A GUIDE

SITE GUIDE

FOR ELECTRICAL INSTALLATIONS UP TO 100 A

updated to 18TH EDITION

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CERTSURE LLP

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CHAPTER 1
INTRODUCTION

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1.1 Scope

This Guide is intended for contractors who carry out electrical installation work in dwellings, including houses and flats. It provides information and guidance relating to the design, construction, inspection, testing and certification of domestic electrical installation work, and is intended to promote good practice and aid understanding of the fundamental concepts of protection for safety. The guidance is based on the requirements of *BS 7671: 2018 Requirements for Electrical Installations*, and references to Regulation numbers are to those contained in that Standard.

1.2 Statutory and non-statutory requirements

1.2.1 Health and Safety at Work etc Act 1974

The Health and Safety at Work etc Act 1974 (HSW Act) is the primary legislation dealing with occupational health and safety in the United Kingdom. This is an enabling Act, a provision in law that confers on appropriate officials – in this case the Health and Safety Executive – the power to implement or enforce the law. The HSW Act sets out the general duties that employers have towards employees and members of the public, and that employees have to themselves and to each other.

The principle of *'so far as is reasonably practicable'* may be applied to some of these duties. This principle is considered further in Section 1.3.1 of this Guide along with the principle of absolute duty. In the case of offences under the HSW Act, a person is deemed 'guilty' until proven 'innocent' which is the opposite of the presumption of innocence that exists in 'criminal' law. This means that a person charged with a health and safety offence must demonstrate that they took the relevant precautions in relation to the duties placed on them by the HSW Act.

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1.2.2 Electricity at Work Regulations 1989

The Electricity at Work Regulations 1989 (EWR) is a Statutory Instrument made under the Health and Safety at Work etc. Act 1974 (HSW Act).

A statutory instrument is a form of subordinate or secondary legislation, which is made under an enabling Act.

Statutory instruments are classified according to their subject matter as being local or general in application. The requirements contained in the EWR are generally applicable. That is to say, they apply (with very few exceptions) wherever work is carried out on, or close to, live conductors.

The provisions contained within a statutory instrument must be complied with; they are not optional or preferred conditions.

EWR were introduced to require precautionary measures to be taken against the risk of death or personal injury caused by electricity when carrying out work activities.

EWR contains 21 regulations. A brief summary of the general regulations is provided below.

Regulation 2 defines a number of terms used within the Regulations, including *danger; electrical equipment; and injury.*

Regulation 3 requires employers and employees to comply with 'the provisions contained within EWR in so far as they relate to matters within (their) control'. The nature of these duties is expanded on in the Health and Safety Executive (HSE) publication *The Electricity at Work Regulations 1989 - Guidance on Regulations* (HSR25), which is considered further in Section 1.3.1 of this chapter.

Regulation 4 gives requirements relating to the construction, use and maintenance of systems, and the electrical equipment therein, and is reproduced below:

1) All systems shall at all times be of such construction as to prevent, so far as is reasonably practicable, danger.
2) As may be necessary to prevent danger, all systems shall be maintained so as to prevent, so far as is reasonably practicable, such danger.
3) Every work activity, including operation, use and maintenance of a system and work near a system, shall be carried out in such a manner as not to give rise, so far as is reasonably practicable, to danger.
4) Any equipment provided under these Regulations for the purpose of protecting persons at work on or near electrical equipment shall be suitable for the use for which it is provided, be maintained in a condition suitable for that use, and be properly used.

Regulation 5 is concerned with the strength and capability of equipment with regard to its use under normal, transient and prospective fault conditions.

Regulation 6 relates to the construction and protection of electrical equipment against the adverse or hazardous environments to which electrical equipment might reasonably be exposed in use. This is of relevance to the use of the International Protection (IP) code described in *BS EN 60529: 1992* (as amended).

Regulation 7 requires conductors that may give rise to danger to be covered by insulation and where necessary be provided with other means of protection; or be so placed to prevent so far as is reasonably practicable, danger.

Regulation 8 is concerned with the provision of earthing or other precautions to prevent danger.

Regulation 9 deals with the integrity (that is, the continuity) of referenced conductors.

Regulation 10 requires all joints and connections to be mechanically and electrically suitable for use.

Regulation 11 requires means of protecting against excess of current to be provided.

Regulation 12 calls for the provision of secure means of isolation to any electrical equipment – that is, whole installations, or one or more circuits, or individual items as necessary to prevent danger.

Regulation 13 states that:

> Adequate precautions shall be taken to prevent electrical equipment, which has been made dead in order to prevent danger while work is carried out on or near that equipment, from becoming electrically charged during that work if danger may thereby arise.

Regulation 14 prescribes three conditions which must all be satisfied before a person may be involved in work on or near live conductors. The conditions are:

a) it is unreasonable in all the circumstances for it to be dead; and

b) it is reasonable in all the circumstances for him to be at work on or near it while it is live; and

c) suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

Regulation 15 requires the provision of adequate working space, means of access, and lighting where electrical equipment is situated.

Regulation 16 requires persons to be competent to prevent danger or injury and is worthy of repeat here:

> No person shall be engaged in any work activity where technical knowledge or experience is necessary to prevent danger or, where appropriate, injury unless he possesses such knowledge or experience, or is under such degree of supervision as may be appropriate having regard to the nature of the work.

The issue of competency is considered further in Section 1.3.1 of this chapter.

1.2.3 Construction (Design and Management) Regulations 2015

The current edition of the Construction (Design and Management) (CDM 2015) Regulations came into force in April 2015. The Regulations place a legal duty on everyone involved in construction work from the design stage through to completion to:

- sensibly plan the work so the risks involved are managed,
- have the right people doing the right work at the right time,
- cooperate and coordinate work,
- have the right information about risks and how they are managed,
- effectively communicate information to those who need it, and
- consult and engage workers about risks and how they are managed.

The purpose of the CDM Regulations is to enable those involved with construction to manage the health, safety and welfare of those affected whilst construction work takes place.

Regulation 2 sets out how the Regulations are to be interpreted and describes what is meant by construction work, and lists the role of persons (dutyholders) involved in construction work such as; client, designer and contractor for example. Table 1 highlights the dutyholders and briefly outlines their roles and responsibilities and is an extract from the HSE guidance to CDM Regulations.

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Table 1 Roles and responsibilities of dutyholders

CDM duty holders	Who are they?	Summary of role / main duties
Clients	Organisations or individuals for whom a construction project is carried out.	Make suitable arrangements for managing a project. This includes making sure that other duty holders are appointed and sufficient time and resources are allocated. Relevant information is prepared and provided to other duty holders.
Domestic clients	People who have construction work carried out on their own home or the home of a family member, that is not done in furtherance of a business, whether for profit or not.	Domestic clients are in scope of CDM 2015 but their duties as a client are normally transferred to the contractor, on a single contractor project or the principal contractor, on a project involving more than one contractor.
Principal designers	Are appointed by the client in projects involving more than one contractor. They can be an organisation or an individual with sufficient knowledge, experience and ability to carry out the role.	Plan, manage, monitor and co-ordinate health and safety in the pre-construction phase of a project. This includes amongst other duties preparing and providing relevant information to other duty holders.
Designers	Those who, as part of a business, prepare or modify designs for a building or product, or prepare or modify designs to systems relating to construction work	Provide information to other members of the project team to help them fulfil their duties.
Principal contractors	Appointed by the client to co-ordinate the construction phase of a project where it involves more than one contractor.	Plan, manage, monitor and co-ordinate health and safety in the construction phase of a project.
Contractors	Those who do the actual construction work. They can be either an individual or a company.	Plan, manage and monitor construction work under their control so that it is carried out without risks to health and safety. For projects involving more than one contractor, co-ordinate their activities with others in the project team. For single-contractor projects, prepare a construction phase plan.
Workers	The people who work for or under the control of contractors on a construction site.	Responsible for their own health and safety and that of others who may be affected by their actions.

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Regulation 4 states that it is the duty of the client to make suitable arrangements for the management of the project. It is the client's responsibility to make sure that before the construction phase begins, the contractor draws up a construction phase plan and the designer prepares a safety file which is to be revised appropriately as the project continues (Regulations 12 and 15 refer).

Regulation 6 states that a project is notifiable if the construction work on a construction site is scheduled to -

(a) last longer than 30 working days and have more than 20 workers working simultaneously at any point in the project; or
(b) exceed 500 person days.

Where a project is notifiable, the client must give notice in writing to the Health and Safety Executive (HSE) as soon as is practicable before the construction phase begins. The notice must comply with the requirements of Regulation 6(3).

Regulation 8 recognises that organisations or individuals can carry out the role of more than one dutyholder, provided they have the skills, knowledge, experience and (if an organisation) the organisational capability necessary to carry out those roles in a way that secures health and safety of all concerned involved with the project.

CDM 2015 Regulations makes a distinction between domestic and commercial projects. Client duties apply in full for commercial projects where the client has the overall responsibility to see that the project is fully managed. For domestic projects, the client's duty normally passes to other dutyholders such as the principal contractor.

1.2.4 Provision and Use of Work Equipment Regulations 1998

The Provision and Use of Work Equipment Regulations require that work equipment, including installations, is so constructed (or adapted) so as to be suitable for the purpose for which it is provided.

Equipment must be inspected after installation and before use, at suitable intervals and after exceptional events for example fire, flooding, or mechanical damage. Potentially dangerous machinery must be guarded. Where necessary, equipment logs must be maintained and adequate training given to equipment operators.

1.2.5 Electricity Safety, Quality and Continuity Regulations

The main purpose of the Electricity Safety, Quality and Continuity Regulations is to provide for the safety of the electricity supply distribution system, that is, for the safety of the general public and of persons working on the system. As the title implies, the Regulations

also have requirements for power quality and supply continuity. There are many references to *BS 7671*. The regulations require distributors, prior to connection of new properties, to obtain confirmation that the installation to be connected complies with the requirements of *BS 7671* (Regulations 9(4) and 25(2) refer).

Regulation 24(4) requires the distributor to make available an earth connection for new supplies, unless inappropriate for reasons of safety. In the UK this is almost always achieved by the provision of a PME earthing facility.

Regulation 27(3) recognises that, depending upon the distance from the substation transformer, the characteristics of the distribution network and the loading on the system, the voltage and the frequency of the supply at the consumers' supply terminals will vary. In the case of a low voltage supply clause 3 (b) limits the permitted variation in voltage at the consumers' supply terminals to plus 10 % and minus 6 % of the declared voltage.

Regulation 28 requires the distributor to provide on request a written statement of:

a) the maximum prospective short-circuit current at the supply terminals;

b) for low voltage connections, the maximum earth loop impedance of the earth fault path outside the installation;

c) the type and rating of the distributor's protective device or devices nearest to the supply terminals;

d) the type of earthing system applicable to the connection; and

e) the number of phases, frequency and voltage.

1.2.6 The Building Regulations

England and Wales. The Building Regulations 2010

The Building Regulations 2010 (Statutory Instrument 2010 No. 2214) are made under powers provided in the Building Act 1984 and currently apply in England and Wales, but not Scotland or Northern Ireland.

The purpose of the Building Regulations is to provide for the health and safety of people in and around buildings and also provide for matters such as energy conservation and access and use. In the Building Regulations the term "building work" means:

a) the erection or extension of a building,

b) the provision or extension of a controlled service or fitting in or in connection with a building,

c) the material alteration of a building, or a controlled service or fitting,

d) work required by Regulation 6 (requirements relating to material change of use),

e) the insertion of insulating material into the cavity wall of a building,

f) work involving the underpinning of a building.

Schedule 1 of the Building Regulations describes the requirements relating to building work and material change of use as described in Regulations 4 & 6. These requirements are divided into the following parts:

Part A	(Structural safety)
Part B	(Fire safety)
Part C	(Resistance to contaminants and moisture)
Part D	(Toxic substances)
Part E	(Resistance to the passage of sound)
Part F	(Ventilation)
Part G	(Sanitation, hot water safety and water efficiency)
Part H	(Drainage and waste disposal)
Part J	(Combustion appliances and fuel storage systems)
Part K	(Protection from falling, collision and impact)
Part L	(Conservation of fuel and power)
Part M	(Access to and use of buildings)
Part N	(Glazing safety)
Part P	(Electrical safety)
Part Q	(Security)
Part R	(Physical infrastructure for high speed electronic communications networks)

To provide the construction industry with guidance on how these requirements of the Building Regulations can be met, for each of the parts previously listed, the Ministry of Housing, Communities and Local Government publishes a series of Approved Documents.

The Approved Documents may be downloaded free-of-charge from **www.planningportal.gov.uk**
Two editions of Approved Document P, dealing with electrical safety, are available:

- the 2006 Edition,
- the 2013 Edition, which applies to work in England from 6 April 2013.

It should be noted that the power to make Building Regulations for Wales has been transferred to Welsh Ministers from 31st December 2011. The Building Regulations 2010 and related guidance such as the Approved Documents published prior to that date will continue to apply in Wales until Welsh Ministers decide that changes should be made. As a result of this transfer of power, for electrical installations in dwellings, the approved document used in England is different to that used in Wales. In England, the 2013 edition of Approved Document P is used whilst, in Wales, apart from 'excepted energy buildings[1]', the 2006 (including 2010 amendments) edition is used.

[1]Excepted energy buildings, as defined in The Welsh Ministers (Transfer of Functions) (No. 2) Order 2009, are energy infrastructure buildings and, for these buildings, the 2013 edition of Approved Document P is applicable.

Although there are significant differences between the Approved Documents used in England and Wales both approved documents:

1. Limit the scope of Part P to electrical installations in dwelling-houses, flats and certain common areas and business premises associated with the dwelling house or flat.
2. Contain statements to the effect that electrical installation work should be designed and installed in accordance with *BS 7671*. Both editions of Approved Document P require all electrical installation work to be inspected and certified in accordance with the requirements of *BS 7671*.

However, in terms of the types of work that is classified as being 'notifiable electrical installation work' and the category of person permitted to inspect and test notifiable work there are important differences between the approved documents used in England and Wales. In Approved Document P the term 'notifiable electrical installation work' means electrical installation work that must be either certified by the building control body or certified by a person authorised by the applicable approved document. After completion of the notifiable electrical installation work, whichever procedure is followed, the occupier of the building should receive a copy of a Completion Certificate.

Notifiable work - Wales

Section 0 of Approved Document P: 2006 provides details of notifiable work and these details are summarised below. The requirements for work in kitchens, special locations and special installations are different from the requirements for the general areas of the dwelling.

Notes:

1. A kitchen (as defined in Section 0 of Approved Document P: 2006 is a location containing a sink and food preparation facilities).
2. Special locations, as given in Table 2 of Approved Document: 2006, are locations containing a bath tub, shower basin, swimming pool, paddling pool and a hot air sauna.
3. Special installations are installations that, due to the nature of the installation, additional dangers exist. These are described in Table 2 of Approved Document: 2006 and are described in the following section.

The electrical installation work that is currently notifiable in Wales is as follows:

Anywhere within or attached to a dwelling:

- a complete new installation (a full rewire),
- replacing a consumer unit,
- the installation of:
  - > a new circuit,
  - > the power or control wiring for a new central heating system,
  - > a special installation as given in Table 2 of Approved Document: 2006 - are electric floor and ceiling heating systems, garden lighting and power installations, a solar photovoltaic power supply system, a small scale generator or an extra-low voltage lighting installations, (other than a pre-assembled, CE marked lighting sets).

Within a kitchen or special location:

The work described in the previous section, plus:

- any alteration or addition to an existing circuit for the addition of adding lighting points, socket-outlets or a fused-spur,
- the supply to another location, such as a conservatory and attached garages.

Within a special location

- Installation of telephone or extra-low voltage wiring and equipment for the purposes of communications, information technology, signalling, control or similar.

Notifiable work - England

When compared with the description of the electrical installation work that is notifiable in Wales (based on the 2006 edition of Approved Document P), the list of the electrical installation work that is currently notifiable in England (based upon the 2013 edition of Approved Document P) is, as shown in the following section, less comprehensive.

The electrical installation work that is currently notifiable in England is as follows:

Anywhere in a dwelling or its surroundings:

- installation of a new circuit,
- replacement of a consumer unit.

Within a special location:

- any alteration or addition to an existing circuit.

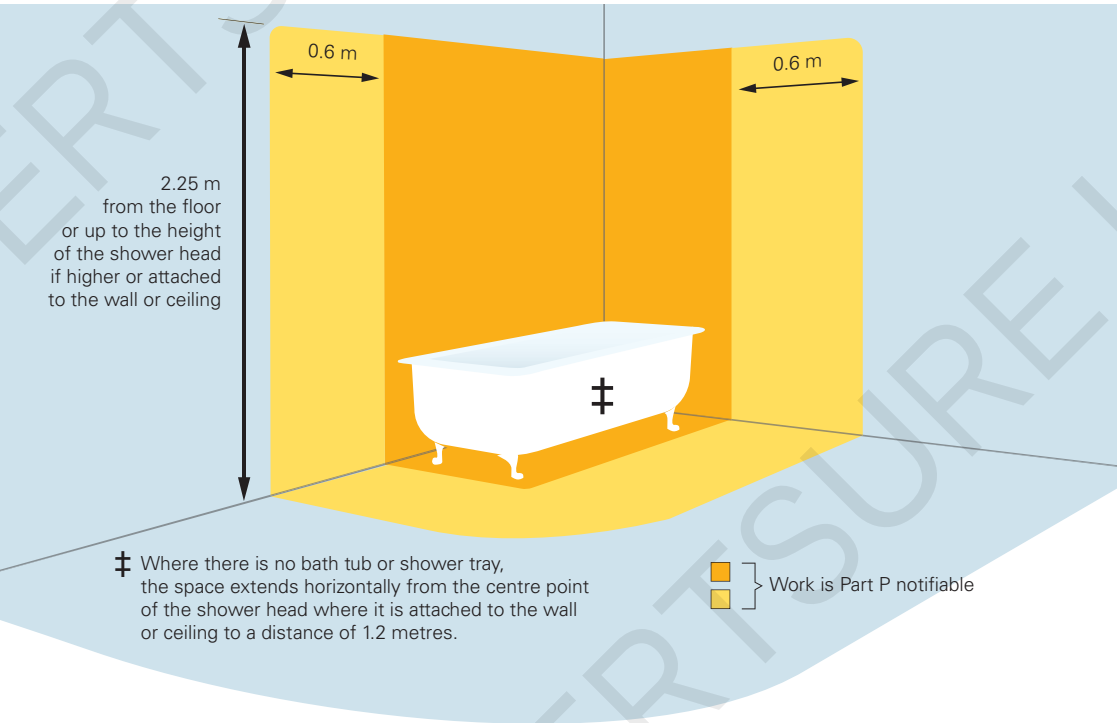

Fig 1.1 Illustration for notifiable work in a room containing a bath or shower in accordance with Approved Document P: 2013

As described in Approved Document P: 2013, special locations in dwellings are rooms containing a bath or shower, swimming pool or a sauna heater. For a room containing a bath or shower, an alteration or addition to an existing circuit is notifiable only where carried out in the space surrounding a bath or shower (as illustrated in Fig 1.1), rather than the whole room volume, which is the case for rooms containing a swimming pool or sauna heater.

Certification of notifiable work

The 2006 edition of Approved Document P permits the certification of notifiable work to be carried out by either:

1. an installer who is registered with a Part P competent person self-certification scheme such as the ones offered by NICEIC or ELECSA, or
2. a building control body.

In addition to the two methods of inspection and testing of notifiable work permitted by the 2006 edition of Approved Document P, the 2013 edition of this document permits certification by a registered third party certifier. However, due to concerns regarding the safety of the installation, operators of many self-certification schemes, including NICEIC and ELECSA, do not operate a 3rd party certification scheme.

The 2013 edition of Approved Document P advises that to comply with the Building Regulations, depending upon the nature of the work being undertaken, it may be necessary to comply with other approved documents and provides the following examples:

Part A (Structural): depth of chases in walls, and the size of notches in floors and roof joists

Part B (Fire safety): Fire safety of certain electrical installations; provision of fire alarms and fire detection systems; fire resistance of service penetration through floors, walls and ceilings

Part C (Resistance to contaminants and moisture): resistance of service penetrations to rainwater and contaminants such as radon

Part E (Resistance to the passage of sound): soundproofing of service penetration

Part F (Ventilation): dwelling ventilation rates

Part L (Combustion appliances and fuel storage systems): energy efficient lighting

Part M (Access to and use of buildings): height of socket-outlets and switches

Further information on how the Building Regulations affect the work of an installation electrician can be found in the in the NICEIC and ELECSA publication 'A Short Guide to the Building Regulations'. Within this Guide advice on how to comply with Part A (Structure) is provided in Section 11.6.

The responsibility for complying with the Building Regulations rests with the person carrying out the building work, which can include plumbing and electrical installations. The person carrying out the electrical installation is personally responsible for compliance. Persons employing others to carry out work should confirm who has responsibility for compliance with the Building Regulations.

The owner of the building may be served with the enforcement notice if the work does not comply with the Building Regulations.

Scotland. Building (Scotland) Regulations

The Building (Scotland) Regulations are made under powers provided in the Building (Scotland) Act 2003. This Act gives Scottish Ministers the power to make building regulations to provide for the health, safety, welfare and convenience of persons using buildings and of those who may be affected by buildings or matters connected with buildings such as how they are used by others. The Building Regulations also seek to promote the conservation of fuel and power and encourage sustainable development.

Two Technical Handbooks have been issued by Scottish Ministers to provide guidance on how to comply with the standards set in the Building (Scotland) Regulations; one for domestic buildings and one for non-domestic buildings.

The handbooks consist of the following sections:

0	General	4	Safety
1	Structure	5	Noise
2	Fire	6	Energy
3	Environment	7	Sustainability

It is worth noting at this point that a dwelling may include surgeries, consulting rooms and the like having a floor area not exceeding 50 m^2 forming a part of a dwelling and which are used by the occupier of the dwelling for professional or business purposes (Section 0.2.2 of the Technical Handbook - Domestic refers).

Where a building has mixed domestic and non-domestic usage, the relevant part(s) of the appropriate technical handbook should be applied. Where a particular building or part thereof might be considered to fall into more than one category, the building should be designed to meet the more stringent of the recommendations (see Section 0.1.6. of the Technical Handbook - Domestic).

The handbooks and associated appendices may be downloaded, free-of-charge, from the Scottish Government website **www.gov.scot**

1.2.7 *BS 7671*

BS 7671: 2018 ***Requirements for Electrical Installations,*** also known as the *IET Wiring Regulations* ***Eighteenth Edition,*** contains requirements for the design, erection and verification of most types of general electrical installation (Regulation 110.1 refers).

Given the ever increasing complexity of electrical installations, it is frequently necessary to also take into account the requirements and recommendations contained within other British Standards, Codes of Practice and the like.

Certain electrical installations of a more specialised nature, such as those in aircraft, ships and trains; public systems for electrical distribution; and within a general installation, including lightning protection systems, lifts and the electrical equipment of machines, are not covered by *BS 7671* but rather by other British Standards (Regulation 110.2 refers).

BS 7671: 2018 introduced a new informative appendix where the objective is to consider how energy usage can be reduced.It is beyond the scope of this Guide to consider further how the application of Appendix 17 impacts upon the design and erection of electrical installations. whilst maintaining electrical safety and control.

Although the requirements of *BS 7671* are non-statutory, compliance with them may be cited as evidence in a court of law to claim compliance with a statutory requirement (see Regulation 114.1). The Health and Safety Executive (HSE) states in a note within the introduction of *BS 7671* that they (HSE) consider installations which conform with the relevant parts of *BS 7671* as being likely to achieve conformity with the relevant parts of the *Electricity at Work Regulations 1989*.

1.3 Guidance

1.3.1 Health and Safety Executive HSR25 - The Electricity at Work Regulations 1989 - Guidance on Regulations

This Health and Safety (HSE) publication provides clear, concise guidance on the general regulations contained within the Electricity at Work Regulations 1989 and is essential reading for any persons involved in electrical installation work in the UK. It is now downloadable – free of charge – from the HSE website.

Anyone who is involved with electricity, whether working directly on electrical systems, installations or equipment, or using electrically operated equipment, is classed as a Duty Holder. As has already been stated in Section 1.2.2 of this Guide, Regulation 3 of EWR requires duty holders to comply with the provisions contained within EWR in so far as they relate to matters within their control.

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Depending on the particular regulation concerned, the regulations in EWR 1989 impose one of two levels of duty upon persons working on, or in close proximity to, electrical systems (as defined in Regulation 2 of EWR 1989) or parts thereof, namely:

- absolute, or
- so far as is reasonably practicable.

Absolute duty

An absolute duty requires that a regulation must be met regardless of the cost, time or effort incurred in so doing. Regulation 29 offers a defence where criminal proceedings have been brought against a person or persons considered to have failed in their absolute duty. The defence puts the onus on the person(s) so accused to demonstrate that 'they took all reasonable steps and applied due diligence to avoid' committing an offence.

Unless stated otherwise, the requirements of a particular regulation are absolute.

Reasonable practicability

Where embodied in a regulation, reasonable practicability allows a balance to be struck between, on the one hand, the level of risk reduction considered acceptable and, on the other, the cost, time and effort of so doing.

In order to apply reasonable practicability, it will be necessary for a risk assessment to be performed and it should be remembered that this risk assessment could be the subject of scrutiny in the event of an accident or incident occurring.

Competence

Regulation 16 requires persons to be competent to prevent danger and injury. It should be noted that this competence requirement applies not only to those persons involved in work activities on or near electrical installations and equipment, but also to those employed in a managerial, design or supervisory capacity whose actions and decisions might put themselves or, more likely, others at risk of danger or injury.

HSR25 makes it clear that the intention of Regulation 16 is 'to ensure that persons are not placed at risk due to a lack of skills on the part of themselves or others' when dealing with electrical equipment.

Regulation 16 cites technical knowledge and experience as being appropriate indicators of competence and continues to state that in some cases an appropriate degree of supervision may be necessary. Although the successful completion of a particular qualification does not of itself indicate an individual's competence, it might act as a suitable indicator of such.

Similarly, having a number of years of relevant work experience does not mean that a person is competent, but it might do so.

A person may be deemed competent at a particular work activity or range of work activities on account of the relevant training and experience that has been accumulated over time. Where a company employs qualified and experienced personnel, there may be occasions when unfamiliar equipment and / or working practices could be encountered that might require further training to be provided.

Supervision by a competent person can be an appropriate means of allowing those who are not yet fully competent (such as trainees) to gain valuable work experience in a safe manner. It can also permit persons who are not competent, such as painters decorating an electrical switchroom, to work in close proximity to electrical equipment without risk of danger or injury. In such circumstances *BS 7671* would consider them to be instructed persons (as defined).

A person carrying out inspection and testing activities must be competent in such work in terms of their experience and training, and where necessary any shortfall in either of these factors may be addressed by the provision of appropriate supervision.

In Northern Ireland the Electricity at Work Regulations (Northern Ireland) 1991 apply. The Health and Safety Executive for Northern Ireland (HSENI) has produced the *Memorandum of Guidance on the Electricity at Work Regulations (Northern Ireland) 1991* to give guidance on these Regulations.

GS38 - Electrical test equipment for low voltage electrical systems

This HSE publication gives guidance on the following in connection with the selection and use of voltage test lamps and voltage detectors:

- causes of accidents,
- requirements for test probes and leads,
- systems of work,
- examination of equipment.

Precautions to be taken during testing

The key recommendations of GS38 are as follows.

i) Test probes should have finger barriers to prevent hands inadvertently slipping and allowing accidental contact with live parts.

ii) The tips of the probes should be insulated such that no more than 4 mm of the tip remains exposed.

iii) Wherever practicable – that is, where this will not interfere with the correct use of the test lamp or voltage detector, no more than 2 mm of tip should be exposed, or probes fitted with spring loaded insulated screening should be used.

iv) Leads should be adequately insulated and identified.

v) Leads should also be sufficiently flexible and of length suitable for their purpose, that is, neither too long nor too short.

vi) Where the leads are not permanently attached to the instrument, there should be no accessible live parts in the event of a lead becoming detached in use.

vii) In the case of voltage test lamps, the leads (and therefore the person using the instrument) should be protected by either:

- a high breaking capacity (HBC) fuse of rating not exceeding 500 mA, or
- a current limiting resistor and a fuse.

viii) In the case of voltage detectors, the current that may pass through the instrument is limited by the internal circuit design, protective impedance and current limiting resistors built into the probes.

ix) The maximum voltage and, where applicable, any short time rating should be clearly shown on voltage test lamps and voltage detectors.

Guidance Note GS38 is available as a free download from: **www.hse.gov.uk**

Other Guidance

The HSE publish guidance on a wide range of topics which are of relevance to those involved in electrical installation work including the following.

- Simple guide to the Provision and Use of Work Equipment Regulations 1998
- Safe use of work equipment. Approved Code of Practice and Guidance (L22)
- Short guide to the Personal Protective Equipment at Work Regulations 1992 (L25).

1.3.2 Electrical Safety First

Electrical Safety First formerly known as the Electrical Safety Council produces, in association with other industry bodies, a range of technical and best practice guidance for the electrical industry, as well as information on electrical product safety. Of particular interest to installation electricians are the Best Practice Guides and the questions and answers produced by the Electrical Installation Forum.

Best Practice Guides

There are currently nine Best Practice Guides:

No 1 Replacing a consumer unit in domestic premises, where lighting circuits have no protective conductor

No 2 Guidance on the management of electrical safety and safe isolation procedures for low voltage installations

No 3 Connecting a micro-generation system to a domestic or similar electrical installation (in parallel with the mains supply)

No 4 Electrical installation condition reporting: Classification Codes for domestic and similar electrical installations

No 5 Electrical installations and their impact on the fire performance of buildings

Part 1 - Domestic premises: Single family units (houses, flats, maisonettes, bungalows)

No 6 Portable and stationery appliance testing in private rented accommodation

No 7 Test instruments for electrical installations: Accuracy and consistency

No 8 Selection and use of plug-in socket-outlet test devices.

No 9 Safe installation of retrofit LED lamps

All of the above are freely available from the ESF website on the installation forum

www.electricalsafetyfirst.org.uk

1.3.3 NICEIC and ELECSA

NICEIC and ELECSA have produced a wide range of publication relating to electrical installation work. Included in these publications are the popular Short Guide series which deal with specific topics, a number of Learning Guides designed to assist electricians further develop their technical skills, and Snags and Solutions which provide guidance on practical problems which may occur on site and also guides to Initial and Periodic Verification.

Details of NICEIC and ELECSA publications can be found in the electrical section of NICEIC Publications at the NICEIC shop. **www.shop.niceic.com**

The Wiring Regulations Advisory Group (WRAG)

WRAG is a discussion forum comprising of technical representatives from a wide range of industry bodies, hosted by the Electrical Safety First. It produces guidance for electrically competent persons on a range of technical issues that have been raised in enquiries to the bodies contributing to the forum.

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Topics relating to new work, additions and alterations, certification and reporting, and periodic inspection and testing have been discussed with the resulting guidance made freely available from the Electrical Safety First website **www.electricalsafetyfirst.org.uk**

Other Guidance

Electrical Safety First, with the co-operation and assistance of relevant industry partners, has produced guidance on matters such as downlighters and fire safety, electrical safety for landlords and electrical safety for those involved in the construction industry. This guidance is also downloadable, free-of-charge, from the Electrical Safety First website.

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