The WIRING MATTERS

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ISSUE 14 SPRING 2004

ALL CHANGE – NEW COLOURS AGREED

By Paul Cook

AMENDMENT NO 2 : 2004 to BS 7671 : 2001 is formally published on 31st March 2004 and is now available free on the IEE's website www.iee.org/technical. Unusually the Amendment is divided into three parts instead of following regulation number order:

(1) Cable core colours
(2) The Electricity Safety Quality & Continuity Regulations
(3) General (thin walls)

This is to keep all the changes associated with the cable colour change together for ease of understanding. The IEE has been considering the change of core colours since 1968 when the changes were made to appliance flexes colours. The Low Voltage Directive standardised safety requirements across the European Union and was, and still is, a valiant attempt to remove barriers to trade.

The removal of barriers to trade in the electrical appliance sector has been one of the successes of the common market. Older readers will perhaps remember the allegation that all video recorders imported into France had to go through one particular customs post in Poitiers. This was presumably never true but it expressed the frustrations that manufacturers wishing to export experienced.

IMPLEMENTATION

Retrospective?

No. It is important to note that the cable colour changes are not retrospective. There is no intention that existing installations will need to be rewired or remarked with the new cable colours or the alphanumeric marking system. Extensions or alterations to existing installations may be carried out in the old cable colours or in the new cable colours until 31st March 2006. What is required is that, except where there is no possibility of confusion, unambiguous marking shall be provided at the interface between conductors identified in accordance with the harmonised arrangements and those to previous versions of the Regulations. A new Appendix No 7 is included to provide guidance as to how this should be done. There is a requirement that where alterations or additions are made to an installation, such that some of the wiring complies with the harmonised requirements and some is in the old colours, a warning notice shall be affixed at or near the appropriate distribution board. For domestic installations the warning would be adjacent to or on the consumer unit at the origin.

Identification by colours and numbers

Installations commencing on site after 31st March 2004 and before 1st April 2006 may be installed in accordance with Amendment No 2 or Amendment No 1, i.e. they may use

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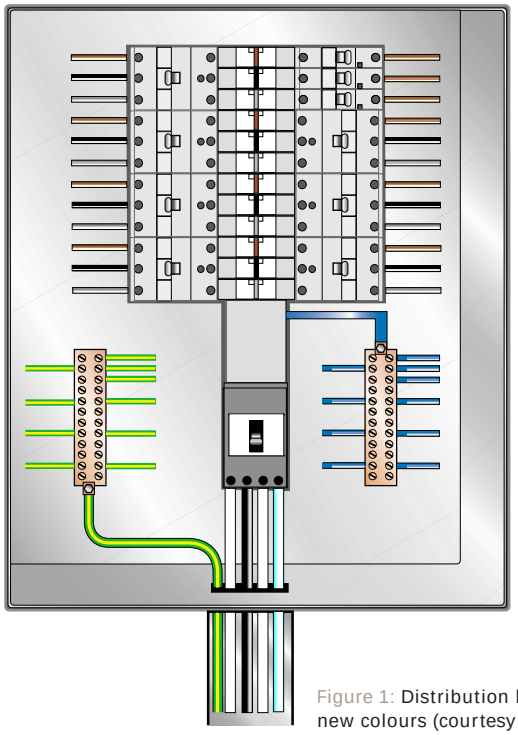

Figure 1: Distribution board – new colours (courtesy of NICEIC)

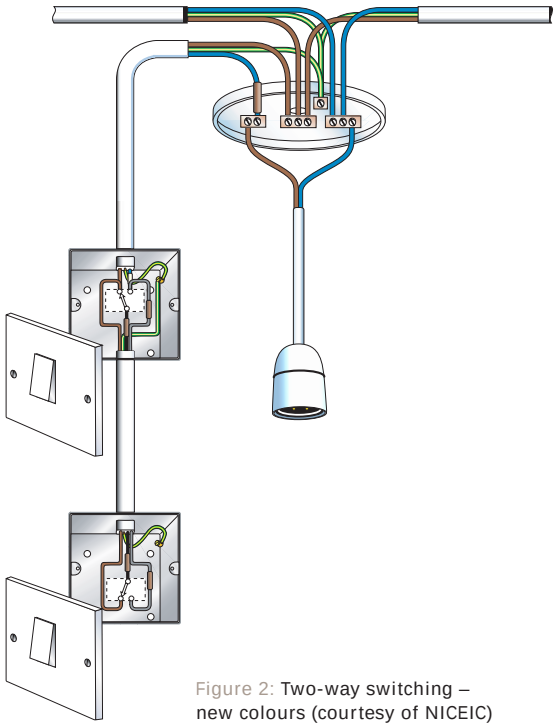

Figure 2: Two-way switching – new colours (courtesy of NICEIC)

the new harmonised colours/marking or the old colours, but not both. Installations commencing on site after 31st March 2006 are required to use the new harmonised colours or marking.

The implementation of changes to the Wiring Regulations has in the past been based on design dates. This Amendment is different; on-site start dates are the key. It is recognised that contractors and their customers will probably want to adopt the new colours in new installations as soon as possible, even if their designs were carried out to earlier versions of the Wiring Regulations.

The Electricity Safety Quality & Continuity Regulations

The changes required by the publication of the Electricity Safety Quality & Continuity Regulations are for immediate implementation as they reflect the current law. Copies of the Electricity Safety Quality & Continuity Regulations may be downloaded from the HMSO website http://www.hmso.gov.uk. You will need to know the year (2002) and Statutory Instrument number (2665). The significance of the Electricity Safety Quality & Continuity Regulations is with respect to the status of BS 7671. The Regulations forbid the use of TNC systems other than in distribution systems, and this a long-standing prohibition in the UK although it was not specifically prohibited in the Electricity Supply Regulations 1989 as amended.

There are many references to BS 7671 in the Electricity Safety Quality & Continuity Regulations and it is of some significance that the Standard is so well recognised in legislation.

General amendments

The changes in the section headed General are to clarify existing requirements particularly those for thin walls and partitions. As such, the changes in the general amendments are for immediate implementation.

PUBLICATION

Amendment No 2 : 2004 is issued by The IEE and available as a free download from the IEE website. A new version of BS 7671 : 2001 is available for sale, from 31st March, incorporating Amendments No 1 : 2002 and No 2 : 2004. The cover of this new version is brown, an appropriate colour. At the same time a revision of the *IEE On-site Guide* is available, again with a brown cover and also incorporating the requirements of Amendments No 1 and No 2. An Appendix is included in the *On-site Guide*, very similar to Appendix 7 of the Wiring Regulations, summarising the recommendations for marking at the interface between old and new installations. ■

WEBSITE REFERENCES

> The IEE
www.iee.org/technical
> HMSO
www.hmso.gov.uk

HARMONISED COLOURS AND ALPHANUMERIC MARKING

By Paul Cook

THE IEE and those represented on its joint national committee, including the Health and Safety Executive, the DTI, the NICEIC and the ECA, have been considering the change on and off since 1969 when the new cable colours were adopted in appliance flexible cables.

There were and are concerns then that a colour change would put at risk the excellent safety record of the UK with respect to electrical installations in buildings. The UK's record is without equal. Consequently the Wiring Regulations committee has moved with care.

Harmonisation of marking has continued to develop in Europe and across the world. BS EN 60046 : 2000 *Basic and safety principles for the man-machine interface, marking and identification. Identification of conductors by colours and numbers* and BS EN 60445 : 2000 *Basic and safety principles for the man-machine interface, marking and identification of equipment terminals and terminations* have enabled the adoption throughout Europe of common marking and identification for machines including the UK. European Standard HD 308 *Insulated cables and flexible cords for installations* introduced the brown and blue colours for flexible cables in 1969 and the 2001 edition extends the scope to fixed wiring.

The UK was much involved with the adoption of the fixed wiring colours throughout Europe. As electricians who are familiar with three-phase flexible cables, what had been adopted in Europe was hardly helpful in that a three-phase cable could have black or brown phase conductors in any combination. If an indication of phase rotation was required it was necessary to apply numbered or lettered sleeves. Within the UK it was

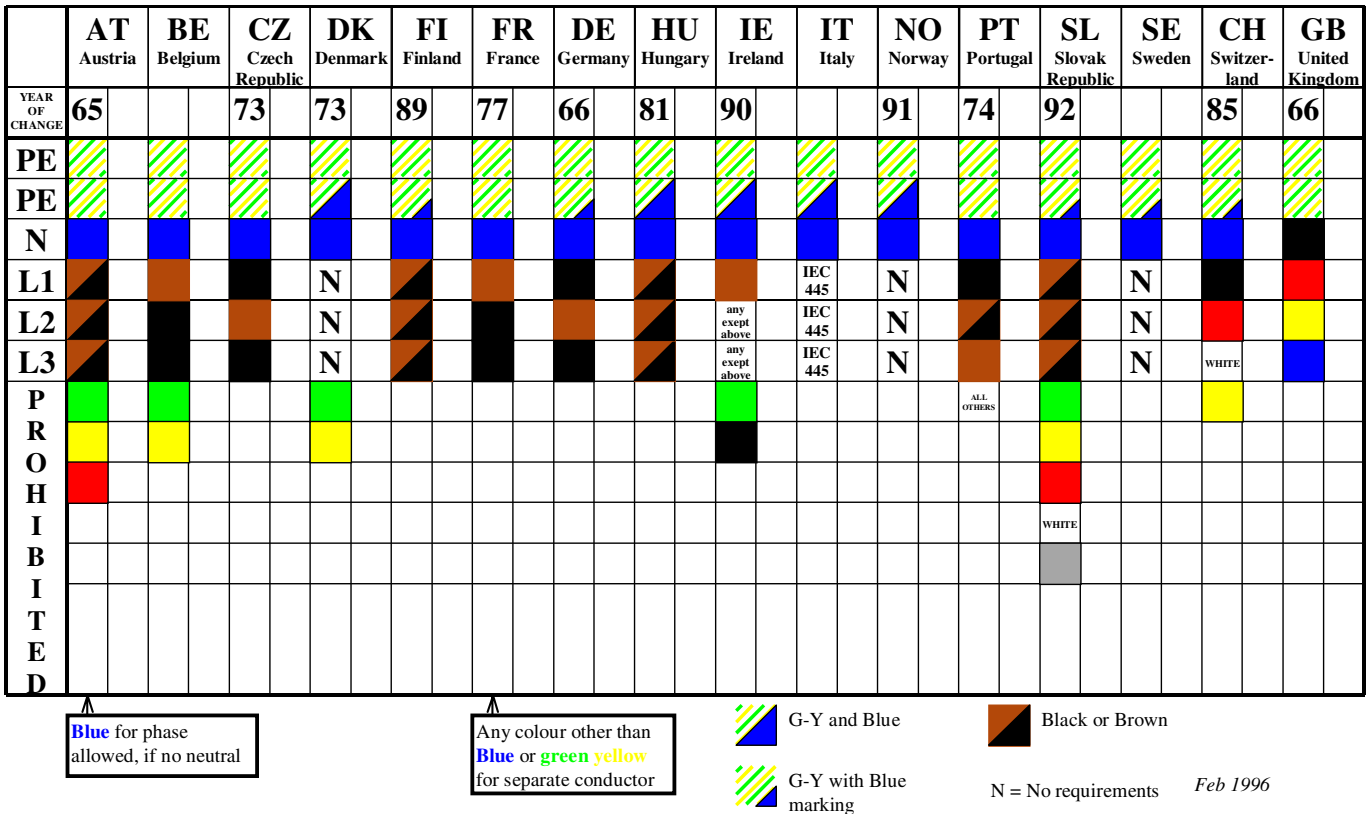

Figure 1: Fixed wiring colours in Europe

thought important that where cable cores were to be identified by colour, three separate colours should be used. As will be seen from Figure 1, every other country had adopted black and brown for phase colours as they were the preferred colours of the International Electrotechnical Commission (IEC).

The UK saw the only way forward to be to persuade the other countries in Europe to adopt three separate phase colours, proposing brown, black and grey (or perhaps pink for the third colour). The UK proposals were adopted throughout Europe and the whole of Europe will be changing its three phase colours to the brown, black and grey being introduced into the UK.

CONSULTATION

The IEE and the BSI followed the customary joint consultation procedures. The draft for Public Comment was published in March 2003 and many comments were received and considered. Not surprisingly the major concern was marking at the interface between old and new colours. Initially the Committee considered that it might be appropriate to tape old and new cables in the new colours. However, a better solution was arrived at which was the adoption of the alphanumeric marking system for old and new conductors at the interface unless there was no possibility of confusion.

ALPHANUMERIC MARKING

The alphanumeric marking system (letters with numbers) adopted was that of standards BS EN 60446 : 2000 and BS EN 60445 : 2000, the long titles of which were quoted above. The new Table 51 – Identification of conductors – includes not only colours but the new alphanumeric marking.

ALTERATIONS OR ADDITIONS TO EXISTING INSTALLATIONS

The new Amendment includes an Appendix 7 which specifically addresses the marking at the interface between old and new installations.

Function	Alphanumeric	Colour
Protective conductors		Green-and-yellow
Functional earthing conductor		Cream
a.c. power circuit[1]		
Phase of single-phase circuit	L	Brown
Neutral of single- or three-phase circuit	N	Blue
Phase 1 of three-phase a.c. circuit	L1	Brown
Phase 2 of three-phase a.c. circuit	L2	Black
Phase 3 of three-phase a.c. circuit	L3	Grey
Two-wire unearthed d.c. power circuit		
Positive of two-wire circuit	L+	Brown
Negative of two-wire circuit	L-	Grey
Two-wire earthed d.c. power circuit		
Positive (of negative earthed) circuit	L+	Brown
Negative (of negative earthed) circuit[2]	M	Blue
Positive (of positive earthed) circuit[2]	M	Blue
Negative (of positive earthed) circuit	L-	Grey
Three-wire d.c. power circuit		
Outer positive of two-wire circuit derived from three-wire system	L+	Brown
Outer negative of two-wire circuit derived from three-wire system	L-	Grey
Positive of three-wire circuit	L+	Brown
Mid-wire of three-wire circuit[2][3]	M	Blue
Negative of three-wire circuit	L-	Grey
Control circuits, ELV and other applications Phase conductor	L	Brown, Black, Red, Orange, Yellow, Violet, Grey, White, Pink or Turquoise
Neutral or mid-wire[4]	N or M	Blue

NOTES:
(1) Power circuits include lighting circuits.
(2) M identifies either the mid-wire of a three-wire d.c. circuit, or the earthed conductor of a two-wire earthed d.c. circuit.
(3) Only the middle wire of three-wire circuits may be earthed.
(4) An earthed PELV conductor is blue.

Table 1: Table 51 from BS 7671 : 2001 Amendment No 2 : 2004

Single-phase installations

An alteration or addition made to a single-phase installation need not be marked at the interface providing that:

(1) Old cables are correctly identified by their colour, red for phase and black for neutral; and
(2) The new cables are correctly identified by the colours brown for phase and blue for neutral.

The new colours are already found in appliance flexes and lighting pendants, so electricians are familiar with the relationship between the old and new colours in single-phase installations. For this reason it is considered that there is no need to mark at the interface for single-phase installations marked in the correct colours. However a caution notice is to be fixed on or near the consumer unit or fuseboard from which the circuit is supplied.

Three-phase installations

There has always been concern regarding the use of blue for neutrals in three-phase installations as in the UK we have for many years used blue as a phase identification. This was probably the reason for the considerable delay in adoption of the new colours.

The recommendation in Appendix 7 is that where an alteration or addition is made to a two- or three-phase installation wired in the old colours with an addition or extension in the new colours, unambiguous identification is required and cores shall be marked as follows:

Neutral conductors – old and new conductors = N

Phase conductors – old and new conductors = L1, L2, L3

Function	Old conductor		New conductor	
	Colour	Marking	Marking	Colour
Two-wire unearthed d.c. power circuit				
Positive of two-wire circuit	Red	L+	L+	Brown
Negative of two-wire circuit	Black	L-	L-	Grey
Two-wire earthed d.c. power circuit				
Positive (of negative earthed) circuit	Red	L+	L+	Brown
Negative (of negative earthed) circuit	Black	M	M	Blue
Positive (of positive earthed) circuit	Black	M	M	Blue
Negative (of positive earthed) circuit	Blue	L-	L-	Grey
Three-wire d.c. power circuit				
Outer positive of two-wire circuit derived from three-wire system	Red	L+	L+	Brown
Outer negative of two-wire circuit derived from three-wire system	Red	L-	L-	Grey
Positive of three-wire circuit	Red	L+	L+	Brown
Mid-wire of three-wire circuit	Black	M	M	Blue
Negative of three-wire circuit	Blue	L-	L-	Grey

Table 2: Table 7E from Appendix 7
Example of conductor marking at the interface for additions and alterations

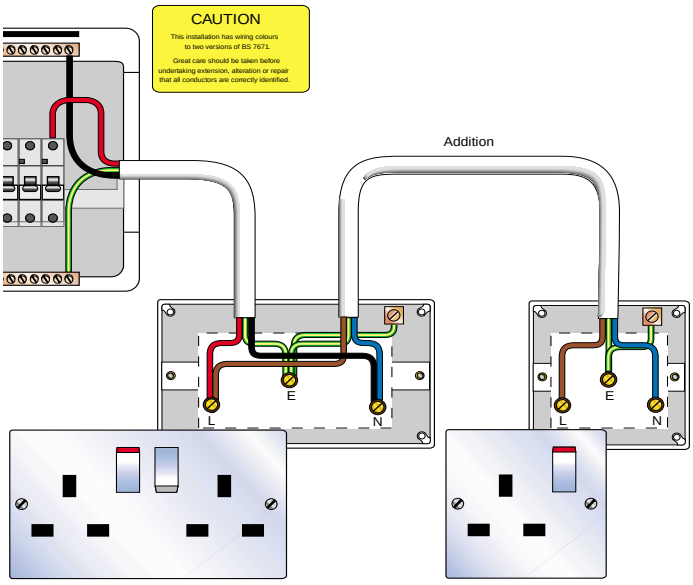

Figure 2: Extension to a single-phase installation showing caution notice and absence of interface marking (courtesy of NICEIC)

The adoption of this marking removes the ambiguity that is always of concern where colours alone are used.

DC INSTALLATIONS

Interest in d.c. installations has not been as great as it is now since the a.c/d.c. changeovers carried out by the supply companies in 1960s. D.c. power supplies are now a significant feature of IT installations. The D.C. Users Forum, on behalf of the industry, expressed its concern that particular attention had to be given to d.c. installations. As a result marking was introduced for d.c. and Appendix 7 was particularly amenlude guidance for d.c. installations.

IMPACT ASSESSMENT

The IEE has prepared an impact assessment of the colour change. This describes the development of the change, the work in Europe and the changes made following the public consultation. It is available on the IEE website: www.iee.org/cablecolours ■

PART P FOR THE INSTALLER

In May 2003 the Government announced that it would introduce a new Part P to the Building Regulations which would bring within its scope domestic electrical installation work in England and Wales. This initiative, led by the Office of the Deputy Prime Minister (ODPM), has the purpose of curbing the rising number of electrical accidents and fires in the home, it reported.

By Robin Mellors-Bourne

PART P will for the first time place a legal requirement for safety upon persons carrying out electrical installation work in dwellings. Currently BS 7671 is only a standard – and the recommendation of the IEE – but is not a legal requirement.

The ODPM further announced that Part P would only come into force when self-certification schemes were in place to ensure compliance of the work undertaken, which would help to raise industry standards and create a better-qualified workforce. At the time of writing we still await publication of Approved Document P which will offer guidance on how to comply and news of accepted competency schemes. This article, therefore, can only give an indication of the likely impact of the new Part P.

REQUIREMENT & SCOPE

The electrical safety requirement in Part P is likely to be that: "fixed electrical installations shall be suitably designed, installed, inspected and tested so as to provide reasonable protection against being the source of a fire or a cause of injury to persons."

This will apply to fixed installations intended to operate at low or extra-low voltage, in England and Wales. A fixed installation will mean those parts attached to, or supported from, the building fabric.

The scope of work will be fixed electrical installations in buildings after the supplier's meter including:

- dwellings
- dwellings and business premises which have a common supply
- areas of common access within blocks of flats (but not lifts)
- shared amenities in blocks of flats

Dwellings are defined in Part B of the Building Regulations as follows: "a unit of residential accommodation occupied (whether or not as a sole or main residence): (a) by a single person or by people living together as a family, or (b) by not more than 6 residents living together in a single household, including a household where care is provided for residents."

It is assumed that related areas such as gardens, garages and sheds will be included.

Part P will apply to new installations and also to alterations and additions to existing installations (including rewires). There will be a requirement to ensure that the parts of the existing installation upon which the new installation depends for safety comply with BS 7671:2001. In some cases this may demand an element of consequential remedial work.

The requirements of Part P will apply to work whether carried out professionally or as DIY, including minor works (with the possible exception of certain minor DIY work).

HOW TO COMPLY

It is understood that compliance with Part P will be achieved by following the applicable regulations in BS 7671:2001 and the guidance published in the *IEE On-site Guide*. It is thought that Part P will require installation work to be inspected and tested during and on completion to verify that it is safe (e.g. for compliance with BS 7671:2001).

NOTIFICATION TO BUILDING CONTROL

All fixed electrical installation work will become a 'controlled service' under the Building Regulations. It will have to be notified, before work commences, to the Building Control office of the relevant Local Authority, in order that they may inspect the work. This will apply to all work carried out, professionally or as DIY, with the following exceptions:

(1) where the proposed work is to be undertaken by a prescribed competent person authorised to self-certify compliance on completion of the work;
(2) where the work is minor and not in a kitchen or other area classified as a special location or installation.

Minor work is likely to be electrical work not involving the addition of a new circuit, such as adding a socket outlet or lighting point to an existing circuit, or replacement of accessories. Special installations or locations are expected to include:

- Kitchens
- Locations including a bath or shower or sauna
- Swimming pools, fountains and gardens
- Small-scale embedded generators including solar power supply systems
- Electric heating systems including floor and ceiling heating
- ELV lighting installations unless pre-assembled

It is understood that all work in kitchens, bathrooms and these other special locations will need to be notified, or self-certified, irrespective of how minor.

COMPLIANCE WITH OTHER PARTS OF THE BUILDING REGULATIONS

Installation work in new dwellings will need to comply with any other relevant Parts of the Building Regulations.

Certification will be of compliance with all the relevant Building Regulations. It is hoped that OPDM will publish guidance on to what degree this will be true for rewires and alterations to existing installations. See the short article in this issue for some practical advice.

COMPETENT PERSONS SCHEMES

Several millions of installations are undertaken annually. Building Control officers will not be able to cope with the work of inspecting them all. The only realistic mechanism to certify compliance will be self-certification by what ODPM calls a Competent Person. It invited schemes to be proposed to assess and ensure the competency of installers in autumn 2003. The successful candidates are not yet known but two candidates are the "Part P Competent Person Scheme" from BRE-Certification and the ECA (backed by the IEE) and the NICEIC's "Domestic Installers Scheme".

Details of how such schemes will operate will be provided by successful scheme operators. However, it is expected that firms or self-employed people will be assessed for competency through a combination of the qualifications and experience of the personnel, the sustainability of the firm (or self-employed person), and site inspections.

The industry has developed a framework for assessing competency, called the Electrotechnical Assessment Scheme (EAS), which can be seen on the IEE website. The major bodies lobbied ODPM for it to be the benchmark for Competent Persons Schemes under Part P. ODPM invited schemes to adopt the EAS "or equivalent".

Once a firm (or person) is registered, it will be able to issue a certificate of compliance on completion of the work which it will send to the relevant Local Authority Building Control office, and the householder. This avoids the need for notification to and inspection by Building Control.

Details of the compliance certificate, and who issues it to whom, are yet to be finalised. However, it is likely to be a simple form certifying compliance with all the relevant Building Regulations, separate from existing BS 7671 forms.

Precise guidance in this area and the roles of individuals within a firm which is acting as a Competent "Person" are awaited from ODPM.

WILL THE HOUSEHOLDER CARE?

These processes will add to the price paid by the customer, so what is the incentive for the customer to employ either a Competent Person or a contractor who will notify to Building Control, as opposed to doing the work unregulated? The Government's proposed "home information pack" (or "seller's pack") is expected to require the householder to provide certificates of compliance with Building Regulations in order for the house to be sold. This should prove a strong incentive to the householder.

WHO NEEDS TO REGISTER?

No contractor will be obliged to join a Competent Persons Scheme but many firms will wish to do so to avoid being dependent on Building Control for inspections. If a firm or person operates entirely in commercial/industrial settings (not domestic), the requirements of Part P do not apply. Scotland and Northern Ireland have their own regulatory system and are not affected by Part P.

A firm's membership of a trade association will not give the status of competency under a Competent Person Scheme. Nor will an individual's membership or qualification, such as holding the ECS card, automatically qualify them as a Competent Person. Only persons registered within an operational Competent Person Scheme for Part P will be able to self-certify compliance.

WHEN WILL IT HAPPEN?

Publication of the Approved Document P and successful Competent Persons Schemes is still awaited. The introduction of Part P and the launch of the CPS schemes are unlikely before the end of 2004. Once that announcement is made, large numbers of applicants are expected to register in time for Part P to be launched. With 100,000 electrical installation enterprises, including self-employed electricians, there are major challenges ahead for all. ■

WEBSITE REFERENCES

www.odpm.gov.uk
www.iee.org/technical
www.eca.co.uk
www.niceic.org.uk

THE BUILDING REGS BUT NOT PART P

By Paul Cook

APART from the imminent Part P – concerned specifically with the safety of fixed electrical installations – there are many other requirements in the Building Regulations that the electrical installer and designer need to know about, including:

Approved document A – *Structure*
Approved document B – *Fire Safety*
Approved document F – *Ventilation*
Approved document L – *Conservation of Fuel and Power*
Approved document M – *Access and Facilities for Disabled People*

All these Approved documents may be downloaded without charge from the website of the Office of the Deputy Prime Minister (ODPM, see references for the URL).

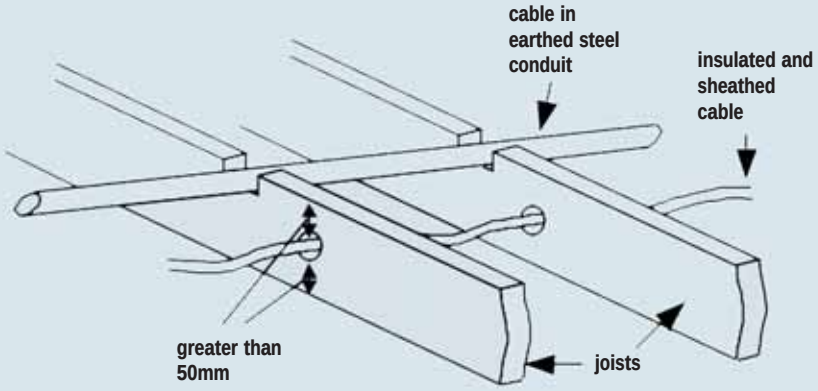

Figure 1: Cables through joists (from *IEE On-site Guide*)

Notes:
1. *Maximum diameter of hole should be 0.25 x joist depth.*
2. *Holes on centre line in a zone between 0.25 and 0.4 x span.*
3. *Maximum depth of notch should be 0.125 x joist depth.*
4. *Notches on top in a zone between 0.1 and 0.25 x span.*
5. *Holes in the same joist should be at least 3 diameters apart.*

APPROVED DOCUMENT A – *STRUCTURE*

Part A has requirements for chases in the building structure (1C 31 Chases) as follows:

Vertical chases should not be deeper than one-third of the wall thickness or in cavity walls one-third of the thickness of the leaf. Horizontal chases should not be deeper than one-sixth of the thickness of the leaf or wall. Chases should not be so positioned as to impair the stability of the wall particularly where hollow blocks are used.

We are more familiar with the requirements for notches and holes in supportive floor and roof joists as given in 1B 6 of Section A1. The *IEE On-site Guide* gives guidance on this and a drawing from it is reproduced here.

APPROVED DOCUMENT B — *FIRE SAFETY*

Here we are concerned with automatic fire detection and alarm systems. If houses are not protected by automatic fire detection and alarms systems in accordance with BS 5839 Part 1 or BS 5839 Part 6, they are required to be provided with a suitable number of smoke alarms. Brief guidance for the purposes of wiring domestic properties is given in the *IEE On-site Guide*. However, persons carrying out designs of larger houses, loft conversions, flats and maisonettes will need to make reference to B1, Section 1; this is reproduced in Appendix B of *IEE Guidance Note 4, Protection Against Fire*.

Part B also requires precautions to be taken to inhibit the spread of fire within a building. Its requirements for the internal linings are that they should adequately resist the spread of flame over their surfaces and, if ignited, have a rate of heat release which is reasonable in the circumstances. This sets classifications for linings of walls and ceilings and roof lights which installers must take note of. It is also particularly applicable to thermo-plastic materials, which include lighting diffusers forming part of the ceiling. Guidance is given in *IEE*

Guidance Note 4 and Section 6 reproduced in Appendix B.

APPROVED DOCUMENT F – *VENTILATION*

There are performance requirements for the ventilation of domestic premises, including particular requirements for kitchens, utility rooms and bathrooms as summarised in the table, right.

APPROVED DOCUMENT L – *CONSERVATION OF FUEL AND POWER IN DWELLINGS*

Part L requires reasonable provision to be made for the conservation of fuel and power in dwellings. Amongst other requirements is that lighting systems are provided with appropriate lamps and sufficient controls so that energy can be used efficiently. Rooms that are expected to be used the most should be fitted with fixed lighting that can only accept lamps with a luminous efficiency exceeding 40 lumens per circuit watt.

APPROVED DOCUMENT M – *ACCESS AND FACILITIES FOR THE DISABLED*

Most electricians are more generally aware of these requirements and the diagrammatic guidance given in the *IEE On-site Guide* is reproduced here.

WEBSITE REFERENCES

> Building Regulations Approved Documents:
www.odpm.gov.uk

> IEE
www.iee.org/technical

Room	Rapid ventilation (e.g. opening windows)	Background ventilation	Extract ventilation fan rates (3,4)
Occupiable room (1)	1/20th of floor area	For floor areas: up to 10 m^2 - 4000 mm^2, greater than 10 m^2 at the rate of 400/m^2 of floor area	–
Kitchen (2) (domestic type)	Opening window (no minimum size)	4000 mm^2	30 litres/second adjacent to hob, or 60 litres/second elsewhere
Bathrooms (including shower-rooms)	Opening window (no minimum size)	4000 mm^2 per bath/shower	15 litres/second per bath/shower
Sanitary accommodation (and/or washing facilities)	1/20th of floor area, or mechanical ventilation at 6 litres/second per WC or 3 air changes per hour	4000 mm^2 per WC	

Notes:

1 *For specific rooms designed for heavy smoking, such as rest rooms where smoking is permitted.*
2 *A domestic type kitchen is one where the appliances and usage is of a domestic nature. This provision is not intended to cover commercial kitchens.*
3 *PSV can be used as an alternative to a mechanical extract fan for domestic type facilities.*
4 *Where an open-flued appliance is provided in a building with mechanical extract, the spillage of flue gases could occur. The open-glued appliance needs to be able to operate safely whether or not the fan is running and guidance is provided in Approved Document J.*

Table 1: Ventilation of rooms containing openable windows (i.e. located on an external wall)

Number of rooms created[1]	Recommended minimum number of locations[2]
1-3	1
4-6	2
7-9	3
10-12	4

Notes

1 *Hall, stairs and landing(s) count as one room (but may contain more than one fitting)*
2 *Excludes garages, lofts and outhouses*

Table 2: Method for determining the number of locations to be equipped as a reasonable provision for efficient lighting

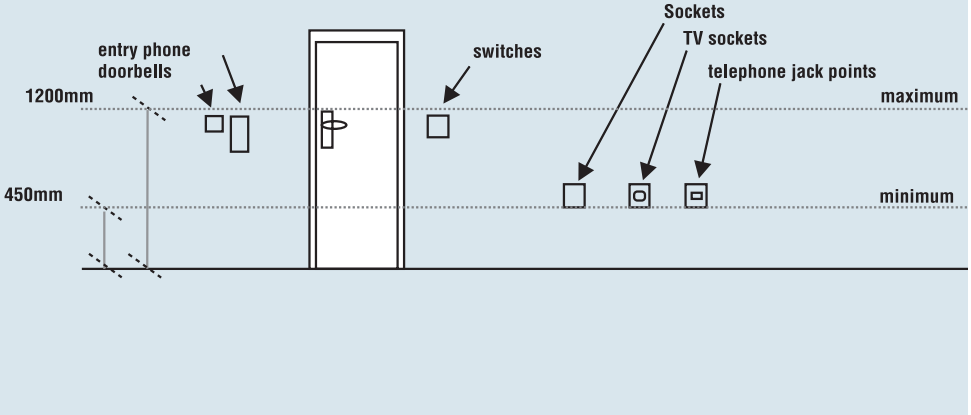

Figure 2: Heights of wiring accessories (from the *IEE On-site Guide*)

CABLES CONCEALED IN THIN WALLS OR PARTITIONS

By Paul Cook

ONE of the changes in Part C of Amendment No 2 : 2004 clarifies the requirement for cables concealed in a thin wall or partition. It may be helpful if the complete Regulation is reproduced here. It is available in Part C of Amendment No 2 which is free from www.iee.org/technical.

The requirements of old regulations 522-06-06 and 522-06-07 have been included in one regulation as it is considered that the four alternative protective measures are equally acceptable. The particular concern has been with respect to thin walls or partitions, i.e. walls and partitions of thickness of 100 mm or less. Clearly for such walls there are particular concerns with respect to damage to cables from fixings penetrating from the side of the wall or partition where the accessory is not visible.

The zones generally remain unchanged as shown in Figure 1. The change is with respect to the reverse side, i.e. the side of the wall on which there is not an accessory. The Amendment allows a zone on this reverse side providing the location of the accessory can be determined from this reverse side as is shown in the drawing. In the drawing it is possible to walk through the doorway from a room without an accessory and see that there is an electrical accessory on the other side and judge that it is likely that there are cables installed in the thin wall. This relaxation only applies to walls of 100 mm thickness or less. For thicker walls the 5 cm distance from the reverse side is to be maintained or precautions taken.

522-06-06 A cable concealed in a wall or partition at a depth of less than 50 mm from the surfaces of the wall or partition shall:

(i) incorporate an earthed metallic covering which complies with the requirements of these Regulations for a protective conductor of the circuit concerned, the cable complying with BS 5467, BS 6346, BS 6724, BS 7846, BS EN 60702-1 or BS 8436, or

(ii) of insulated concentric construction complying with BS 4553-1, BS 4553-2 or BS 4553-3, or

(iii) be enclosed in earthed conduit, trunking or ducting satisfying the requirements of these Regulations for a protective conductor, or be mechanically protected sufficient to prevent penetration of the cable by nails, screws and the like, or

(iv) be installed in a zone within 150 mm from the top of the wall or partition or within 150 mm of an angle formed by two adjoining walls or partitions. Where the cable is connected to a point, accessory or switchgear on any surface of the wall or partition, the cable may be installed in a zone either horizontally or vertically, to the point, accessory or switchgear. Where the location of the accessory, point or switchgear can be determined from the reverse side, a zone formed on one side of a wall of 100 mm thickness or less or partition of 100 mm thickness or less extends to the reverse side.

METAL-FRAMED PARTITIONS

A Coroner's Report has recently been made available describing the circumstances where a person working on a building site was electrocuted as a result of the frame of a metal partition becoming live. An unfortunate series of events led to this fatality. The prime problem was that during the construction of the walls and fixing of the cladding, screws of incorrect size were used and a cable was so positioned that one screw held the cable fixed whilst a second screw penetrated the cable, making the frame alive. The frame was not generally accessible, as it was covered with an insulating medium, and the accident arose whilst working in loft space when a metal vent pipe was drawn into contact with the live partition frame.

The joint IEE/BSI committee has yet to discuss this regrettable incident. The HSE is investigating and the report is awaited. The previous guidance of the joint committee has been that steel framework would generally require neither earthing nor main bonding provided insulated and sheathed cables were used and the manufacturer's instructions were followed with respect to sleeving when passing through cut-outs in the steel work were followed. The committee also advised that any rough burrs

should be removed from the edges of steelwork where cables pass through.

The guidance from the IEE/BSI committee has required that manufacturers' guidance be provided and followed. Of course it is necessary for any electrical installation to be inspected and tested during and on completion of the works and before being made live. The particular hazards now identified as being associated with metal-framed partitions will encourage all of us in the electrical and plumbing trades to take care that installations are properly carried out and inspected and tested during and on completion of work as necessary. Installations should never be made live before such inspections and tests have been carried out in accordance with BS 7671 : 2001 and to the satisfaction of the responsible person.

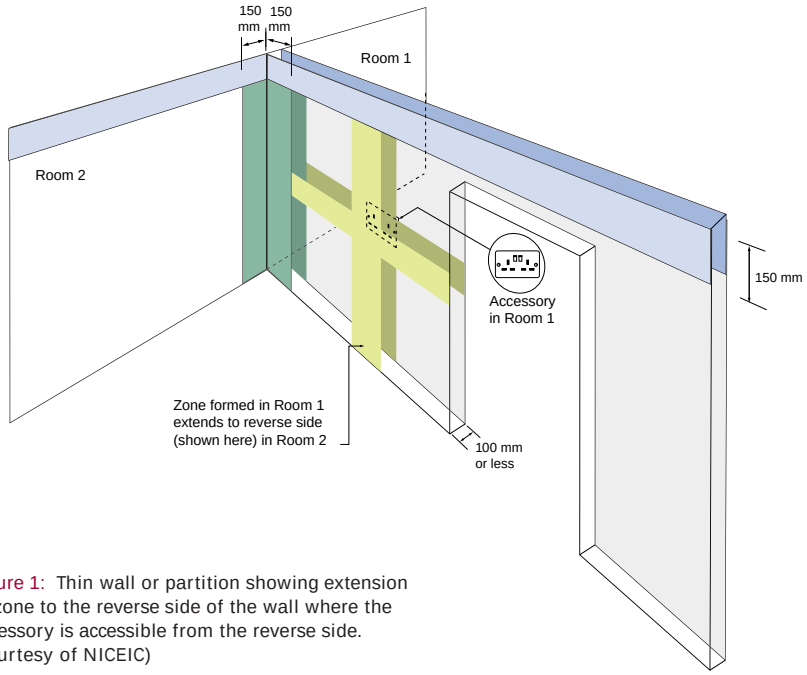

Figure 1: Thin wall or partition showing extension of zone to the reverse side of the wall where the accessory is accessible from the reverse side. (courtesy of NICEIC)