



Requirements for cables concealed in a wall or partition – A brief overview

by Geoff Cronshaw

A new series of Regulations (522.6.6 - 522.6.8) have been introduced in the 17th Edition of the IEE Wiring Regulations concerning cables concealed in a wall or partition. These new Regulations introduce the concept of skilled person, instructed person and ordinary person.

RCD PROTECTION

It is now a requirement to protect cables concealed in a wall or partition (at a depth of less than 50 mm) by a 30 mA RCD where the installation is not intended to be under the supervision of a skilled or instructed person where other methods

of protection, including the use of cables with an earthed metallic covering, earthed conduit/trunking or mechanical protection, can not be employed.

Irrespective of the depth, a cable in a partition where the construction includes metallic parts other than fixings shall be protected by a 30 mA RCD.

For example, this means that in a domestic installation, where insulated and sheathed cables are concealed in a wall at a depth of less than 50 mm and have no mechanical protection, they need to be installed within the safe zones and protected by a 30 mA RCD.

DEFINITIONS

Skilled person

A person with technical knowledge or sufficient experience to enable him/her to avoid dangers which electricity may create.

Instructed person

A person adequately advised or supervised by skilled persons to enable him/her to avoid dangers which electricity may create.

Ordinary person

A person who is neither a skilled person nor an instructed person.

WIRING SYSTEMS

To conform with the requirements of BS 7671, wiring systems must utilise cables complying with the relevant requirements of the applicable British Standard or Harmonised Standard.

Alternatively, if equipment complying with a foreign national standard, based on an IEC Standard is to be used, the designer or other person responsible for specifying the installation must verify that any differences between that standard and the corresponding British Standard or Harmonised Standard will not result in a lesser degree of safety than that afforded by compliance



Figure 1: RCBO – Residual current circuit-breaker with overcurrent protection



Figure 2: RCCB - Residual current circuit-breaker

with the British Standard.

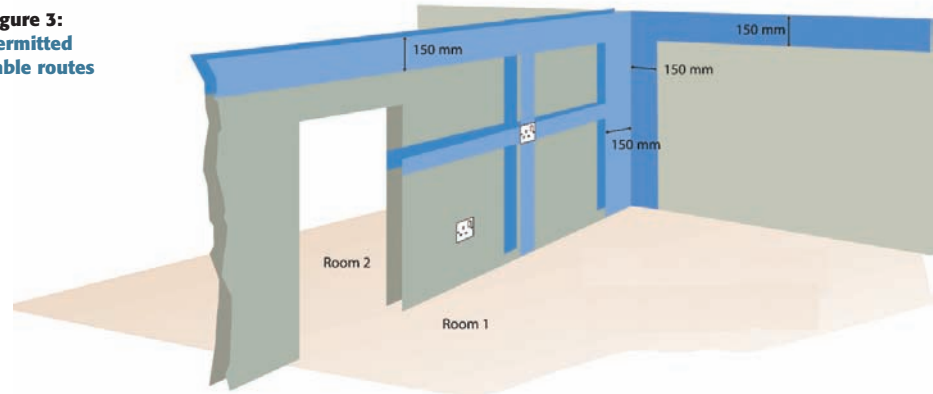
The effect of environmental conditions and general characteristics around various parts of the installation must be assessed to enable suitable electrical equipment, including the wiring system, to be specified.

For example, cables and equipment used in agricultural and horticultural premises should be installed away from areas or routes used by animals or be of a type to withstand such attack.

Any part of the fixed installation which may be exposed to a severe impact must be able to survive it. In workshops, for example, where heavy objects are moved, installation of wiring systems in traffic routes should be avoided or localised protection must be provided.

Therefore, when designing a concealed installation, the designer must select a suitable wiring system. Under the 17th Edition, depending on the type of wiring selected, the method of installation

Figure 3:
Permitted
cable routes



and whether the installation will be under the control of a skilled person, or instructed person or ordinary person will depend whether the concealed wiring will require RCD protection or not.

For example, in a domestic installation, where insulated and sheathed cables are concealed in a wall at a depth of less than 50 mm and have no mechanical protection, they need to be installed within the safe zones and need to be protected by a 30 mA RCD.

Regulations 522.6.6 and 522.6.8 are reproduced here for information.

522.6.6 A cable concealed in a wall or partition at a

depth of less than 50 mm from a surface 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) be enclosed in earthed conduit complying with BS EN 61386 and satisfying the requirements of these Regulations for a protective conductor, or
- (iii) be enclosed in earthed trunking or ducting complying with BS EN 50085 and satisfying the requirements of these

Regulations for a protective conductor, or
(iv) be mechanically protected against damage sufficient to prevent penetration of the cable by nails, screws and the like, or
(v) 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



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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.

522.6.7 Where Regulation 522.6.6 applies and the installation is not intended to be under the supervision of a skilled or instructed person, a cable installed in accordance with Regulation 522.6.6 (v), and not complying with Regulation 522.6.6 (i), (ii), (iii) or (iv), shall be provided with additional protection by means of an RCD having the characteristics specified in Regulation 415.1.1.

522.6.8 Irrespective of the depth of the cable from a surface of the wall or partition, in an installation not intended to be under the supervision of a skilled or instructed person, a cable concealed in a wall or partition the internal construction of which includes metallic parts, other than metallic fixings such as nails, screws and the like, 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) be enclosed in earthed conduit complying with BS EN 61386 and satisfying the requirements of these Regulations for a

protective conductor, or
(iii) be enclosed in earthed trunking or ducting complying with BS EN 50085 and satisfying the requirements of these Regulations for a protective conductor, or
(iv) be mechanically protected sufficiently to avoid damage to the cable during construction of the wall or partition and during installation of the cable, or
(v) be provided with additional protection by means of an RCD having the characteristics specified in Regulation 415.1.1.

NOTE: If the cable is installed at a depth of 50 mm or less from the surface of a wall or partition the requirements of Regulation 522.6.6 also apply.

RCD PROTECTION

An RCD is a protective device used to automatically disconnect the electrical supply when an imbalance is detected between live conductors. In the case of a single-phase circuit, the device monitors the difference in currents between the line and neutral conductors. If a line to earth fault develops, a portion of the line conductor current will not return through the neutral conductor. The device monitors this difference, operates and disconnects the circuit when the residual current reaches a preset limit, the residual operating current ($I_{\Delta n}$). An RCD on its own does not provide protection against overcurrents. Overcurrent protection is provided by a

fuse or a circuit-breaker. However, combined RCD and circuit-breakers are available and are designated RCBOs.

Unwanted tripping

Unwanted tripping of RCDs can occur when a protective conductor current or leakage current causes unnecessary operation of the RCD. An RCD must be so selected and the electrical circuits so subdivided that any protective conductor current that may be expected to occur during normal operation of the connected load(s) will be unlikely to cause unnecessary tripping of the device.

Discrimination

Where two, or more, RCDs are connected in series, discrimination must be provided, if necessary, to prevent danger. During a fault, discrimination will be achieved when the device electrically nearest to the fault operates and does not affect other upstream devices. Discrimination will be achieved when 'S' (Selective) types are used in conjunction with downstream general type RCDs. The 'S' type has a built-in time delay and provides discrimination by simply ignoring the fault

for a set period of time allowing more sensitive downstream devices to operate and remove the fault. For example, when two RCDs are connected in series, to provide discrimination, the first RCD should be an 'S' type. RCDs with built in time delays should not be used to provide personal protection.

Labelling

Regulation 514.12.2 requires that where an installation incorporates an RCD a notice shall be fixed in a prominent position at or near the origin of the installation. The Regulation requires that the notice shall be in indelible characters not smaller than illustrated in BS 7671, see fig. 4.

Testing

Refer to Regulations 612.8.1, 612.13.1 and 415.1.1 for requirements in terms of verification of installed RCDs.

CONCLUSION

Under the 17th Edition, designers will now have to determine from the client whether the installation is going to be under the supervision of a skilled person, instructed person or ordinary person. ■

This installation, or part of it, is protected by a device which automatically switches off the supply if an earth fault develops. Test quarterly by pressing the button marked 'T' or 'Test'. The device should switch off the supply and should then be switched on to restore the supply. If the device does not switch off the supply when the button is pressed, seek expert advice.

Figure 4: Labelling requirement of 514.12.2