Electrical Safety First

The UK's electrical safety experts

Best Practice Guide 1 (Issue 2)

Replacing a **consumer unit** in **domestic premises** where lighting circuits **have no protective conductor**

BestPracticeGuide

This is one of a series of Best Practice Guides produced by Electrical Safety First* in association with leading industry bodies for the benefit of electrical contractors and installers, and their customers.

Electrical Safety First is indebted to the following organisations for their contribution and/or support to the development and revision of this Guide:

BEAMA Installation
www.beamainstallation.org.uk

British Gas
www.britishgas.co.uk

BSI Product Services
www.bsigroup.com

City & Guilds
www.cityandguilds.com

Electrical Contractors' Association
www.eca.co.uk

ELECSA
elecsa.co.uk

NAPIT
www.napit.org.uk

NICEIC
www.niceic.com

SELECT
(Electrical Contractors' Association of Scotland)
www.select.org.uk

SCEME
www.sceme.org

In electronic format, this Guide is intended to be made available free of charge to all interested parties. Further copies may be downloaded from the websites of some of the contributing organisations.

The version of this Guide on the Electrical Safety First website (www.electricalsafetyfirst.org.uk) will always be the latest. Feedback on any of the Best Practice Guides is always welcome – email bpg@electricalsafetyfirst.org.uk

Electrical Safety First is supported by all sectors of the electrical industry, approvals and research bodies, consumer interest organisations, the electrical distribution industry, professional institutes and institutions, regulatory bodies, trade and industry associations and federations, trade unions, and local and central government.

*Electrical Safety First (formerly the National Inspection Council for Electrical Installation Contracting) is a charitable non-profit making organisation set up in 1956 to protect users of electricity against the hazards of unsafe and unsound electrical installations.

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Replacing a **consumer unit** in **domestic premises** where lighting circuits **have no protective conductor**

This Best Practice Guide fully recognises that unearthed lighting circuits do not comply with BS 7671. In following the guidance, the installer accepts this and must be satisfied that all new work on any particular installation addresses the risks.

In all cases, the initial approach should be to persuade the customer that protective conductors should be provided.

Introduction

This Best Practice Guide has been produced by Electrical Safety First in association with the bodies indicated on page 2. It is intended to promote best practice, and takes into account the requirements of BS 7671: 2008

By following the guidance it is considered that the installer will have provided protection for the customer so far as is reasonably practicable.

The purpose of the guidance is to protect customers and installers against dangerous situations that could arise from an old installation where an installer is replacing a consumer unit or other main switchgear in a home built before 1966 and wired in accordance with the 13th Edition, or earlier, of the IEE Wiring Regulations.

These regulations did not require a protective conductor to be taken to every lighting point and related accessory as is the current requirement.

A consumer unit need not be replaced simply because it has rewireable fuses, cartridge fuses or older-type circuit-breakers, as these devices can provide satisfactory overcurrent protection. Similarly, a consumer unit need not be replaced because it does not incorporate RCD protection, as there may be ways to provide this protection other than by replacing the consumer unit.

Best Practice Guide Number 6 provides further general advice and guidance for designers, installers, verifiers and inspectors where a consumer unit or other main switchgear is to be replaced in a home wired in accordance with the Sixteenth Edition or earlier of the IEE Wiring Regulations.

Limitation

This Best Practice Guide applies only to the reconnection of existing lighting circuits in domestic premises that do not have circuit protective conductors.

Legal requirements

There is no legal requirement, and no regulation in BS 7671, requiring an existing electrical installation to be upgraded to current standards.

However, there is a requirement under the Building Regulations for England and Wales to leave the installation and the building no worse in terms of the level of compliance with other applicable parts of Schedule 1 to the Building Regulations than before the work was undertaken. (Schedule 1 gives the requirements with which building work must comply,)

Similarly, the Scottish Building Standards Technical Handbooks, which provide guidance on achieving the standards set in the Building (Scotland) Regulations 2004, require that any work associated with the replacement of a service, fitting or equipment by another of the same general type is to a standard no worse than at present.

Main earthing and bonding

The installation of a replacement consumer unit must comply with the current edition of BS 7671. In particular, the installer must, as a minimum, verify that:

a) the main earthing terminal of the installation is connected to an adequate means of earthing via a suitably sized earthing conductor

b) the main protective bonding is adequate, and

c) the meter tails and the distributor's equipment have adequate current-carrying capacity.

Note. Some electricity distributors have requirements regarding the earthing conductor, main bonding conductors and meter tails that exceed the requirements of BS 7671.

If any of the above conditions **(a)**, **(b)** or **(c)** is not met, the customer should be informed that upgrading is required.

If the customer refuses, the installer should not proceed with fitting the new consumer unit.

Reasons for change

Planned change
Where possible, when an installer is pricing the replacement of a consumer unit, checks should be made at a switch, a lighting point and the consumer unit, to ascertain if circuit protective conductors are present. If the presence of circuit protective conductors cannot be established, it is essential that the customer is advised that there is a possibility that some lighting points may not be earthed.

To enable the work to comply fully with the current standard and improve safety, it is necessary to install protective conductors to every lighting point and related accessory. This could involve considerable additional cost, not only in installing new cables, but also in the renewal of decorations unless the customer is willing to accept surface wiring.

In the circumstances where the customer is unable or not prepared to accept either the cost or disruption of re-wiring the circuit(s) or installing separate circuit protective conductors, but still requires a new consumer unit to be installed, the installer needs to carry out a risk assessment before agreeing to replace only the unit.

Where cables are lead or rubber-sheathed, then deterioration of the cables is likely to necessitate re-wiring when the consumer unit is replaced.

Distress change
A distress change occurs when the consumer unit has suffered mechanical or fire damage, has become unusable through overheating or found to be in a dangerous condition with exposed live parts. This situation usually requires immediate replacement of the consumer unit.

It should be explained to the occupant before the consumer unit is replaced that:

- if an immediately dangerous condition is found in an existing final circuit, it will not be possible to reconnect that circuit until remedial action is carried out, and

- it will be necessary to return to the installation to carry out any further work that would have been required if the replacement of the consumer unit had been planned. This further work, where required, must be carried out without delay.

Risk assessment

In all cases, the initial approach should be to persuade the customer that protective conductors should be provided.

Where it is proposed to replace a consumer unit, but the customer is unable, or not prepared, to accept either the cost or disruption of re-wiring the circuit(s) or installing separate protective conductors, a risk assessment should be undertaken for the purpose of advising the customer as to the level of risk that would exist on completion of the proposed work.

A disclaimer does not absolve the installer from responsibility.

The risk assessment requires inspection and testing:

Inspection is required to establish whether or not, for the circuits concerned, there are:

1. Class I light fittings or metal accessories
2. Class I light fittings or metal accessories that are simultaneously accessible to earthed metalwork or extraneous-conductive-parts, including conductive flooring

3. Accessible Class I light fittings or metal accessories in special locations or outdoors

4. Lighting circuits that supply socket-outlets that may be used for portable equipment.

Testing is required where there are items that fall into categories 1 to 4 above.

There are two tests to be applied (with the main switch off):

(1) To establish whether or not equipment is earthed.
This test should be applied between the earth terminal in the existing consumer unit and all Class I light fittings and metal plate accessories. If the resistance value is 1 ohm or less, the equipment may be considered to be earthed.

(2) To establish whether or not the insulation resistance of the circuits is satisfactory.

a) This test should be applied separately to each lighting circuit between the live conductors (line and neutral connected together) and the earthing terminal in the consumer unit, with that terminal connected to the means of earthing. The resistance should be at least 1 megohm.

b) The test should then be applied between line and neutral connected together and the exposed-conductive-parts of every Class I lighting fitting and metal switch plate that Test **(1)** has shown not to be earthed. The resistance should be at least 1 megohm.

If the circuit does not fulfil the requirements of either **(a)** or **(b)**, there would be a risk of electric shock if the circuit were to be re-energised. The customer must be advised in writing that this danger exists, and that the equipment must be disconnected from the supply unless it is agreed to install 30 mA RCD protection as part of the work.

Action following risk assessment

1. If none of the items in the risk assessment indicate that there is a significant shock risk, the replacement of the consumer unit may proceed.

2. A notice with black letters on a yellow background should be fixed on or adjacent to the consumer unit stating:

WARNING: Circuit(s) Nos.xxxx do not have provision for earthing metal equipment. TO AVOID RISK OF ELECTRIC SHOCK, DO NOT REPLACE INSULATED LIGHTING FITTINGS OR SWITCHES WITH METAL LIGHTING FITTINGS OR SWITCHES.

3. If the risk assessment indicates that there is a shock risk due to there being unearthed Class I lighting fittings or metal accessories that can be touched simultaneously with earthed metal parts or extraneous-conductive-parts, these lighting fittings and metal accessories should be replaced with Class II lighting fittings and insulated accessories. If the customer declines to have the Class I lighting fittings and metal accessories replaced, the installer should decline to commence the replacement of the consumer unit.

4. If the risk assessment indicates that the insulation resistance is less than 1 megohm, the installer should decline to carry out the replacement of the consumer unit without further investigation and appropriate remedial work.

RCD protection

BS 7671 does not permit a residual current device (RCD) to be the sole means of protection against electric shock. RCDs should not be used as an alternative to adequate earthing.

However, a 30 mA RCD will provide additional protection and could be used where unearthed Class I lighting fittings or accessories are not simultaneously accessible with earthed metal parts or extraneous-conductive-parts. This method will not satisfy the requirements of BS 7671 and should be listed as such on the electrical installation certificate for the replacement consumer unit.

If the customer refuses to accept the advice to install circuit protective conductors to lighting circuits and related accessories, the installer is advised to fit 30 mA RCD protection to the circuit(s) concerned to reduce the risk of electric shock.

Where a consumer unit is being replaced, additional protection by means of RCDs in accordance with Regulation 415.1 must be provided to the extent required by the current edition BS 7671, such as for:

- socket-outlets (Regulation 411.3.3 refers)
- mobile equipment for use outdoors (Regulation 411.3.3 refers)
- cables concealed in walls or partitions, where required by Regulations 522.6.6 to 522.6.8, and
- circuits of locations containing a bath or shower (Regulation 701.411.3.3).

Circuits that are to be provided with RCD protection must be divided between a sufficient number of RCDs or otherwise designed as necessary to avoid hazards and minimise inconvenience in the event of a fault (Regulations 314.1 and 314.2 refer).

Inspection, testing and certfication

The work carried out should be inspected and tested and an electrical installation certificate in accordance with BS 7671, detailing the work, should be given by the installer to the customer.

The certificate should state in the non-compliances section that lighting circuits nos. xxx do not have protective conductors and that the installation of the consumer unit has been carried out in accordance with the recommendations in this Best Practice Guide.

The installer should state on the certificate that a full periodic inspection and test of the complete installation has not been carried out.

A strong recommendation that the installation has a full periodic inspection and test as a matter of urgency should be made to the customer.

Summary

Procedure

- Ascertain consumer unit requirements
- Ascertain adequacy of existing earthing and bonding arrangements
- Identify any circuits without circuit protective conductors
- Determine whether the customer will agree to the installation of circuit protective conductors.

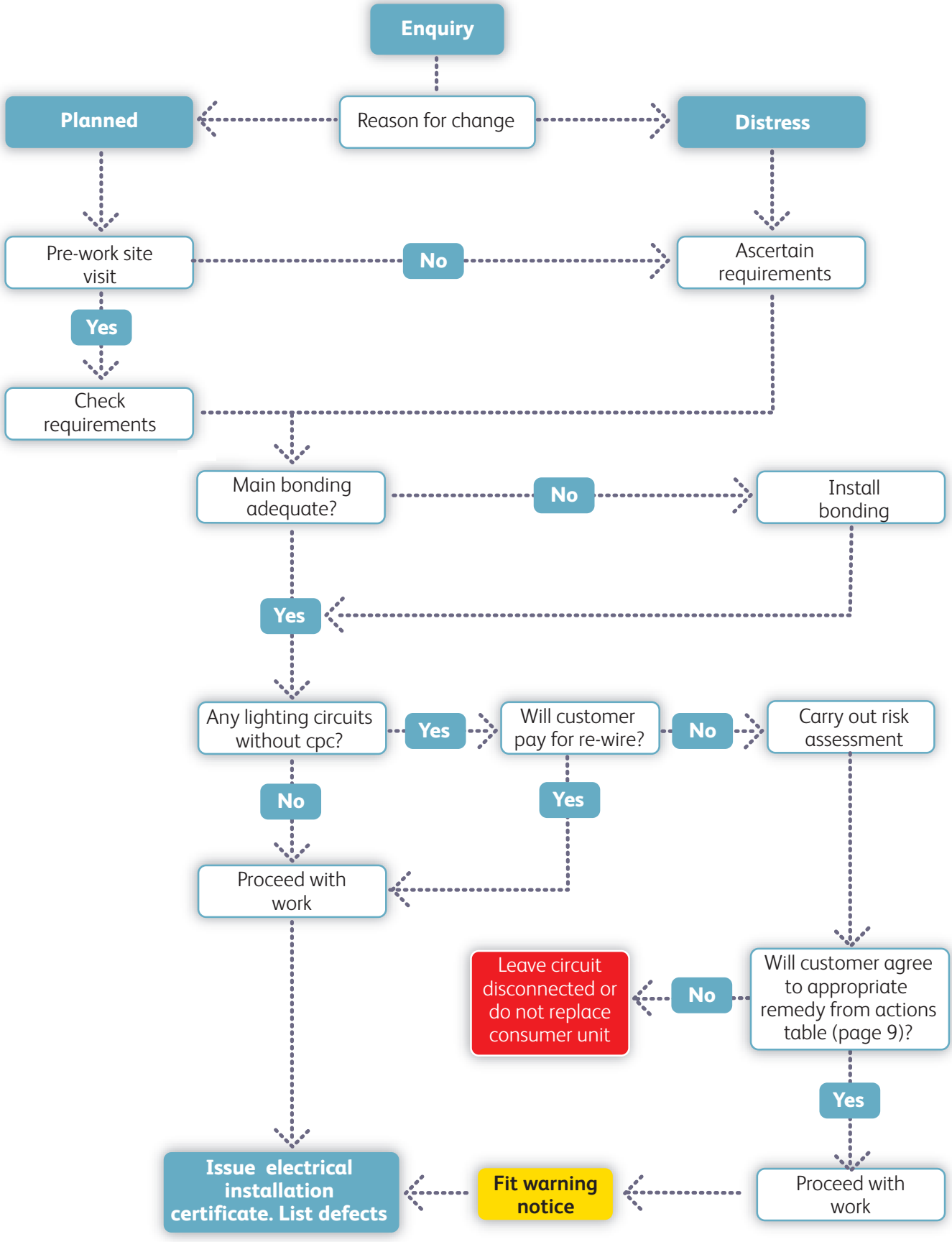
If the customer will not agree to the installation of circuit protective conductors:

- Carry out a risk assessment including inspection and testing
- Replace metal fittings and accessories, or separately earth metal fittings
- Fit a warning notice as necessary
- Issue an electrical installation certificate, detailing non-compliances if any
- Advise the customer in writing of any risks remaining on completion of the work.

Actions table

RISK	SITUATION	ACTION	REMEDY	ACTION IF REMEDY DECLINED
Earthing & bonding	Main earth arrangements inadequate		Bring up to current BS 7671 standard	Do not proceed with replacing consumer unit
	Main bonding not present or incorrect		Bring up to current BS 7671 standard	Do not proceed with replacing consumer unit
	Bonding clamps not BS 951		Fit new clamps	Do not proceed with replacing consumer unit
Lighting circuit – no cpc apparent	Class I fittings & accessories simultaneously accessible with earthed metalwork or extraneous-conductive-parts	Verify 'no earth' to metal parts	Install cpcs to these points, or change to Class II fittings & accessories and fit warning notice at consumer unit	Leave lighting circuit disconnected or do not proceed with replacing consumer unit
	Class I fittings & accessories in areas with a conductive floor	Verify 'no earth' to metal parts	Install cpcs to these points, or change to Class II fittings & accessories and fit warning notice at consumer unit	Leave lighting circuit disconnected or do not proceed with replacing consumer unit
	Class I fittings & accessories in special locations or outdoors	Verify 'no earth' to metal parts	Install cpcs to these points, or change to Class II fittings & accessories and fit warning notice at consumer unit. Install supplementary bonding if required by BS 7671	Leave lighting circuit disconnected or do not proceed with replacing consumer unit
	Class I fittings & accessories in other areas	Verify 'no earth' to metal parts. Apply insulation resistance test between live parts and exposed-conductive-parts	Fit warning notice at consumer unit. If insulation resistance less than 1 megohm, fit 30 mA RCD or RCBO	Leave lighting circuit disconnected or do not proceed with replacing consumer unit
	2 or 3 pin socket-outlets connected to unearthed lighting circuits that may be used for portable equipment		Remove from service or install cpc to these points	Leave lighting circuit disconnected or do not proceed with replacing consumer unit

Domestic consumer unit replacement procedure where there are lighting circuits having no protective conductor



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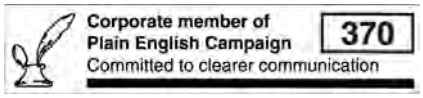

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Electrical Safety First is the UK charity dedicated to reducing deaths and injuries caused by electrical accidents. Our aim is to ensure everyone in the UK can use electricity safely

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