

RCD Legislation and Codes of Practice

Overseas legislation

The use of RCDs is mandatory in many countries, including the majority of EEC and Scandinavian states, most of the Middle East countries, Singapore, Malaysia, South Africa, Hong Kong and Commonwealth countries, and the USA. Other countries are reviewing their position and there is no doubt that many will follow suit in the near future.

Guidelines in the UK

Here in the UK, there is a growing body of legislation, regulations, codes of practice and recommendations which is accelerating the rate of adoption of RCDs and widening considerably their areas of application. The trend is clear and cannot be ignored.

Health and Safety at Work Act 1974

The Health and Safety at Work Act 1974 and the Electricity at Work Regulations 1989 are statutory documents and non-compliance constitutes a criminal offence.

Electricity at Work Regulations 1989

Because of the wide range of work covered by the regulations, the requirements are framed in general terms. However, in the Memorandum of Guidance on the above regulations, a clear case is made for using RCDs as an additional safeguard for earthing (Reg 8). Also under Clause 12 (Isolation), it advises that the use of RCDs will meet the provision of isolation.

IEE Wiring Regulations 2001

Although compliance with BS 7671 (2001) (otherwise known as the 16th Edition IEE Wiring Regulations) is not mandatory – in the event of an accident, failure to comply could result in prosecution by the HSE. The HSE also accepts that compliance with BS 7671 also gives compliance with The Electricity at Work Act.

a) Indirect Contact

Chapter 413-02 States that where indirect contact protection is to be achieved by earthed equipotential bonding and automatic disconnection of the supply, an RCD can be used as the means of protection in TN and IT earthing systems and is the preferred method of TT systems.

Also, the IEE's "Design participants notes" for the 16th Edition BS 7671: confirms that if an RCD is selected to provide indirect protection, it is not necessary to undertake the disconnection calculations required for overcurrent devices because the RCD will always trip within 0.2 seconds.

b) Direct Contact

Regulation 412-06-02 States that an RCD is recognised as reducing the risk of an electric shock from direct contact with live parts as long as:

- i) The RCD is not the sole means of protection, see Reg 402-01-01
- ii) The RCD's tripping current is rated at 30mA, and tripping time is under 40mS for a 150mA fault current

c) Areas of Increased Shock Risk

- i) Reg 471-08-01 States that in areas of increased shock risk, automatic disconnection of the supply shall be by means of an RCD
- ii) Reg 471-16-01 States that socket outlets rated at 32A or less, that can reasonably be expected to supply portable equipment for use outdoors, shall be protected by an RCD
- iii) Reg 471-16-02 States that portable equipment for outdoors connected other than through a socket outlet by means of a flexible cable and having a current capacity of less than 32A, shall be protected by an RCD
- iv) Reg 471-08-06 States that all socket outlets in a TT earthing system shall be RCD protected

d) Caravans

- i) Reg 608-03-02 States that where a caravan is protected from indirect contact by automatic disconnection of the supply, a double pole RCD shall be installed complying with Reg 412-06-02

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- ii) Reg 608-13-05 States that socket outlets on caravan parks provided for use by caravans or motor homes, shall be protected by an RCD and no more than three socket outlets shall be connected to one RCD.

e) Swimming Pools

- i) Reg 602-07-01 States that where it is not possible to locate socket outlets outside of Zone B, they shall comply with BSEN 60309-2 and shall be at least 1.25m from the edge of Zone A and at least 0.3m above floor level. These outlets must be protected by an RCD.
- ii) Reg 602-07-02 States that socket outlets, switches or accessories can be installed in Zone C if they are protected by an RCD

f) Agricultural and Horticultural Premises

Reg 650-03-01 States that circuits supplying socket outlets shall be RCD protected

g) Construction Site Installations

Reg 604-08-03 States that all socket outlets shall have one or more of the following measures:

- Automatic disconnection and reduced low voltage system
- An RCD complying with Reg 412-06-02 (ii)
- SELV (Reg 411-02 and 471-02)
- Electrical separation (Reg 413-06 and 471-12)

h) Functional testing of RCDs

Regulation 713-13-01 States that where an RCD is used to provide protection against indirect contact or supplementary protection against direct contact, the RCD shall be subjected to an appropriate fault condition independent of any test facility incorporated in the device. The table below gives the required trip times to comply with BS7071 for portable RCDs and BS 7288 for RCD socket outlets

Fault Current	$0.5 \times I_n$	$1 \times I_n$	$5 \times I_n$
Trip Time	No trip permissible	< 200 mS	< 40 mS

Where " I_n " is the rated trip current of the RCD in milliamps

Health and Safety Executive

Where greater guidance is deemed necessary, the HSE issue notes to assist. The following are relevant but not comprehensive:

- a) **GS 23** (Feb 1990) – Electrical Safety in Schools
A higher standard of electrical protection can be achieved by using a 30mA RCD
- b) **GS 50** (May 1991) - It is recommended that sockets being used by entertainers be RCD protected
- c) **PM 32** (Nov 1990) – Safe Use of Portable Electrical Apparatus Allows the use of RCD protection for portable electrical apparatus
- d) **HS(G) 67** – Motor Vehicle Repair*
Calls for RCD protection on steam and water pressure cleaners
- e) **HS(G) 104** – Residential Care Homes*
Calls for outdoor portable equipment to be protected by RCDs
- f) **HS(G) 55** – Health and Safety in Kitchens and Food Preparation Areas*
Calls for RCD protection for pressure washing units and steam cleaners
- g) **HSE PM 29** – Electrical Risks from Steam/Water Pressure Cleaners*
Calls for portable equipment to be protected by an RCD
- h) **HS(G) 41** – Petrol Filling Stations*
174: Protective multiple earthing suggests that where part of a larger installation, a filling station should be provided with its own earth (TT installation). It should then have its own RCD protection.
200: Portable and transportable equipment. Where voltages above 10 volts are supplied an RCD rated 30mA should be provided
216: General (Protection against electrical shock). All circuits feeding equipment on the forecourt must be disconnected in a time not exceeding 400ms in event of the occurrence of an earth fault

*Note. As these are areas of increased risk, please refer to BS 7671 (16th Edition) Reg 471-08-01. See Chapter 3.9 Part C Page 5

Department of Education and Science

(In Building Bulletin 76)

"Maintenance of Electrical Services (1992) suggests:

- A higher standard of electrical protection can be achieved through the use of RCDs
- Safety features, such as RCDs...are of paramount importance
- A policy of fitting RCDs in all halls in educational premises should be adopted, if to be used for public performances, etc.
- All external socket outlets and outlets which will supply equipment to be used outdoors should be protected by an RCD
- Socket outlets in plant areas should be protected by RCDs

In areas used for drama performance: The entire power systems and stage lighting system (potentially one of the greatest sources of danger of electrical shock in educational premises) should be protected by RCDs"

BS 6396 Electrical Systems in Office Furniture and Office Screens

"It is preferred that multiple socket outlets are protected by an RCD"

BS 7036 Provision and Installation of Safety Devices for Automatic Power Operated Pedestrian Door Systems

"RCD protection should be provided so as to minimise electrical faults developing the risk of electrical shock and fires".

Brewers Society – guidance for licensees

While the guidance refers the reader to compliance with the Electricity at Work Regulations, it is relevant to point out that parts of licensed premises are areas of increased risk and reference should be made to BS 7671, Regulation 471-08-01. The HSE document GS 50 may also be relevant.

Consumer Safety Unit (DTI)

The Department of Trade & Industry has produced a leaflet entitled "Don't be a Tool Hire Hazard" in association with ROSPA and Which? In this leaflet it continually stresses the need for RCD protection.

IEE Codes of practice for in-service inspections and testing of electrical equipment

The length of extension leads should not exceed the following:

Core area	Maximum length
1.25mm ²	12 metres
1.5mm ²	15 metres
2.5mm ²	25 metres

Extension leads exceeding the above lengths should be fitted with a 30mA RCD manufactured to BS 7071.

Cable reels must be used within their reeled or unreeled ratings as appropriate.

Product Liability

Manufacturers are required to ensure that their products are virtually foolproof to install and use. This makes particularly strong demands on electrical equipment manufacturers.

Most electrical accidents are caused by damaged or worn cables, or loose connections, and many electric appliances are now double-insulated, giving a limited degree of protection. The careless use of some equipment, such as lawnmowers, hedgetrimmers and power tools, however, can result in damage to their own cables. Appliances using water as a cleaning medium (e.g. floor scrubbers, washing machines and dishwashers) can become live as a result of water spillage or leaks.

The increase in product liability legislation has already convinced some manufacturers to fit RCDs to their equipment as standard, or to offer them as accessories. This practice is likely to grow and companies which ignore the trend will do so at risk to the future of their business.

Conclusion

The use of RCDs in the UK is already widespread and is set to increase as installations are refurbished and designed to comply with the relevant legislation and regulations. Having foreseen these trends some years ago, GreenBrook Electrical has developed new generation technology to secure its position as the leading UK supplier of RCDs. Not only does GreenBrook Electrical have a very comprehensive range of RCDs, but several items present unique and innovative solutions to satisfy the user's requirements.

Manufactured to the highest standards with strict quality control procedures, PowerBreaker® RCDs are designed for long, reliable life. Supported by a nationwide network of electrical wholesalers and unparalleled marketing programmes, these top quality products satisfy the needs of virtually every type of application.

In its commitment to the highest levels of Customer Service and user safety, GreenBrook Electrical continues to provide specialist advice regarding the installation and application of RCDs across the broad spectrum of industrial, commercial and domestic installations.