

# The requirements for provision of information and documentation within BS 7671

by Jon Elliott

This article seeks to bring to the reader's attention to the many requirements within the 17th Edition relating to provision of information considered necessary for the safe and effective use of electrical installations. It summarises the fundamental requirements for provision of information and documentation laid down in Chapter 13, highlights particular situations where the requirements for identification and notices given in Section 514 apply and states the identification and labelling requirements specific to isolation and switching.

In the next edition of *Wiring Matters*, we will concentrate on the specific requirements for safety services, special installations and locations and the information items which relate to inspection, testing and reporting.

A number of new requirements have been introduced in the 17th Edition which will be discussed at the appropriate place within these articles.

## Introduction

Ever since the First Edition of the Wiring Regulations was published, there have been requirements for the identification of potential hazards relating to an electrical installation. As installations increase in complexity the number of instances requiring clear identification and labelling has

also increased and, as BS 7671 expands to encompass a greater number of special installations and locations, the need to leave behind concise instructions for users of the installation and others who may work on or near the installation in the future becomes greater.

The vast majority of requirements relating to the provision of identification and warning notices appear in Section 514 and are therefore assumed to be relatively familiar to users of BS 7671. As such, the majority of requirements therein will not be discussed in any real detail in this article.

## Fundamental requirements

Chapter 13 lays down the fundamental requirements for electrical installations. Within this chapter there are a number of requirements pertinent to this article.

Regulation 132.2 requires the person(s) responsible for the design of an installation to obtain, by various means, information relating to the characteristics of the supply arrangement. These details along with all other relevant documentation specific to the installation are required to be made available on completion of work by Regulation 132.13. Regulation 134.1.3 gives the fundamental requirements for the identification of conductors and, where necessary terminals, while Regulation 134.1.7 calls for



the provision of warning signs and notices as a measure to minimise the risk of danger or injury to persons working on or otherwise using the installation.

## Protection against shock

The 17th Edition gives greater recognition to the use of double or reinforced insulation as a protective measure within

an installation. Regulation 412.2.1.1 requires Class II equipment to be identified by the following symbol:



Regulations 412.2.1.2 and 412.2.1.3 call for the following symbol to be displayed when supplementary or reinforced

The protective conductors associated with the electrical installation in this location **MUST NOT BE CONNECTED TO EARTH.**

Equipment having exposed-conductive-parts connected to earth must not be brought into this location.

### CAUTION

This installation has wiring colours to two versions of BS 7671. Great care should be taken before undertaking extension, alteration or repair that all conductors are correctly identified.

insulation is applied to equipment:



Regulation 412.2.4.1 states that neither of the above symbols should be displayed on a wiring system being used where double or reinforced insulation is being employed to provide basic and fault protection.

Barriers and enclosures are widely employed in installations as a means of preventing contact with live parts. If a barrier or enclosure prevents access to equipment, such as a capacitor, which may retain an electrical charge sufficient to pose a danger after being switched off then Regulation 416.2.5 requires a warning label to be displayed warning of this risk on said barrier or enclosure.

The protective measure of earth-free local equipotential bonding is not widely used, indeed, is only to be used in special circumstances. Earth-free local equipotential bonding may only be employed in parts of an installation controlled by, or under the supervision of

skilled or instructed persons.

Nevertheless, there remains a significant risk of the protective measure being rendered ineffective by the introduction of a connection to Earth by those not familiar with it. As such Regulation 418.2.5 requires the warning notice, which appears in Regulation 514.13.2, to be displayed in a prominent position at every point of access to an area so protected. See above, top.

This warning notice is also required to be displayed in a similar manner and for the same reasons, by Regulation 418.3 at all points of entry to an area where, another relatively infrequently employed protective measure, electrical separation to supply two or more items of equipment, is being employed.

#### Common rules

The general requirements relating to identification and labelling are dealt with in the 514.1 group of regulations which require, except where no possibility of confusion exists, the

provision of clear and unambiguous marking of each item of switchgear and controlgear (Regulation 514.1.1 refers), wiring (514.1.2) and at the point of connection between conductors identified in accordance with 17th Edition requirements and those requirements of earlier versions of The Regulations (514.1.3). In the case of installations containing wiring which has been identified in accordance with more than one Edition of BS 7671, Regulation 514.14.1 requires the warning notice (shown left bottom) to be posted on or near the relevant distribution board. Reference can be made to Appendix 7 if further guidance is required on this matter.

Although rarely seen in installations, where it is

considered necessary to be able to distinguish electrical conduits from other building services, Regulation 514.2 requires such a conduit to be coloured orange.

In general, the cores of cables should be identified by colour and/or lettering and/or numbering (514.3.1 refers) in accordance with Table 51, which is reproduced overleaf.

Regulation 514.4.2 gives a number of requirements for protective conductors, perhaps the most important of which being that single core cables coloured green/yellow throughout their length should not be used for any purpose other than as a protective conductor and may not be over-marked at their terminations other than to aid circuit identification as permitted by Regulation 514.5.2.

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**WARNING - DUAL SUPPLY**

**Isolate both mains and on-site generation before carrying out work.**

**Isolate the mains supply at . . . . .**

**Isolate the generator at . . . . .**

Where an installation contains PEN conductors, Regulation 514.4.3 requires them to be either identified by:

- green-and-yellow throughout their length with blue markings at the terminations
- blue throughout their length with green-and-yellow markings at the terminations

Regulation 514.4.6 states that bare conductors, which should be identified in accordance with Table 51, may be so identified by the application of tapes, sleeves, discs or paint. Regulation 514.4.5 prohibits the use of the single colour green.

Regulation 514.6 states that identification by colouring or numbering is not required for:

- concentric conductors
- the metal sheath or armouring of cables being used as a protective conductor
- bare conductors in situations where permanent identification is not practicable
- exposed-conductive-parts and extraneous-conductive-parts used as a protective conductor

All protective devices such as fuses, circuit-breakers and RCDs are required to be so arranged or identified such that the circuit which they protect can be identified by Regulation 514.8.1.

Regulation 514.9.1 describes those items of information which should be provided,

preferably in close proximity to the relevant part of the installation, detailing the type of wiring and nature of each circuit, methods used to provide basic and fault protection, sufficient information to allow the correct identification of isolation and switching devices and equipment or circuits considered to be vulnerable if particular tests were to be carried out.

Regulation 514.10 contains requirements for the application of warning notices in situations where a nominal voltage exceeding 230 volts exists and would not normally be expected.

When an installation contains one or more RCDs, which is increasingly the case, a label reminding the user of the installation to press the integral test button quarterly (every 3 months) is required by Regulation 514.12.2. An explanation of the use of the integral test facility of an RCD is required by Regulation 721.515.1, amongst other instructions, to advise the user of a caravan. However, it should be noted that the requirements for periodic testing and periodic operation of the integral test facility of RCDs are not applicable to installations for outdoor (amenity) lighting, highway power supplies and street furniture where said installations are subject to a programmed inspection and testing procedure (559.10.7.1 refers).

According to Regulation 514.13.1 a label to BS 951 carrying the wording *SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE* should be installed wherever a connection is made with:

- an earthing conductor and an earth electrode
- a bonding conductor and an extraneous-conductive-part
- the main earthing terminal and marshalling terminals where these are separate from the main switchgear

Where a distribution board has wired from it circuits having a high protective conductor current, Regulation 543.7.1.5 requires these circuits to be identified such that anyone carrying out alterations and/or additions at said distribution board in the future is aware of their presence.

**Isolation and switching**

Understandably, the 17th Edition contains a number of requirements relating to identification and labelling in relation to isolation and switching and these are summarised below. In situations where it is not possible for live parts to be isolated by a single device, Regulation 514.11 requires the posting of a warning notice stating this. This requirement is expanded upon in Regulation 537.1.6.

In installations which include a generator which can be used in parallel as an additional source of supply, Regulation 514.15 requires the warning notice shown above to be posted at:

- the origin of the installation
- the meter position if situated remote from the origin
- the distribution board or consumer unit to which the generator is connected

■ ALL points of isolation provided for BOTH sources of supply

Regulation 537.2.1.3 requires that when an installation, an enclosure, or an item of equipment contains live parts which are connected to more than one supply and unless an interlock arrangement has been provided to disconnect all such supplies before access to live parts can be achieved, a warning notice informing persons of this situation should be displayed in a prominent position.

Isolators are provided to put a deliberate break in conductors in order to disconnect the supply from those downstream parts of the installation. If the position of the contacts or other means of providing this break in continuity is not externally visible (which is not common in modern switchgear), a clear and reliable indication of their position, which occurs only once the isolated position has been achieved, must be provided (537.2.2.2 refers). Regulation 537.2.2.6 requires that the purpose of every device that is to be used to provide isolation should be clear either as a direct result of its position, as would be the case with an isolator forming an integral part of an item of equipment, or as a result of labelling, which would be appropriate where an isolator was mounted in a location remote to the item of equipment which it controlled.

In such a case it would, in all but the most simple of installations, be necessary to place a notice local to both the isolator and the item of equipment in question.

Switching off for mechanical maintenance is a function similar to isolation whereby electrically actuated

equipment is made safe for persons to work on, in, or near, whether or not they are electrically skilled.

Where a device is provided for this purpose, Regulation 537.3.2.4 requires it to be so placed and marked such that its purpose is apparent and such it can be used as intended. A similar requirement applicable to devices provided for emergency switching in given in Regulation 537.4.2.7.

Part 2 defines emergency switching as “an operation intended to remove, as quickly as possible, danger, which may have occurred unexpectedly”.

Regulation 537.6.4 requires that firefighter’s switches must be coloured red. It also requires an identification plate with the wording *FIREFIGHTER’S SWITCH* of specified overall dimensions and letter size to be placed on, or close to, said switch. Its ON and OFF positions must be clearly identifiable by a Person standing in front of it as installed, the OFF position being at the top. If more than one firefighter’s switch is installed on a building, Regulation 537.6.3 (iv) requires those parts of the installation so controlled to be clearly stated alongside the appropriate device.

Section 559.10 gives requirements for outdoor lighting installations, highway power supplies and street furniture. Regulation 559.10.7.2 requires a label to be placed externally on any temporary supply unit stating the maximum sustained current which may be supplied by said unit.

In the next issue of *Wiring Matters*, we will concentrate on the identification and labelling requirements for safety services, inspection and testing and special installations and locations. ■

Function	Alphanumeric	Colour
Protective conductors		Green-and-yellow
Functional earthing conductor		Cream
<b>AC power circuit (1)</b>		
Line of single-phase circuit	L	Brown
Neutral of single or three-phase circuit	N	Blue
Line 1 of three-phase AC circuit	L1	Brown
Line 2 of three-phase AC circuit	L2	Black
Line 3 of three-phase AC circuit	L3	Grey
<b>Two-wire unearthed DC power circuit</b>		
Positive of two-wired circuit	L+	Brown
Negative of two-wired circuit	L-	Grey
<b>Two-wire earthed DC power circuit</b>		
Positive of (negative earthed) circuit	L+	Brown
Negative of (negative earthed) circuit <sup>(2)</sup>	M	Blue
Positive of (positive earthed) circuit <sup>(2)</sup>	M	Blue
Negative of (positive earthed) circuit	L-	Grey
<b>Three-wire earthed DC power circuit</b>		
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 <sup>(2)(3)</sup>	M	Blue
Negative of three-wire circuit	L-	Grey
<b>Control circuits, ELV and other applications</b>		
Line conductor	L	Brown, Black, Red, Orange, Yellow, Violet, Grey, White, Pink or Turquoise
Neutral or mid-wire <sup>(4)</sup>	N or M	
NOTES:		
(1) Power circuits include lighting circuits		
(2) M identifies either the mid-wire of a three-wire DC circuit or the earthed conductor of a two-wired earthed DC circuit		
(3) Only the middle wire of three-wire circuits may be earthed		
(4) An earthed PELV conductor is blue		

Table 51: Identification of conductors

