18th Edition Guide

How BS 7671:2018 Amendment 2 will affect you

SCREWFIX

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Life Is On Schneider Electric

Contents

Thanks to the Arena Training Centre who supported Schneider Electric with the creation of this e-book

Introduction

Anyone working in the electrical industry will no doubt have been anticipating the changes to BS 7671, with debate over the public consultation document raging in work vans, classrooms, construction sites and online. With the recent publication of Amendment 2 to BS 7671:2018 bound in a newly coloured brown cover, this e-book is written with electricians in mind. It deals with each section providing the key changes and in places some explanation of underlying principles, as well as commentary on how the changes might affect those of us on the tools and running electrical businesses.

In line with Schneider Electric's vision to 'empower all to make the most of our energy and resources, bridging progress and sustainability', a range of our products is presented herein which will support the changes brought about by the latest edition of BS 7671.

What do I need to do?

BS 7671:2018+A2:2022 was issued on 28th March 2022 and can be implemented immediately. BS 7671:2018+A1:2020 remains current until 27th September 2022, when it will be withdrawn.

Part 1

What are the changes?

Part 1 has limited changes but makes the first hint at the new section appearing later in Part 8 since it now includes requirements for Prosumer's Electrical Installations. A prosumer is simply an energy user that both produces and consumes electricity.

This could be residential or non-residential properties that are connected to additional sources of supply and/or storage, i.e. PV or battery. Electricians are encouraged to read the IET Code of Practice for Electrical Energy Storage Systems which provides greater depth and clarity in relation to this evolving technology. There is likely to be a proliferation of prosumer installations as a consequence of rising energy costs and the need to secure clean, efficient, zero carbon energy systems. For example, homeowners may well be encouraged to install solar PV systems, the effectiveness of which is maximised when installed alongside a battery.

The recent demise of the feed-in tariff has made solar less economically viable, but given the rising number of homeowners with battery cars, many of which will not use the battery's full capacity, it makes sense to build electrical systems which will permit both charging and discharging of a battery, allowing the homeowner to store energy and optimise its use. Electricians are clearly going to be leading this new strategy.

Part 1

Part 1 also goes on to include the installation of fibre optic cables, which electricians are becoming more familiar with given their growing use in transmission for television signals, specialist lighting and decorations, internet and networking.

What do I need to do?

You should be aware of the changes to the industry and government policy. The development of eco-friendly generation and smart use of electrical power is likely to be funded and encouraged. You may need to consider how your business will keep up with the changing industry, what new opportunities are available to you moving forward, what training requirements you will need to fulfil and what technology is available for you to meet the changing needs of your customers.

How can Schneider Electric support you?

Consider use of flexible media options, where installers can fit Euromodule accessories into a front plate/grid to match the design of the accessories.

This provides flexible systems, and if specific modules are not available from the same manufacturer it's possible to interchange. Exercise caution when 240 V modules are being incorporated. Also remember correct screening between the likes of data cables and 240 V rated supplies in the same application.

Part 2

What are the changes?

Definitions have been expanded and modified with the majority of new definitions relating to the language used in Part 8. In particular it defines

- Consumer; an entity using electricity such as a business or homeowner.
- Producer; an entity generating power such as a business with a solar PV system.
- Prosumer; an entity that both consumes and produces power.
- PEI or Prosumer's Electrical Installation; the electrical parts associated with the installation.
- Operating mode; the way in which an electrical system works in terms of energy flow between different sources of power.
- Direct feeding mode; where the PEI is supplied by the local public network.
- Reverse feeding mode; where the PEI is supplying the public network, for example when a home with a PV array generates more energy than it uses.
- Island Mode; where the PEI is disconnected from the local supply but remains energised
- Load Shedding; a process whereby loads are switched off to optimize demand. An example might when an electrical system is running in island mode. It may limit demand by switching off non-essential loads thereby maximising the time the installation can operate in island mode.

What do I need to do?

The move to installing electrical systems that permit both production and consumption of energy is likely to increase. Do you have the knowledge and skills for your company to work in tomorrow's industry and if not how can you develop them within your business?

Part 4

What are the changes?

Regulation 411.3.1.2 has been redrafted. The regulation now requires that in each consumer's installation within a building extraneous-conductive-parts that are liable to introduce a dangerous potential difference be connected to the main earthing terminal.

A note has been added clarifying that where non-metallic pipes, e.g. plastic, enter the building and are then connected to metallic pipes within the building, the metallic pipes within the building do not normally require protective bonding as they are unlikely to be extraneous-conductive-parts.

The redrafting will certainly assist installers in making suitable decisions about where to connect bonding but the fundamental principles of equipotential bonding really do need to be better understood across the industry. Protective equipotential bonding should not be confused with earthing.

Earthing is designed to minimise the time that touch voltages appear for during a fault. Equipotential bonding serves the function of minimising touch voltages within a building until the fault is cleared.

Metal work that has no reference to another potential (normally Earth potential) cannot introduce a risk of touch voltage during a fault. When electricians bond such metal work, they actually introduce a potential to it during a fault.

The regulations reinforce this idea by stating that metal pipework which is connected to an incoming pipe made from plastic will not necessarily be extraneous and may therefore not require bonding.

Whilst the wording of the regulations is welcomed, electricians need to familiarise themselves with methods of testing metal work to confirm if it is extraneous or not. Where it is proven not to be extraneous, equipotential bonding should not be connected.

Where metal work cannot introduce another potential and is not therefore extraneous, the action of bonding such metal work will actually seek to distribute voltages to the metal work during a fault, that would not otherwise have been present if it had remained unbonded. Subsequently, unnecessary bonding may have the opposite effect on the safety of the installation.

Part 4

What do I need to do?

Ensure that when undertaking equipotential bonding you have ascertained if the metal work meets all requirements necessary for it to be deemed an extraneous-conductive-part. Guidance Note 3 and 8 provide guidance on how to test if metal work is extraneous.

Regulation 411.3.3 relating to the provision of additional protection by way of 30mA RCDs on socket outlets and mobile equipment used outside has been redrafted. It now has three indents. It states that 30mA RCDs are required:

- on socket-outlets up to and including 32A in locations where they are likely to be used by ordinary persons, children or disabled users
- on socket-outlets up to and including 32A in other locations
- on mobile equipment (not exceeding 32A for use outdoors

An exception applies to bullet point 2, which states that RCD protection can be omitted where a suitably documented risk assessment with the involvement of a skilled person (electrically) determines that RCD protection is not necessary.

Part 4

If you design a circuit requiring the omission of RCD protection the risk assessment should be written by the individual responsible for the installation, with the involvement of the electrician who is skilled (electrically).

Managers who are not skilled (electrically) should not be writing risk assessments ruling out RCD protection for their convenience or purely financial reasons. The regulations refer to Appendix 2 which reminds us that risk assessments should be undertaken such that they comply with The Management of Health and Safety at Work Regulations 1999.

Omission of an RCD for a socket supplying a critical piece of equipment is a serious step to take and if someone were to be killed or injured as a consequence, the persons involved in the production of the risk assessment may be held to account in Court. Risk assessments must also be subject to continuous review.

Unwanted tripping can be caused by a range of factors and steps to reduce or eliminate them is preferable to omission of an RCD. Unwanted tripping can often be eliminated by good circuit design.

Part 4

So when might it be suitable to omit an RCD? A strong argument might be presented for the omission of an RCD where the failure of a piece of critical equipment may result in harm to people. In commercial settings, a failure of critical equipment may result in significant financial damage - but this argument will need even more careful consideration since you would effectively be putting a price on human life in the event of an accident caused by the omission of the RCD.

If you have opted to omit RCD protection, consideration may be given to a range of steps to reduce the risk. These may include but are not limited to

- using interlocked plug and socket outlets
- only permitting class 2 equipment to be used with an inspection of the flex prior to use
- restricting access to the socket
- clear labelling
- inspection regimes
- management regimes
- provision of separate isolation and other action

Finally, an electrician can bypass the rigmarole of even attempting a risk assessment to negate the use of an RCD. You might for instance choose to hard wire the equipment.

Part 4

What are the changes?

Regulation 411.4.2 now sees what was previously a ‘NOTE’ promoted to an actual regulation which now recommends an additional connection to earth, by means of an earth electrode in accordance with Chapter 54, being made to the main earthing terminal of any TN system.

For those of you wondering why this has been brought in it is worth considering:

- Whilst many of us have learnt to recognise TN-S systems from TN-C-S systems, the truth is that old and damaged TN-S cables are repaired by the distribution providers in such a way that they become TN-C-S. Those of you who have studied the existing regulations pertaining to the installation of Electric Vehicle Chargers will be familiar with this idea of assuming TN-S is TN-C-S from a design point of view. Except where TN-S systems are privately owned and can be guaranteed to be TN-S it is best to assume that a TN-S public supply is in fact TN-C-S.
- TN-C-S systems generally have very low external impedances meaning that fault currents a commensurately higher, often many hundreds of amps which means that during a fault the disconnections times are much faster and therefore safer.
- Despite this TN-C-S systems can pose problems for designers. Firstly, on a faultless TN-C-S system the voltage between the MET of the TN system and True Earth can be as high as 18.4V. A person coming into contact with something connected to the TN-C-S earth whilst in contact with True Earth may perceive a voltage. This introduces a risk of a small shock which in some special locations could be seen as unacceptable due to the risk of ignition or persons being surprised by the perceived shock perhaps resulting in an accident.
- There also exists a much more dangerous scenario which occurs when the PEN conductor becomes broken which sees the Main Earth Terminal rising in potential to much higher and dangerous voltages as well as issues with diverted neutral currents. Again, this is one of the reasons that TN-C-S systems are prohibited in certain special locations.
- The use of an earth rod therefore helps to reduce the voltage between the main earthing terminal in Earth and thereby decrease the risk of a significant shock in the event of an open PEN conductor.

Part 4

What do I need to do?

It will be interesting to see what guidance is issued by the IET in the near future but for those of you installing wiring in new builds, it would pay dividends to get involved at an early stage to ensure that a suitable earth electrode can be installed at the foundation stage. Indeed, you may make use of the foundation steelwork to achieve very low Earth readings.

Retro fitting a suitable earth electrode will be more problematic. It is inherently dangerous to drive a metal rod into the ground as there is a risk you may hit an underground electrical service, drainage, gas, oil, water etc. In some circumstances you will need to scan and dig repeatedly to ensure that you do not have an accident, whereas you may find on a remote farmyard that a piece of land is available without any risk of a dangerous strike. If you are concerned that your effort in digging may not be rewarded with a suitably low reading you can always procure an electrode kit which includes conductive concrete to guarantee a low reading.

The value of impedance on the rod will need to be as low as practicable and should always be lower than 200 ohms, (a value above 200ohms is deemed to be unstable since freezing conditions can increase the contact resistance by up to 8 times, giving rise to a value of impedance which would be close to the limit for 30mA RCD protected circuits to disconnect effectively). Thus, simply placing one electrode remove may not achieve the desired value of impedance and the idea that ‘banging in a rod’ is all that is required to comply with this regulation is not true. Further guidance can be found in BS 7430 Code of Practice for Protective Earthing of Electrical Installations.

Part 4

What are the changes?

Regulation 421.1.7 has been redrafted. It is now a requirement to protect single phase AC final circuits supplying socket outlets with a rated current not exceeding 32A using arc fault detection devices (AFDD) but this only applies to:

- Higher Risk Residential Buildings (HRRB) Those over 18m in height or in excess of six storeys, whichever criteria is met first. It is anticipated that in many areas higher risk residential buildings will be defined in legislation which can be subject to change over time, as well as in risk management procedures adopted by fire and rescue services. Current legislation should be applied.
- Houses in Multiple Occupation (HMO)
- Purpose-built student accommodation
- Care homes

For all other premises, the regulation recommends AFDDs for single-phase AC final circuits supplying socket outlets not exceeding 32A. The use of AFDDs does not obviate the need to apply one or more measures provided in other clauses in this standard.

Part 4

What do I need to do?

AFDDs have been a rarity for many electricians involved with smaller scale projects and domestic installations given the restrictive prices. It is likely that prices will fall as they are sold in higher volumes. You will of course need to factor in the additional cost of these devices when pricing work.

AFDDs are designed to detect arcing in series or parallel originating from loose connections or damaged insulation. BEAMA have produced an excellent resource entitled Guide to Arc Fault Detection Devices which provides further information on the operation of these devices. Assuming you have correctly specified your AFDD and distribution board, connecting them at the origin of the circuit is no more difficult than installing an RCBO.

In 2016/17, there were more than 13,000 fires in England which occurred in electrical distribution and other electrical appliances. AFDDs will play a role in reducing this number wherever a fire risk assessment has been carried out. Consideration for such devices may be laid out in the assessment.

Part 4

How can Schneider Electric support you?

The Easy9 range of circuit protection devices has been increased to include the EASY AFDD which combines the functions of an MCB, RCBO, Overvoltage Relay and AFDD.

Part 4

What are the changes?

Regulation 422.1 (precautions where particular risks of fire exist) now introduces requirements for the fire safety design of the building(s) to be documented. Also, requirements have been added where cables should have an improved fire performance.

What do I need to do?

Where a building has been designated as having a particular risk of fire there will be a document called a fire safety manual held by the person responsible for the building. You will need to provide that person with a section for the manual covering the electrical installation, the basis of the design with respect to fire safety and any routine maintenance requirements.

Where it is determined that cables should have an improved fire performance but are not covered by Regulations 422.2 to 422.6, you will need to use cable with a minimum light transmittance of 60 % when tested in accordance with BS EN 61034-2. This basically means that the cable has been tested to ensure it doesn't produce so much smoke that escapees cannot see. You will also need to use cables with limited flame propagation according to the minimum requirements of the relevant part of BS EN 60332-3 or where cable management systems according to 422.2.1 (iii) or (iv) are used, cables shall conform to the minimum requirements of BS EN 60332-1-2

Part 4

What are the changes?

Regulation 422.2 now introduces separate requirements for escape routes and a new concept of 'protected escape routes' with further information provided at Appendix 13. Reference to conditions BD2, BD3 and BD4 have been deleted. Protected escape routes whilst new to BS 7671 are not new to anyone in the field of fire safety design in buildings. It is defined in part 2 as a route enclosed with specified fire-resisting construction designated for escape to a place of safety in the event of an emergency. Such routes may be corridors, stairways or lobbies. In order to protect escapees from the effects of fire and smoke these routes should be effectively maintained as fire sterile so it is important to control the presence of any combustibles within them.

Regulation 422.2.1 has been amended and places requirements on cables installed in protected escape routes, such as requirements about their routes and their resistance to flame propagation and light transmittance. Such cables were discussed previously in this document. It also requires that cable management systems in protected escape routes shall be of one or more of the following types and be of limited smoke production so as not to inhibit escape:

- Conduit systems classified as non-flame propagating according to BS EN 61386
- Cable trunking systems and cable ducting systems classified as non-flame propagating according to BS EN 50085
- Cable tray and cable ladder systems classified as non-flame propagating according to BS EN 61537, or
- Powertrack systems meeting the requirements of BS EN 61534.

Part 4

What do I need to do?

You should limit any cabling within protected escape routes since cables can burn and produce smoke. Cables selected should meet with the requirements laid out in the regulation for enhanced performance in a fire. You should only install cables for lighting, emergency lighting, fire detection and alarm systems within these areas. The fire safety design of the building may permit the use of cable for other circuits where necessary but only where it is installed in non-combustible conduit (e.g. steel).

Bare MICC cable is also permitted for any circuit since it does not produce smoke or burn. Where sockets are required within these routes the installation must not compromise the structure so you will need to use fire resistant pads or other suitable precautions. Not all routes will be protected escape routes and where doubt exists you must seek specialist advice. Any fire-resistant enclosure installed is considered to be outside of the route. You must also ensure that any cables installed in the protected route are as short as practicable and out of arms reach unless mechanically protected from damage that may be caused by escapees. You should also select cables as mentioned previously in the discussion regarding 441.1 above. Cable containment may be used but it must also be non-flame propagating and of limited smoke production so you may select steel conduit, steel trunking, steel tray, steel ladder or Powertrack.

Part 4

If you damage the envelope of the protected escape route (such as by drilling holes for cables) you must ensure that the damage is sealed to the same degree of fire resistance as there was before you damaged it. The sealant should also have the same resistance to the passage of water as the original substrate and be compatible with the wiring installed.

The sealant must provide adequate strength (including for any forces that may be exerted during a fire) and permit movement due to expansion and contraction. If you traverse any escape route with conduit, cable ducting, cable trunking, busbar or busbar trunking, whilst at the same time penetrating the protective envelope of the escape route, where the containment has an internal cross-sectional area greater than 710 mm^2 you must internally seal it in accordance with the requirements of Regulation 527.2.2.

Part 4

What are the changes?

In Chapter 44, Regulation 443.4 for determining if protection against transient overvoltages is needed has been redrafted. Regulation 443.4.1 now requires protection against transient overvoltages to be provided where the consequence caused by the overvoltage could result in:

1. serious injury to, or loss of, human life
2. failure of a safety service, as defined in Part 2
3. significant financial or data loss.

For all other cases, protection against transient overvoltages shall be provided unless the owner of the installation declares it is not required due to any loss or damage being tolerable and they accept the risk of damage to equipment and any consequential loss.

Regulation 443.4.2 requires protection against overvoltages to be considered in the case of equipment likely to produce switching overvoltages or disturbances and gives conditions.

Regulation 443.5 (Risk assessment method) has been deleted and Annex A443 (examples of calculated risk level CRL for use of SPDs) has also been deleted.

Part 4

What do I need to do?

Electricians will be thankful that the problematic CRL calculation has gone, with surge protection now being clearly defined as necessary in three well defined scenarios. But first let's clear up some common misconceptions about overvoltages.

Overvoltages can originate from the network due to lightning strikes. However, they can also arise from equipment that produces switching overvoltages or disturbances. This is common with inductive or capacitive equipment, such as motors, transformers, capacitor banks, storage units or high current loads.

These disturbances can cause progressive damage to electronic components greatly decreasing the life of the equipment. In commercial scenarios where equipment fails it may result in huge losses in productivity and subsequently profits.

Part 4

The installation of SPDs therefore arises out of the needs of the electrical installation design rather than out of a desire for manufacturers to sell devices. BS 7671 does not specify requirements for protection against transient overvoltages due to direct or nearby lightning strikes, which is covered by BS EN 62305-2. Nevertheless, where an electrical system is part of a building that has a lightning protection system the requirements for surge protection will form part of the lightning protection risk assessment.

After all, there is no point protecting a building from a direct strike by installing a lightning protection system if the induced transient voltages will go unprotected and destroy the building with an electrical fire.

With this in mind the new regulations are clearer. Where human life is at risk such as hospitals you will need to fit SPDs. Point 2 refers to safety services which are defined in Chapter 2 as ‘An electrical system for electrical equipment provided to protect or warn persons in the event of a hazard, or essential to their evacuation from a location’.

This means SPDs will be required in any structure that has fire alarm systems, emergency lights or other similar systems. Point 3 means you will need to install SPDs in places like banks or shops. Domestic electricians will need to consider the cost of an SPD relative to the cost of the installation and equipment that could be damaged therein. Where SPDs are not fitted, installers will need to get the customer to put in writing that they understand the cost of any potential loss and deem it to be acceptable.

Domestic electricians can of course, as many do already, simply fit them without recourse to a discussion, as and when they replace consumer units.

Part 4

How can Schneider Electric support you?

The residential Easy9 range has a Type 2 device with upstream circuit protection from a 20A MCB.

Part 5

What are the changes?

Section 514 contains a number of changes and exemplar illustrations of notices can now be found at Appendix 11.

514.4.2 now states single-core cables and conductors in multicore cables identified by green-and-yellow throughout their length shall only be used as a protective conductor and shall not be overmarked at their terminations. Previously it only referred to single core cables.

Table 51 updates the colour of functional earthing from cream to pink and updates the colours for DC power circuits.

Regulation 514.9.1 now contains an exception for domestic (household) premises in that an electrical certificate conforming to Appendix 6 is sufficient to comply with the requirements laid out regarding diagrams and charts.

Regulation 514.9.2 states that that all diagrams, charts, and information or instruction notices must comply with the applicable standards specified.

Regulation 514.12.1 (Notices: periodic inspection and testing) and Regulation 514.12.2, concerning the RCD notice now contain an exceptions for domestic (household) premises where certification and guidance has been provided to the person ordering the works.

Regulation 514.14 regarding non-standard colours has been deleted and a new Regulation 514.16.1 has been introduced requiring a label to indicate the presence of SPDs. However, there is an exception for domestic (household) premises or similar.

Part 5

What do I need to do?

The requirement for new labelling will mean those of you who utilise personalised branded labels will need to get more produced. Domestic electricians may avoid the need for labels where they provide comprehensive certification and guidance to customers. As a jobbing sparky though, you may want to continue adding clear branded labels simply because customers have a habit of losing paperwork and if you use branded labels, it advertises your brand to the next owner.

Part 5

How can Schneider Electric support you?

Schneider consumer units are supplied with a selection of notices to cover these situations.

Table 52.2 which provides the derating factors for cables in insulation is moved to Appendix 4 with all the other tables that provide this information.

531.3.2 requires electricians to consider using RCBOs for individual circuits in residential properties.

531.3.3 now requires the use of type AC RCDs on fixed loads where it known that the load will have no DC components such as electrical heating appliances and filament type lighting.

Regulation Group 543.7 has been modified slightly.

Regulation 544.1.1 concerning main protective bonding conductors has also been revised. It now states except where PME conditions apply, a main protective bonding conductor shall have a cross-sectional-area not less than half the cross-sectional area required for the earthing conductor of the installation. Where an installation serves more than one building, a main protective bonding conductor shall be selected in accordance with the characteristics of the distribution circuit protective conductor for that particular building. The cross-sectional area shall be not less than 6 mm^2, and need not exceed 25 mm^2 if the bonding conductor is of copper or a cross-sectional area affording equivalent conductance in other metals. Table 54.8 must still be used where PME conditions apply.

Regulation Set 551.7 has additional requirements added for installations where the generating set or sets may operate in parallel with other sources including systems for distribution of electricity to the public.

554.4 Heating conductors and cables Regulations 554.4.2, 554.4.3, and 554.4.4 have been deleted.

Part 5

When installing distribution circuits to outbuildings where non-PME supplies are used it may be possible to utilise much smaller CSA bonding conductors than previously.

The use of type AC RCDs is likely to be replaced by the use of at least type A RCDs, since AC RCDs can be blinded by the presence of residual DC fault current resulting in the device not tripping under fault conditions. Equipment that can cause this blinding includes LED lighting, IT equipment, induction hobs, electric vehicle chargers, UPS systems and VFDs. Further information on RCD selection is available in the RCD Handbook produced by BEAMA and Wiring Matters ISSUE 77 Sep 2019.

How can Schneider Electric support you?

Schneider Electric have been supplying Type A RCBO across their entire (residential, commercial and industrial) circuit protection range for several years now.

We also have a range of RCDs covering a wide selection of applications.

Part 6

What are the changes?

Regulation Group 643.3 has been redrafted. Insulation resistance tests are now required to be measured between live conductors and then between live conductors and protective conductors connected to the Earthing arrangements. It goes on to state that during this latter test, the line and neutral conductors may be connected together.

The requirements for testing insulation resistance where equipment is likely to influence the verification test or be damaged has been clarified and reference is made to a testing before connection and then after at a test voltage of 250 V DC. Following the connection, the testing should be done between live conductors and protective conductor connected to earthing.

The requirements for RCD testing have changed and Table 3A (Time/current performance criteria for RCDs) in Appendix 3 has been deleted. Regardless of RCD Type, an alternating current test at rated residual operating current ($I_{\Delta n}$) is used to verify the effectiveness.

A note has been added highlighting how fault loop impedance testers may be adversely affected by power converting equipment such as invertors.

Appendix 6 has been redrafted. Key changes include where multiple minor works have been carried out it is now acceptable to complete one EIC instead of multiple minor works certificates. The EIC and Minor Works Certificates also includes the warnings which previously were affixed to the consumer unit or distribution board.

Part 6

What do I need to do?

The paperwork has not changed that much and has greater clarity which should make the process of completion a lot simpler. In terms of testing, the guidance should clear up confusion over how to test electrical circuits for insulation resistance. It highlights that testing is not something that is simply carried out at the end of an installation. Consideration for how connected loads might stop you fully testing will be required to allow for testing during the construction.

The note regarding how earth fault loop impedance testing can be affected by power converting equipment should not give rise to concern. Those of you who test in accordance with Guidance Note 3 will generally not be affected since the guidance clearly indicates that such measurements are preferably measured by way of a single Z_e measurement and dead test $R_1 + R_2$ measurements on final circuits rather than carrying out multiple live tests.

RCD testing is greatly simplified only requiring a single test at $I_{\Delta n}$. That said, you may wish to carry out more extensive testing especially when most Multi-Function Testers carry out an automatic RCD test which would of course tests at ½ $I_{\Delta n}$, $I_{\Delta n}$ and 5x$I_{\Delta n}$. Additionally, many testers permit testing of different types of RCDs. It will therefore be up to you whether you see fit to carry out additional testing above the minimum set in BS 7671.

Part 7

What are the changes?

Section 702 Swimming pools and other basins changes include:

- Regulation, 702.414.3, concerning SELV and PELV, has been introduced which removes the option to use point iv, certain electronic devices, as a source.
- The exception permitting socket-outlets to be located in Zone 1 has been deleted.

Section 703 Rooms and cabins containing sauna heaters changes include:

- Regulation 703.414.3, concerning SELV and PELV, has been introduced which removes the option to use point iv, certain electronic devices, as a source.

Section 704 Construction and demolition site installations changes include:

- Regulation 704.511.1 states Plugs and socket-outlets with a rated current exceeding 125A up to 800A and where interchangeability is not required shall comply with BS EN 60309-1.
- Alterations to the requirements for wiring systems (704.52)
- Redrafting of requirements for devices for isolation (704.537).

Section 706 Conducting locations with restricted movement changes include:

- Redrafting of the requirements for protection against electric shock.
- A new Regulation 706.415, requirements for additional protection, has been introduced requiring supplementary equipotential bonding to be provided where functional earthing is required.

Part 7

Section 710 Medical locations changes include:

- Requirements to limit leakage current on IT systems to less than 10mA
- Requirements for the source of energy for SELV and PELV
- Requirements for fitting an equipotential bonding busbar
- the location of IT transformers
- Requirements for diagrams and documentation
- Removal of the use of type AC RCDs in group 1 and 2 locations.
- Removal of regulation 710.531.3.2 regarding socket outlets protected by RCDs
- Requirements for sockets for Medical Outlets.
- Wiring of lighting circuits in group 1 and 2 locations.

Section 711 Exhibitions, shows and stands changes include

- A new Regulation 711.410.3.101 requires all final circuits, other than those of safety services, having a rated current not exceeding 32 A supplying socket-outlets or handheld electrical equipment, and all final circuits for lighting to use either automatic disconnection of supply (with additional protection by means of an ≤30mA RCD), SELV or PELV, or electrical separation.
- Regulation 711.42 concerning protection against thermal effects has been deleted.
- Requirements for isolation and switching have been redrafted.
- The regulations covering luminaires and lighting installations have been redrafted.

Section 712 Solar photovoltaic (PV) power supply systems includes a significant number of changes:

- It defines PV generators that are designed to operate independently of the local supply, in parallel and as an alternative to the local supply.
- There are a significant number of new regulations relating to protection against overcurrent, thermal effects and the nature of protective devices.
- There are also new regulations relating to signage.
- There are extensive new regulations regarding Wiring Systems.
- Regulations regarding selection of Protection, isolation, switching, control and monitoring including the selection of SPDs.
- New regulations regarding earthing and bonding.

Part 7

Section 714 Outdoor lighting installations changes include:

- Changes to automatic disconnection of supply and additional protection.

Section 717 Mobile or transportable units changes include:

- Regulation 717.411.4 has been expanded to take account of PME earthing facilities.

Section 722 Electric vehicle charging installations changes include:

- Incorporation of BS 7671:2018+A1:2020
- Deletion of indent (i) of Regulation 722.411.4.1
- Changes have been made to the notes in particular the one concerning where equipment to be used is not covered by a British or Harmonized Standard.
- A new regulation 722.826.3.201 relating to the use of EV systems on PEI systems.
- In addition, the Annex to 722 has been redrafted and includes guidance on indent (iii) of Regulation 722.411.4.1

Section 753 Heating cables and embedded heating systems in changes include:

- The addition of new regulations covering impact and the installation of heating cables.

Part 7

What do I need to do?

In the confines of this guide, an in-depth review of changes to the regulations for special locations and the impact on electricians is probably not appropriate and will no doubt require you to carefully read through the guidance if you carry out work in these locations.

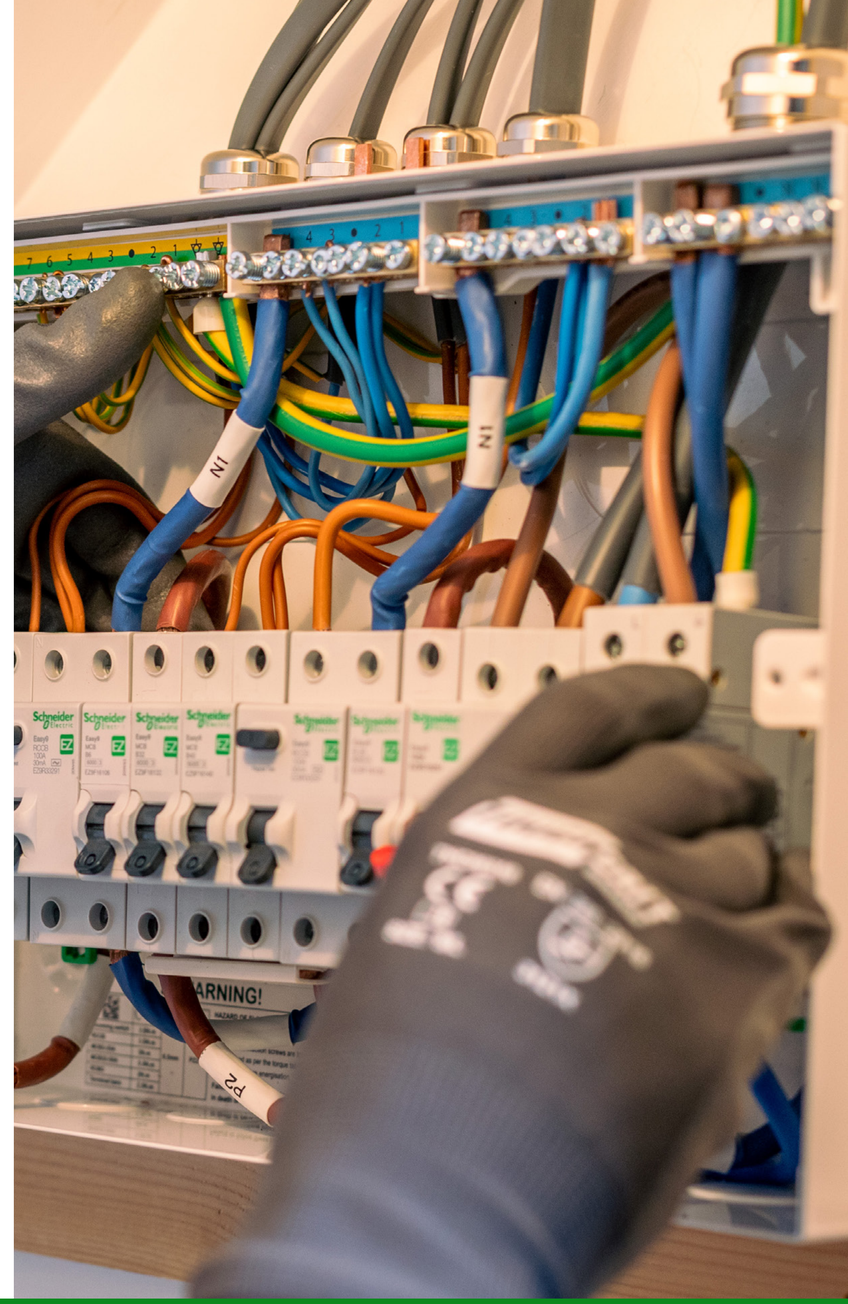
What does stand out though, are the changes to regulations regarding Solar and Electric Vehicle Systems. Amendment 1 came out only weeks after the publication of the 18th Edition and it is easy to become cynical given the cost of the guidance documents to electricians.

The Joint BSI/IET committee undertake considerable work discussing changes and a ‘line in the sand’ has to be drawn at some point to allow the editing and printing of the standards, yet technological developments and tragedies such as Grenfell Tower continue to happen and subsequently the work involved in updating our electrical regulations likewise continues.

The raft of changes we have seen relating to Solar and EV must surely be an indicator that this area of technology is going to grow and subsequently manufacturers and electricians will continue to improve the standards and practices. It is therefore likely that we will see further amendments sooner rather than later.

What does this mean for us electricians? First and foremost it highlights the importance of ongoing training to keep abreast of the changing technology and you should be encouraged to consider how your Continuing Professional Development (CPD) will enable your business to stay current and competitive.

This does not mean simply attending a course at a local training provider; whilst formal education has its uses you might wish to set aside time to read, develop training for others, give or receive coaching, and other such useful activities.



Part 7

How can Schneider Electric support you?

Schneider Electric run a number of CPD training sessions, and always look to introduce more during such times as now when regulations change.

Schneider Electric are taking an active role moving forward as the demand on the ability to monitor, manage and control energy usage either around the home or in commercial environments increases.

Part 8

What are the changes?

A new Part 8 comprising Chapter 82 addresses the topic of prosumer low voltage electrical installations. It references systems that can both produce and store energy as well as making a very bold statement addressing the needs of a Prosumer's Electrical Installation (PEI) to achieve compatibility with existing and future ways to deliver electrical energy to current using equipment or to the public network by means of local sources.

This is the clearest indicator yet that future energy systems will need to work differently to 'ways of old' that focused on power companies generating regionally and delivering power to the end user. The future will see end users generating their own power, storing power permitting them to operate independently of the local supply or at least maximise the consumption of self-generated power.

The focus of the Chapter is safety, proper function and implementation. Safe operation regardless of whether the PEI is operating in parallel or island mode. Proper function in terms of the stability, reliability and quality, even in island mode. Implementation in terms of the PEI taking account of restraints set by the DNO/suppliers and the need for an EEMS Electrical Energy Management System.

The chapter describes some variations on the design of PEI from simple single units with the capacity to produce through to more complex shared PEI.

Part 8

What do I need to do?

The bottom line is that most electricians will need to undertake training to better understand the architecture of PEI. Unless you are fortunate to already be involved in the design and installation of small-scale generation and storage it is likely that you will need to learn more about system design, the benefits of PEI, how to inspect and verify PEI and fault finding on PEI. This will affect all sectors from domestic to commercial to industrial.

The new regulations really do set the bar high for the electrical industry in playing a key role in leading the battle for sustainable green energy systems.

How can Schneider Electric support you?

The intention to leave a couple of spare ways or even 20% spare capacity in new consumer unit installations may have to be reconsidered. Multiple sources of supply, increased visibility and increased control of our energy will require more space in the consumer unit.

The Easy9 range now includes multiple row units providing flexibility for designing a bespoke system comprising of a row(s) for circuit protection devices and an additional row(s) to house a centralised home energy management system, along with contactors and metering.

Appendices

Changes include:

- Appendix 3 Table 3A, covering the tripping times of RCDs, has been deleted.

- Appendix 4 includes minor changes concerning a cable surrounded by thermal insulation.

- Appendix 6 Model forms for certification and reporting:
  - Addition of fields for recording the details of SPDs and AFDDs.
  - The schedule of inspections has been simplified for initial verification. A new example checklist of items requiring inspection during initial verification has been added which can be adapted according to the installation.
  - The single page generic schedule of test results used for EIC and EICR has been redrafted. There is now a separate page for the schedule of circuit details and a separate page for the schedule of test results.

- Appendix 7 Deleted by BS 7671:2018+A2:2022.

- Appendix 11 Warning and user instruction labels. This is a new appendix that provides guidance for the types of safety signs, warning signs and instructions required to be applied to electrical installations.

- Appendix 13 Escape routes and fire protection:
  - The previous content of Appendix 13 concerning methods for measuring the insulation resistance/ impedance of floors and walls to Earth has been removed.
  - New guidance on escape routes and fire protection with detailed guidance on protected escape routes in order to afford a safe passage through the building to an exit.

- Appendix 17 Energy efficiency. Changes include
  - the scope includes dwellings and references the Building Regulations.
  - changes to user decisions, design recommendations, information on determination of meshes, information on user requirements, guidance covering impacts on the design of an installation and guidance on periodic assessment.

Conclusion

The 47th G7 Summit saw a commitment by the G7 nations to reach net-zero emissions by 2050. This ambitious target is only going to be achieved if politicians and engineers are able to deliver on the funding requirements and overcome the technological barriers.

As electricians we can really only influence the latter of these two barriers to success. We must therefore work together to embrace the changes in the latest version of the Wiring Regulations in what may transpire to be one of the most important and ambitious editions released thus far.

What do I need to do?

As mentioned previously, the changes to the appendices indicate that we need to be much more aware of the requirements for designing energy efficient electrical installations.