conductor on generic customer cabling is deemed by this Standard as not fit for purpose as it does not provide adequate safeguards to ensure the safety of customers, cabling providers, carrier staff and the general public. The **Warning Notice** at the front of DR AS/CA S009 has been updated to draw the cabler's attention to this limit and the role of the Standard.

Specifications for ES3 cables and their installation

S008 5.6.19

S009 5.7.3

New requirements have been specified for **cables that are to be used or intended for use for ES3 generic circuits**. In addition to meeting the existing requirements for metallic paired cable in AS/CA S008, these cables now are required to have a maximum conductor resistance (equivalent to 0.5 mm nominal conductor diameter or 24 AWG), an identifiable sheath colour (Homebush Gold) and are to be clearly labelled 'ES3 circuit every 2 m in the colour Homebush Red. Also, ES3 generic cables are not to be used for **ES3 special application circuits**.

	A number of factors were taken into consideration to determine the cable specification for an ES3 generic circuit: • the operational temperature limits, dielectric breakdown voltages and the potential for fire due to overheating or ignition from insulation breakdown. • heat rise attributes of cables: comparison of cable heat rise in bundles for cables with conductor diameters of 0.4 mm and 0.5 mm; heat rise of cables in conduits. • to provide a standardised minimum conductor size for an installer and to meet the fitness for purpose obligations. • to set a limit where engineered solutions are not required. • to set a minimum benchmark for development of active equipment. • to allow for a more effective design process when deciding on how many pairs can be active at a specific current in a cable for a given pathway, taking into account factors such as bundle sizes and cable types.
S009 5.7.1 5.7.2	The **installation of ES3 generic cabling** must be clearly identified at all access points, be appropriately labelled with warning markings where access to conductive parts is possible and meet the appropriate separation distances. The cable route is to be marked at regular intervals.
S009 8.3.3.2 15.2.1	Existing requirements in DR AS/CA S009 that involve ES3 circuits have been revised. These include **subducting ES3 circuits** when installed with other cables, and preventing **access to sockets** capable of carrying an ES3 circuit.
S009 20.2.3, 20.2.4, 20.15, 20.16	Consideration is also being given to **installations utilising earth returns** that may be carrying hazardous energies. The related clauses in DR AS/CA S009 are being reviewed with the recommendation for deletion. Guidance on separation of telecommunications and electrical circuits for indoor cabling, provided in Appendix G, has been revised to reflect the new ES1, ES2 and ES3 electrical energy levels.

Remote powering

DR AS/CA S009 has been revised to address the growing application of communications cabling for the delivery of power to remote devices. Typical remotely powered devices include wireless access points, surveillance cameras, smart lighting, digital signage, building management controllers and sensors.

International Standards allow for cabling up to ten kilometres channel lengths under certain conditions to potentially support industrial cabling such as process control, monitoring, automation (PCMA) and distributed building services such as environmental or access controls and communication between devices for the Internet of Things (IoT) applications. The ISO/IEC 11801-3 and ISO/IEC 11801-6 Standards address these scenarios.

Appendix F has been rewritten for DR AS/CA S009, providing useful information on power feeding in telecommunications networks, describing how the new ES1, ES2 and ES3 electrical energy sources are classified, the implications for cablers working on ES1, ES2 and ES3 circuits and the replacement of the LV telecommunications circuit classification.

S009 5.6.1

There are new requirements that stem from the need to address the potential for higher levels of power being delivered on generic cabling. Generic twisted pair cabling, including cabling used to link distributors, now has a specified **maximum conductor resistance** (equivalent to 0.5 mm nominal conductor diameter or 24 AWG) to ensure the ability to support remote powering. Alternatively, an engineered solution can be used.

S009 5.6.2

The **maximum operating temperature** of a cable becomes an important consideration when delivering remote power, especially for multipair cables and bundled cables. The application of remote powering over new or existing cabling may cause the cable to exceed its safe temperature limit making the cabling unfit for purpose or hazardous. DR AS/CA S009 stipulates that cables should not be installed in a manner that would cause the maximum operating temperature of the cables to be exceeded.

Classifications of persons

AS/SA S009 refers to carriers, cabling providers and customers in the context of the commercial or regulatory relationships among these entities.

In addition, DR AS/CA S009 introduces the concept of **ordinary, instructed and skilled persons**, derived from the new AS/NZS 62368.1 equipment safety Standard, which is replacing the existing AS/NZS 60950.1 Standard. These classifications relate to distinct levels of protection based upon how much each person understands the relevant risks.

S009 4.2.70

The term **ordinary person** (formerly **end user**) essentially applies to the general population, the equipment user, but can also be bystanders. Cablers can be instructed persons or, with additional training, would be considered skilled persons.

S009 4.2.58

Instructed persons are those who have been instructed and trained by a skilled person, or who are supervised by a skilled person, so that they know what energy sources in the product may cause pain, and they know how to avoid unintentional contact with those energy sources.

S009 4.2.86

Skilled persons may have access to all areas of the equipment, including access to ES3 parts which may cause significant injury. Therefore, they must have the appropriate training, qualifications and experience to be able to recognise where and what hazards exist within the equipment and be able to apply their knowledge and skills as a safeguard against pain and injury.[1]

DR AS/CA S009 also now highlights in the Regulatory Notice, that Section 4.1(2)(b) of the *Cabling Provider Rules* requires that an unregistered cabling provider, undertaking any cabling work, be supervised at all times while performing cabling work, by a suitably registered cabling provider.

Fitness for purpose

AS/CA S009 requires that cabling products be selected and installed so that they are fit for purpose for their intended purpose. A plug with inadequate performance characteristics or an ineffectively terminated plug would be an example of an installation that is not fit for purpose.

S008 5.5

A complementary requirement has now been added to DR AS/CA S008 to assist cablers to select cabling products that are fit for purpose for a particular installation. For example, a Category 6 cord that meets its performance requirements for data transmission may also need to meet power feeding requirements. It is recommended that component manufacturers be consulted for confirmation of the intended use and/or capabilities of cabling products used. A typical example would be to confirm that a particular cable can support remote powering to ensure the cable has the ability to handle the current required by the device to be connected and powered.

[1] Demystifying IEC 62368-1: Types of persons. Paul Robinson. Compliance Engineering Manager. IBM Australia. Sydney, Australia. paulrob@au1.ibm.com. 2018-06-28

Terminating fixed & concealed cabling

S009
5.9

New requirements have been introduced to address the increasing installation practice of connecting devices such as security cameras and wireless access points (WAPs) via plug-terminated cabling. In general, **plug-terminated cabling** is not to be installed as fixed or concealed cabling unless certain safety requirements are met. For instance – that it is an integral part of a device, has appropriate anchorage or strain relief, does not expose potentially hazardous voltages and that it is out of arm's reach or housed in a secure enclosure.

These requirements replace the existing S009 Clause 5.15 requirements for terminating fixed or concealed cabling on a plug for connection of customer equipment.

Optical fibre safety labelling

S009
11.1

The requirements for optical fibre systems have been revised to take into account standard installation and inspection practices of cablers and the expected laser hazards associated with optical fibre systems. The requirements and the application of laser warning markings and the laser explanatory labels have also been revised to improve their suitability and alignment with international Standards.

The requirements are to protect the health and safety of any person who may operate, work on, use service or otherwise be reasonably likely to be affected by a telecommunication network or facility. As AS/NZS IEC 60825.2 was not considered to be directly applicable (as it deals with operational systems), the requirements in DR AS/CA S009 were redrafted not to reference but to align as closely as possible to the intent of AS/NZS IEC 60825.2 as it deals in part with Laser Hazard Labels on the same cabling system. The worst-case hazard class was considered to be 3B as specified by AS/NZS IEC 60825.2.

Cable flammability & fire propagation

S009
16.1
16.2

The National Construction Code (the **Building Code of Australia**) contains information about how buildings may be designed to inhibit the propagation of fire. The requirements for cable flammability and fire stopping in DR AS/CA S009 have been revised to work with and align with the Building Code.

Although there is no requirement to change the cable type where an underground or aerial cable enters a building, any cable used within the building past the first cable connection point should generally meet the cable flammability requirements specified in AS/CA S008.

In addition, installed cabling shall not reduce the integrity or performance of fire-resistant or fire-rated building elements, such as a fired rated wall.

Movable cabling & TOs

S009 5.10

Customer cabling can be installed in many scenarios where it must be free to move as a part of the operation of the device, such as pendant outlets, security cameras, medical pendants, articulated monitor/TV wall mount arms, and furniture with sliding parts. In these installations, the cable is to have the necessary flexibility and be installed in a manner to prevent strain that may damage the cable.

Traditionally, telecommunications outlets (TOs) have been mounted on faceplates on walls. New requirements have been added to address the variety of TOs that are hanging as pendants, mounted on movable arms or on movable parts of furniture.

S009 15.5

A movable TO now has to be fixed in an enclosure if it can be moved directly by a person. In addition, the movement must be of a design that it is controlled, predictable and robust.

Pits & access holes

S008 5.8.1

The requirements for pit and access hole products have been updated in DR AS/CA S008 to assist designers to select suitable products, and to assist cablers to install the products effectively, with the aim of improving public safety through a reduction in the number of trip hazards. The new requirements apply to most modular components (e.g. pit risers) as well as complete pits, but some cover components have been exempted (e.g. a generic cover and frame set supplied separately).

Required product information now includes the intended range of installation environments, specific installation and modification methods, and methods for operating and maintaining parts such as covers. It is also recommended that manufacturers supply information about compatible parts, and describe potential hazards arising from misuse or mis-installation of the product. Marking requirements for covers have been clarified.

New in DR AS/CA S008 is a required statement from a registered structural engineer describing the tests and methods used by the manufacturer to demonstrate structural integrity of a pit or access hole product. This replaces the existing structural integrity requirements, which were not suitable for all types of pit and access hole product.

S009 18.1

More detailed requirements are now given for pits and access holes in areas intended to be used by vehicles.

Prohibited markings on underground conduit

S008 5.3.3.2

Conduit used for underground use can no longer bear the word 'ELECTRICAL' or any other marking that may be confusing or misleading.

Blown fibre tube systems **S008** **5.6.17**	Requirements for blown fibre tube systems have been extended to apply to similar systems that have preinstalled elements.
Modular plugs & sockets **S008** **5.7.3** **S009** **App. C.3**	New compatibility recommendations have been included to avoid 8P8C (RJ45) sockets being damaged with the insertion of incompatible 6-postion (RJ11) modular plugs. Information on the necessary design or the use of 8P-to-6P insert/adaptors has been provided.
Earthing outdoor cabling **S009** **20.20**	New requirements have been included for the provision of an earthing bar/terminal at a distributor which is terminating a metallic outdoor customer cable. A typical example of this would be an outdoor surveillance camera cabled back to a distributor within the building. The earthing bar/terminal has to be connected to protective earth or to a suitable bonding point.
Cable between buildings **S009** **17.3.1** **App. N**	The requirements for cabling between buildings has been updated, together with new guidance on installing metallic cables between buildings in an accompanying appendix.
Engineered solutions **S009** **4.2.81**	For specialised installations where it would be impractical for AS/CA S009 to provide the necessary requirements for each situation, requirements can be met by having designs and solutions provided by the appropriate registered engineer (electrical, structural or Information, Telecommunications and Electronic (ITE)). These have been reviewed in DR AS/CA S009, with examples of these being installations at HV sites, installations associated with underground or aerial HV power lines, installations associated with earth potential rise, installations using surge suppression, and pits installed in locations subjected to heavy vehicular loads.

Formatting	The opportunity has been taken in this revision to update AS/CA S008 and AS/CA S009 to the latest Communications Alliance Standards template. In addition to updating all the regulatory references and the reference publications, there are some important differences. The References section has been restructured, with the non-mandatory referenced publications being relocated to a new Bibliography towards the rear of the Standard. All defined terms that are used in the requirements are now presented in SMALL CAPS for ease of identification when reading the requirements. Another new element has been introduced to assist the reader while navigating the extensive list of definitions under Section 4. New lookup tables have been added, grouping definitions in the following categories: cabling, energy source and voltage classifications, persons and service/circuit classifications.

How the Standards are enforced in Australia

Further information on how AS/CA S008 and AS/CA S009 are regulated under Australian legislation can be found on the Australian Communications and Media Authority website at https://www.acma.gov.au/.

For AS/CA S008, the *Telecommunications regulatory arrangements* webpage at: https://www.acma.gov.au/Industry/Suppliers/Regulatory-arrangements/Telecommunications-customer-equipment-and-cabling/telecommunications-regulatory-arrangements.

For AS/CA S009, the Cabling information webpage at: https://www.acma.gov.au/Industry/Telco/Infrastructure/Cabling-rules.

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