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Inspection, Testing, Certification And Reporting

HOME ELECTRICAL PROFESSIONALS WIRING REGULATIONS INSPECTION, TESTING, CERTIFICATION AND REPORTING

This section lists questions relating to:

- Periodic inspection, testing, certification and reporting.

If you have any queries, please contact enquiries@electricalsafetyfirst.org.uk with "Wiring Regulations" as the subject line of your message.

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Enter a search term in the textbox below to search the FAQ.



Q2.1 Where can I find general guidance on the use of Classification Codes for domestic electrical installation condition reports?

General guidance on the use of Classification Codes is available in Issue 4 of Electrical Safety First's Best Practice Guide No 4, which may be viewed or downloaded free of charge by clicking [here](#)



Q2.2 During periodic inspections of domestic electrical installations, I often find that cables that are concealed in walls at a depth of less than 50 mm have no additional protection by means of an RCD, as is now required for installations complying with the 17th Edition. What Classification Code should I give?

Although existing installations need to be assessed against the requirements of the 17th Edition, this does not necessarily mean that they require upgrading, unless a departure from the latest requirements constitutes an immediate or potential danger. However, it would usually be appropriate to recommend improvement by giving the observation a Classification Code C3.

Regulation number(s)

- *Introduction to BS 7671: 2008 incorporating Amendment 3: 2015*

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Q2.3 Where can I find the limiting values of measured earth fault loop impedance for BS 3871 circuit breakers?

Click [here](#).

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Q2.4 What Classification Code should be given if it is found that there is no supplementary bonding in a bathroom having extraneous- or exposed-conductive-parts, and the conditions given in Regulation 701.415.2 for its omission are not met?

Classification Code C2. Where the presence of supplementary bonding cannot be confirmed by inspection, it may be verified by a continuity test ($< 0.05 \Omega$)

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Q2.5 Is it necessary to verify voltage drop during a periodic inspection?

Verification of voltage drop is not normally required unless there is considered to be a voltage drop problem.

Regulation number(s)

- 621.2

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Q2.6 What should be recommended if, during a periodic inspection, the safety of an installation forming part of a TT system is found to be relying on a voltage-operated earth-leakage circuit-breaker (VOELCB) for fault protection?

If a VOELCB on a TT system fails to operate when tested with an instrument or integral test button, this would warrant a Classification Code C2 (potentially dangerous).

But, subject to the VOELCB being proved to operate correctly, continued reliance on it for fault protection (protection against indirect contact) would normally warrant a Classification Code C3 (improvement recommended).

However, if the VOELCB relies on a water pipe not permitted by Regulation 542.2.6 to be a means of earthing, this should attract a Classification Code C2 (potentially dangerous).

In any case, the person who ordered the inspection should be advised that the voltage-operated device should be replaced with RCD protection at the earliest opportunity to enhance the safety of the installation.

Regulation 542.2.6

^

Q2.7 In an existing domestic installation, are 16 mm² single-core pvc/pvc meter tails (having a current-carrying capacity of 87 A clipped direct) adequate if the rating of the distributor's cut-out fuse is 100 A?

This size of tails may be adequate provided the maximum demand of the installation, taking into account the load characteristics (diversity and load profile), does not exceed the current-carrying capacity of the tails, and also provided that the requirements of Regulation 434.5.2 for protection of the tails against fault current are met.

As a practical tip, the current-carrying capacity of the meter tails is likely to be adequate if they have been in service for several years and there are no signs of thermal damage at the terminations or to the cable sheath or insulation.

Regulation number(s)

- 311.1

- 433.3.1(ii)
- 434.5.2

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Q2.8 In an existing domestic installation, is a 10 mm² or 6 mm² earthing conductor adequate if the rating of the distributor's cut-out fuse is 100 A?

This size of earthing conductor will be adequate if the requirements of Regulation 543.1.3 (adiabatic equation) are met.

However, if the supply is PME, the earthing conductor is usually required to be at least 10 mm²

Regulation number(s)

- 543.1.3
- 542.3.1
- 544.1.1

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Q2.9 What is the recommended sequence for testing RCDs?

Preferably, RCDs should be tested in the sequence of: x1 $I_{\Delta n}$, x5 $I_{\Delta n}$ (if required for additional protection), followed by x0.5 $I_{\Delta n}$ and then finally the test button trip.

However, some automated test instruments test in the sequence of: x0.5 $I_{\Delta n}$ followed by the x1 $I_{\Delta n}$ test and then the x5 $I_{\Delta n}$ test (if required for additional protection).

In any case, the test button should be operated last in the test sequence.

^

Q2.10 What is the procedure for periodic inspection and testing when an electrical installation is not energised to enable the necessary live testing to be undertaken?

Live testing is an essential part of establishing whether an installation is in a satisfactory condition for continued service, which is the purpose of a periodic inspection.

It will be necessary for the live testing to be completed, and therefore for the supply to be available, before an Electrical Installation Condition Report indicating a satisfactory overall assessment can be issued.

^

Q2.11 Are the relevant tests of Regulations 612.2 to 612.13, for example continuity of protective conductors, insulation resistance and earth fault loop impedance, applicable to parts of systems such as room and cylinder thermostats, motorized valves and programmers?

Yes. Automatic Disconnection of Supply (ADS) is a commonly-used protective measure against electric shock in such systems. The continuity of protective conductors to each point should be confirmed. The value of R2 or (R1 + R2) may be used to estimate the maximum earth fault loop impedance of each control circuit for verification purposes.

Insulation resistance tests should also be carried out. It is essential that the protective conductors are connected to the general mass of the Earth during line/Earth insulation resistance testing. It is acceptable to measure insulation resistance between the live conductors connected together and the earthing arrangement or to perform the insulation resistance test at 250 V d.c. where connected equipment may cause a misleading reading to be obtained or where components therein are likely to be damaged if the test was performed at 500 V d.c.

Where insulation resistance testing is not carried out, this should be clearly stated as a limitation on the Electrical Installation Condition Report together with the reasons why the testing was not performed.

The results should be recorded on a schedule of test results.

Regulation number(s)

- 411.3.1.1
- 411.3.2
- 612.9
- 621.2

^

Q2.12 Is it acceptable to calculate (R₁+R₂) values when carrying out periodic inspections, using measured loop impedance values?

No. In any event, it is not essential to measure (R₁ + R₂) values for a Condition Report.

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Q2.13 Is it acceptable to carry out dead tests on individual circuits within an energised distribution board when carrying out a periodic inspection?

No, as it involves avoidable live working (unless the construction of the distribution board provides a suitable form of separation. See the BEAMA Guide to Forms of Separation).

^

Q2.14 When carrying out a periodic inspection, is it acceptable to use a wander lead to carry out protective conductor continuity testing to exposed-conductive-parts (such as metallic accessory plates) with the installation still energized?

Yes, provided that the continuity test instrument, test leads and probes are in good condition (to avoid the risk of electric shock). This test method should not be used inside enclosures containing live parts that are energized (to avoid the risk of touching a live part with the wander lead probe).

^

Q2.17 When undertaking a periodic inspection on a domestic electrical installation having more than one consumer unit, do I need to complete a separate Condition Report for each part of the installation?

Not necessarily. It depends on whether all the required information for each part of the installation can be recorded on one Condition Report.

^

Q2.18 When undertaking a periodic inspection on a domestic installation, it is found that, since the wiring was installed, it has been covered by thermal insulation. What, if anything, should be recorded in the Condition Report?

In many cases, the covering of cables in thermal insulation, whilst not recommended, does not result in overheating sufficient to damage or degrade the cable insulation or connected accessories, so would not need to be recorded in the Condition Report.

However, if the inspector has reasonable doubt about the adequacy of the cable rating in relation to the nature of the load (for example there are signs of overheating), such that there is potential danger, a Classification Code C2 (potentially dangerous) would be appropriate.

Regulation number(s)

- 523.9

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Q2.19 On the new Electrical Installation Condition Report, the first few lines of the inspection schedule (1.1 – 1.6 & 3.1) relate to the verification of the distributor's/supply intake equipment. What should I recommend if that equipment is in a dangerous or potentially dangerous condition?

Where inadequacies in distributor's equipment are observed, the contractor should recommend that the person ordering the report requests the distributor or meter operator, as appropriate, to carry out remedial work as necessary to remove the danger or potential danger.

Distributors and meter operators have an obligation under the Electrical Safety, Quality and Continuity Regulations 2002 (ESQCR) to maintain their equipment, so far as is reasonably practicable, to prevent danger.

^

Q2.20 What are the appropriate testing criteria for a time-delayed RCD when connected into a TT system, where the installation was designed prior to the introduction of the 17th Edition?

It would be necessary to verify that the RCD operates within the criteria stated in the relevant product standard (BS EN 61008-1) and reproduced in Table 3A of Appendix 3 - that is between 130 ms and 500 ms.

^

Q2.21 What action, if any, should be taken if it is discovered that the seal on the DNO cut-out fuse has been removed?

The absence of a seal is not an electrical safety issue and so no entry is required on the Condition Report. However, the owner/occupier should be informed that the seal is missing and they should be advised to contact the relevant DNO or meter operator.

^

Q2.22 Can sampling be applied at both the inspection and testing stages when carrying out the periodic inspection and testing of a domestic property?

The principle of sampling can be employed at both the inspection and the testing stages when carrying out a periodic inspection and test.

Sampling can never be applied to measures to determine adequacy of:

- Incoming supply arrangements
- main earthing and bonding

Whilst a degree of sampling is permitted, it is recommended that the following should be undertaken as a minimum where practical:

- an external visual inspection of all accessible electrical equipment (, light fittings, switches, socket-outlets etc.)
- An internal visual inspection of every consumer unit and confirmation that all conductors are correctly located in terminals and are tight and secure
- a close inspection of the terminations and connections at a representative number of items of electrical equipment on every final circuit and, in particular where the external visual inspection has raised concerns
- cpc continuity to all accessible exposed conductive parts Note: An earth fault loop impedance test may be used to confirm there is a connection to Earth.
- earth fault loop impedance at the origin, every accessible socket-outlet and, so far as can be determined, the furthest point of every final circuit (e.g. a lighting circuit).

Testing all RCDs in accordance with BS 7671.

Regulation number(s)

- 621.2

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Q2.23 A number of companies specialising in periodic inspection and testing are offering ‘visual only’ periodic inspections (also called ‘visual condition reports’). As no testing is undertaken, where would the use of such ‘visual only’ inspections be appropriate?

The preferred option is to adhere to the requirements of Regulation 621.2 with a detailed examination of the installation, i.e. a visual inspection supplemented by whatever tests are deemed to be appropriate by the tester to accurately determine the condition of the installation.

A visual condition report can be a valuable alternative in situations where householders are reluctant to commission a full electrical installation condition report. Whilst it is not possible to confirm fully by visual inspection only that an installation is in a satisfactory condition for continued use, a visual inspection can quickly reveal that an installation is in a poor or potentially dangerous condition, justifying the need for further investigation.

However, carrying out an earth fault loop impedance test on just one socket-outlet circuit would enable an inspector to make a more informed assessment of the condition of an installation.

‘Visual only’ inspections should include an examination of the interior of the consumer unit where much useful information on the condition of the installation can be gained.

In rented domestic accommodation including houses in multiple occupation (HMOs), a combination of visual condition reports and electrical installation condition reports can be effective in helping to ensure continued electrical safety. In such cases, visual condition reports should be used only where the installation has been inspected and tested within the previous two years and the appropriate report or certificate is available for reference.

^

Q2.24 What is the recommended frequency for inspecting and testing properties with thatched roofs?

In general, electrical installations do not present increased risks of fire in thatched properties.

In the absence of any specific requirements (such as those of the building insurers), there are no particular requirements over and above those for any installation in domestic premises.

As with any other type of property, the recommended period between inspections can be varied at the discretion of the person carrying out the inspection, based on the outcome of the inspection.

Regulation number(s)

- 622.1

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Q2.25 During a periodic inspection, a circuit having RCD protection is encountered and the design information regarding the provision of fault protection is not available. Which value of maximum permitted Z_s applies – the value for the overcurrent device (circuit-breaker or fuse) or the value for the RCD (or the RCD element of an RCBO)?

Either value can be used. However, it is essential to confirm that the measured value of Z_s is not indicative of a defect, such as a loose connection or an inadequate means of earthing.

Regulation number(s)

- 411.4.4
- 411.4.5
- 411.4.9

^

Q2.26 Whilst carrying out the periodic inspection and testing of an electrical installation, a low-resistance between neutral to Earth (less than 1 MΩ) is found on one of the final circuits. What classification code should be recorded on the Electrical Installation Condition Report (EICR)?

Where an insulation resistance measurement between live conductors connected together and Earth results in a reading of less than 1 MΩ, a classification code C2 ('Potentially dangerous') should be recorded on the EICR.

Subsequent investigation during remedial work would then reveal whether the low insulation resistance was due to a defect or deterioration in the installation, or as a result of connected equipment.

See page 14 of Electrical Safety First's Best Practice Guide No. 4 for further details.

^

Q2.27 I am still working on a new electrical installation that was designed to an earlier edition of BS 7671. To which requirements should the installation be inspected, tested, verified and certificated?

An installation should be inspected, tested, verified and certificated to the version to which it was designed.

^

Q2.28 Does the R1 + R2 test confirm the correct polarity of a radial circuit?

No, not on its own. Whilst the test can provide an indication of polarity, it needs to be combined with inspection and further testing as required by Part 6 of BS 7671: 2008

Regulation number(s)

- 611.3
- 612.6

^

Q2.30 In the model Schedule of Inspections in BS 7671, what needs to be verified in order to confirm the 'Presence of earthing arrangements for combined protective and functional purposes'?

To verify that the requirements of Regulation 543.5.1 relating to combined protective and functional earthing, and Regulation 543.7 relating to high protective conductor currents, have been met as appropriate.

Regulation number(s)

- 543.5.1
- 543.7

^

Q2.31 In the model Schedule of Inspections in BS 7671, what has 'Presence of adequate arrangements for alternative sources' to do with automatic disconnection of supply?

To confirm that the fault protection arrangements for alternative sources of supply have been met.

Regulation number(s)

- 551.4

^

Q2.32 In the model Schedule of Inspections in BS 7671, under 'Automatic disconnection of supply', where applicable, what needs to be verified to confirm the requirements for FELV have been met?

It needs to be verified that the supplementary provisions described in Regulations 411.7.2 and 411.7.3 have been applied to ensure basic protection and fault protection.

Regulation number(s)

- 411.7

^

Q2.33 The model Schedule of Inspections in BS 7671 would be used as part of an Electrical installation certificate where a consumer unit was installed, but no circuit cables were replaced. All boxes have to be a tick or n/a. What then do you need to do with the boxes to do with cable routes in prescribed zones?

As the installer of the consumer unit has insufficient knowledge of the cable routes, the box 'Routing of cables in prescribed zones' should be marked 'n/a'.

^

Q2.34 Is it appropriate to use a multimeter or a multifunction test instrument to prove equipment dead?

The procedure for proving dead should be by use of a proprietary test lamp or two-pole voltage detector as recommended in HSE Guidance Note GS38, Electrical test equipment for use on low voltage electrical systems. The use of multimeters, makeshift devices and non-contact voltage indicators (voltage sticks) is not advised for voltage detection as such use has caused accidents. (See also Electrical Safety First's Best Practice Guide No. 2)

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Q2.35 What should be inserted in the column 'Maximum disconnection times permitted by BS 7671' where an RCD or RCBO is connected to a circuit?

The 'Maximum disconnection time permitted by BS 7671' column is associated with fault protection and the disconnection time to be inserted in that column should be determined in accordance with Regulation 411.3.2.2 (Table 41.1), 411.3.2.3 or 411.3.2.4, as applicable. www.beama.org.uk

Regulation number(s)

- 411.3.2.2
- 411.3.2.3
- 411.3.2.4

^

Q2.36 What inspection, testing and certification should a contractor undertake when carrying out a like-for-like replacement of an accessory or an item of current-using equipment?

An inspection should be carried out to ascertain that the existing cable supplying the item is adequate. Tests of polarity, earth fault loop impedance and, where appropriate, correct RCD operation should, as a minimum, also be carried out.

It is recommended that the results are recorded for the benefit of both the customer and the contractor. A suitable minor works form or works order may be used to record the details of the inspection and testing.

^

Q2.37 An installation uses Automatic Disconnection of Supply (ADS) as a protective measure against electric shock. One or more items of double insulated equipment are installed, such as luminaires. On the schedule of inspections, should the “double insulation” box for both basic and fault protection as a method of protection against electric shock be ticked?

No. That item in the Schedule of Inspections is intended for use when that protective measure is used as the sole protective measure, that is, where a whole installation or circuit is intended to consist entirely of equipment with double insulation. In such a case, the installation or circuit would be required to be under effective supervision in normal use.

Regulation number(s)

- 412.1.3
- Appendix 6

^

Q2.38 An installation uses Automatic Disconnection of Supply (ADS) as a protective measure against electric shock. One or more items of separated extra-low voltage (SELV) equipment are installed. On the schedule of inspections, should the “SELV” box for both basic and fault protection as a method of protection against electric shock be ticked?

No. That part of the Schedule of Inspections is intended for use when a part of an installation relies specifically on that method of protection.

Regulation number(s)

- *Appendix 6*

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Q2.39 An installation uses Automatic Disconnection of Supply (ADS) as a protective measure against electric shock. An electric shaver is supplied using electrical separation through a shaver supply unit. On the schedule of inspections, should the “electrical separation” box for fault protection as a method of protection against electric shock be ticked?

No. That part of the Schedule of Inspections is intended for use when a part of an installation relies specifically on that method of protection.

Regulation number(s)

- *Appendix 6*

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Q2.40 A new mobile or transportable unit has been supplied as new with a “dead test only” Electrical Installation Certificate stating that a competent person must ensure that the unit is connected to a suitable and reliable supply. Is this compliant or must live tests also be completed by the unit manufacturer?

In principle, dead testing by the manufacturer prior to despatch is sufficient. This should be followed by live testing by the installer to fully satisfy the inspection and testing requirements of BS 7671.

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Q2.41 How should the like-for-like replacement of a circuit-breaker be recorded?

It is recommended that such maintenance work be recorded on a Minor Works Certificate, job sheet, invoice or similar.

^

Q2.42 Is it acceptable to issue a Minor Electrical Installation Works Certificate for the replacement of a single protective device where an Electrical Installation Condition Report has identified departures such as: a. 'lack of additional protection by RCD', or b. 'maximum loop impedance values exceeded' and the remedial work would involve: a. replacing a circuit-breaker with an RCBO, or b. replacing a Type C circuit-breaker with a Type B, or replacing a 10 A circuit-breaker with a 6 A device?

Yes. A Minor Works Certificate makes provision for all the required test results for the remedial work described, and requires a competent person to certify that the work does not impair the safety of the existing installation and that the design, construction and inspection and testing of the work complies with BS 7671.

^

Q2.43 What form of certificate should be issued for the addition of a voltage optimisation unit to an existing electrical installation?

Fitting a voltage optimisation unit might affect the existing installation in a number of ways that could have a detrimental effect on its safety, including the introduction of additional impedance (potentially affecting the automatic disconnection of circuits) and disturbance of connections possibly introducing a fault or potential fault.

In order to demonstrate that the safety of the installation has not been impaired, it will be necessary to perform some inspection and testing of those circuits supplied via the unit.

An Electrical Installation Certificate would be needed to record the results of this inspection and testing. It is unlikely that the necessary details could be adequately recorded on a standard Minor Electrical Installation Works Certificate.

Regulation number(s)

- 633.1

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Q2.44 With reference to the preceding question, what inspection and testing is necessary when a voltage optimisation unit is installed in an existing installation?

It is necessary to carry out inspection and testing sufficient to demonstrate that the safety of the existing installation has not been impaired, including:

- inspection of connections
- continuity of protective conductors
- insulation resistance
- polarity

- earth fault loop impedance.

Regulation number(s)

- 633.1

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Q2.45 Do switch-disconnectors installed as part of a solar PV installation have to be non-combustible or mounted in a non-combustible enclosure to meet Regulation 421.1.201?

Regulation 421.1.201 relates to consumer units and similar switchgear assemblies complying with BS EN 61439-3 Low voltage switchgear and controlgear assemblies. Distribution boards intended to be operated by ordinary persons (DBO).

Switch-disconnectors (both a.c. and d.c.), otherwise known as isolating switches, are designed and manufactured to a different standard - BS EN 60947-3 Switches, disconnectors, switch-disconnectors and fuse-combination units and therefore are not subject to this requirement unless they are incorporated within a consumer unit or similar controlgear assembly.

This does not preclude the specification or use of switch-disconnectors having non-combustible / metal enclosures.

Regulation number/s:

- 537.1
- Table 53.4
- Appendix 1

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Q2.46 In a dwelling, do the RCD quarterly test and periodic inspection and testing notice (labels) have to be located at the consumer unit?

No, the notices must be at or near the origin of the installation in a prominent position. Therefore, the notices can be located anywhere near the position at which electrical energy is delivered to the dwelling e.g. cut-out / metering.

Regulation number(s)

514.12.1

514.12.2

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