Scottish Health Technical Memorandum 2020

Volume 1

Operational management

Electrical safety code for LV systems (Escode – LV)

Note: Health Technical Memorandum 2020 (Escode – LV) Volume 2: *Electrical safety rules for low voltage systems* is obtained from HMSO

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NHSScotland, P&EFEx, June 2001

Executive summary

Scottish Health Technical Memorandum (SHTM) 2020 defines the operational guidance on electrical safety requirements for low voltage systems in healthcare and social services premises.

Guidance is intended to assist in meeting the requirements of the Electricity at Work Regulations 1989 which detail the precautions to be taken against risk of death or personal injury from electricity in work activities.

SHTM 2020 will also be of interest and practical help to those involved in the design, purchase and construction of electrical systems and equipment.

This edition of SHTM 2020, including its suite of supplementary publications, has been revised to take account of changes in codes of practice and other documents and user requests for additional guidance. The guidance has been reorganised as follows:

Volume 1: Operational management

The purpose of Volume 1 is twofold:

a. To outline the overall responsibility of managers of healthcare and personal social services premises in setting up and operating reliable low voltage electrical safety procedures.
b. To provide detailed guidance on the actions needed to meet the requirements of the Electricity at Work Regulations 1989.

The volume includes appointment procedures; letters of appointment/acceptance and certificates of appointment of an ‘authorising engineer’, ‘authorised person’ and ‘competent person’.

New additions to this volume include:

a. a working procedure chart for low voltage systems;
b. a pro-forma checklist for annual on-site operational safety inspections;
c. guidance on switchgear labelling;
d. detailed guidance on the testing of portable electrical equipment and fixed wiring.

The guidance has been expanded to clarify requirements, and practical methods of achieving safety objectives are included where appropriate.

Volume 1 should be read in conjunction with Volume 2.

Volume 2: Electrical safety rules – (HTM 2020)

This volume contains the electrical safety rules for low voltage systems and should be obtained from HMSO ISBN 0-11-322152-5.

New additions include:

a. completed examples of model forms;

b. standard abbreviations which may be used in preparing safety programmes.

A number of guidance notes have been added to clarify the interpretation of the rules.

NOTE: 2020 Volume 2 Forms have been included in this SHTM. Please refer to Appendix 8.

Supplementary publications

Safe-to-work permit for low voltage systems made dead (new format).

Safety programmes for low voltage systems (new format).

Certificate of authorisation for live working on low voltage systems (new format).

Limitation-of-access certificate for low voltage systems (new format).

Logbook for low voltage systems.

Contents

1. Scope

1.1 Guidance in this document (Scottish Health Technical Memorandum 2020; *Electrical safety code for low voltage systems (Escode – LV)*) applies to all health care and social services premises containing a low voltage system.

1.2 Guidance is given on the safe operation and maintenance of low voltage systems and equipment up to and including 1000 volts a.c. and 1500 volts d.c. for which "management" (see paragraph 2.9) of the premises has responsibility.

1.3 The use of electricity in health care and social services premises makes it essential that all electrical systems are managed without giving rise to **danger**. Low voltage electrical safety is an integral part of the safety procedures which must be introduced.

1.4 Inadequate control and/or improper use of electricity is a danger to life and property. Owners, occupiers, general managers/chief executives and those responsible for electrical services as "duty holders" (see paragraph 2.7) are accountable for ensuring control; they also have responsibilities for ensuring the safe management, design, installation, operation and maintenance of the electrical systems.

1.5 Guidance is intended to assist duty holders to meet the requirements of the Electricity at Work Regulations 1989 ("the Regulations"), which are made under the Health and Safety at Work etc Act 1974 (HSW Act 1974). It is not an authoritative interpretation of the Regulations or other laws. Such interpretation can only be made by the courts.

1.6 Management of health care and social services premises, as employers, have a "legal" responsibility for ensuring compliance with the relevant Regulations. Statutory Instruments referred to within this document shall be deemed to include any revisions or amendments which have occurred since the date of the original statute.

1.7 Escode – LV is complementary to and should be used in conjunction with accepted safety codes such as HEI/98 etc, related to specialist areas.

Purpose

1.8 The provision of effective procedures and their formalising into written instructions is essential for ensuring a safe system of working where this involves work on conductors or equipment of low voltage systems. This document makes recommendations for the allocation of duties to personnel and the manner in which these duties should be performed. The 'Electrical safety rule book for low voltage systems (Safety rule book (LV))', model safety documents and logbook are contained in Volume 2 of HTM 2020;

Electrical safety code for LV systems (Escode – LV), and are essential components for a low voltage safety organisation.

1.9 The major factors which affect electrical safety associated with a system or equipment are the voltage, current and frequency and not the descriptions given to the systems or equipment. Greater **danger** sometimes exists on equipment described as instruments or electronic than on conventional electrical equipment. It is with this in mind that Escode – LV has been written and should be applied to all forms of low voltage systems, equipment and areas which use electricity, without distinction between types.

Procedures

1.10 Low voltage systems associated with healthcare and social services premises, by their nature, vary considerably in size and complexity, and therefore the procedure advocated in this document cannot cover every circumstance. The guidance given is intended to assist management with the formulation of safe working procedures which should be unique to individual health care and social services premises.

1.11 Because of the specialist nature of the risks, it is important that a specially prepared procedure exists for dealing with routine servicing of low voltage installations and with any emergencies that arise.

1.12 The consequences of undertaking electrical maintenance or switching operations in terms of patient safety and well-being must be fully considered in advance following appropriate consultation with medical and administrative staff.

Standards

1.13 This document is primarily concerned with the safe operation and maintenance of low voltage equipment but it is equally important that the low voltage equipment installed:

a. complies with the appropriate British Standards and, where applicable, international and/or European Standards;

b. has been satisfactorily tested.

1.14 It is also mandatory that “Operating and maintenance” manuals (including “as installed” drawings) for the low voltage system are available to those involved in its operation and servicing. In order to maintain their value these documents must be regularly updated to include details of all modifications and extensions to plant and equipment as and when they occur.

Duties

1.15 There is a legal obligation on all who may be concerned with the operation of, or work upon, the electrical equipment and systems at the managed premises to conduct their work so as to prevent **danger** or **injury** to themselves and/or others. They should also be thoroughly conversant with all Regulations governing the work which they may have to undertake.

Security of information

1.16 The Memorandum of guidance on the Electricity at Work Regulations 1989, produced by the Health and Safety Executive (HSE) highlights a need for the efficient recording of information which, in the event of any proceedings legal or otherwise arising from any contravention of the Regulations, may be used to form the basis for the duty holders' main defence. Consequently, management should consider its policy for the retention of information and the degree to which, if any, they consider security (back-up) copies of documentation should be held.

Other guidance

1.17 Anyone who manages, designs, purchases, installs, operates or maintains LV electrical equipment and systems who needs advice must obtain appropriate guidance. This may be found from the sources listed below, from national, international and industry standards and codes of practice, or by seeking advice from a specialist.

1.18 Practical design guidance for electrical systems is contained in:

a. SHTM 2007; *Electrical services: supply and distribution*;

b. SHTM 2011; *Emergency electrical services*;

c. SHTM 2014; *Abatement of electrical interference*.

1.19 Guidance on high voltage electrical safety is given in SHTM 2021; *Electrical safety code for high voltage systems (Escode – HV).* The Health and Safety Executive (HSE) produce guidance in the form of Approved Codes of Practice for the regulations listed in Chapter 3. A memorandum of guidance is produced for the Electricity at Work Regulations 1989.

1.20 The Institution of Electrical Engineers Wiring Regulations (BS 7671) and associated guidance notes and code of practice on in-service testing are valuable references.

1.21 The HSE provide a series of guidance documents; a full listing is available from them on request.

2. Definitions

2.1 The following definitions apply throughout this document and Appendices.

Personnel

2.2 **Authorising engineer (low voltage)** – a chartered engineer with appropriate experience or an incorporated electrical engineer who possesses the necessary degree of independence from local management and is appointed in writing by management to advise on and monitor the safety arrangements for the low voltage electrical supply and distribution systems of that organisation to ensure compliance with the Electricity at Work Regulations 1989 and to assess the suitability and appointment of candidates in writing to be "authorised persons".

2.3 **Authorised person** – an individual possessing adequate technical knowledge and having received appropriate training, appointed in writing by the authorising engineer to be responsible for the practical implementation and operation of management's safety policy and procedures on defined electrical systems.

NOTE: The suffix "electrical – LV" associated with the definitions "authorised person" and "competent person" will only be used with letters of appointment to provide a clear differentiation between persons having similar titles but appointed for different duties, that is, medical gas systems, etc. The suffix has not been included against these terms when used within this document but is, however, implicit.

2.4 **Competent person** – an individual appointed in writing who in the opinion of an authorised person has sufficient technical knowledge and experience necessary to organise, supervise and control named persons and to prevent danger, while carrying out work on defined electrical systems.

2.5 **Skilled person** – an individual who a) has received the necessary training, b) has the necessary knowledge and experience, and c) has been given permission in writing to carry out defined duties. These duties may be defined in a certificate of appointment or a limitation-of-access certificate.

2.6 **Designated person** – an individual who has overall authority and responsibility for the low voltage electricity system within the premises and who has a duty under the HSW Act 1974 to prepare and issue a general policy statement on health and safety at work, including the organisation and arrangements for carrying out that policy. This person should not be the authorising engineer.

2.7 **Duty holder** – a person on whom the Electricity at Work Regulations l989 impose a duty in connection with safety.

2.8 **Employer** – any person or body who:

a. employs one or more individuals under a contract of employment or apprenticeship;

b. provides training under the schemes to which the Health and Safety (Training for Employment) Regulations 1990 (Statutory Instrument No 1380) apply.

2.9 **Management** – the owner, occupier, employer, general manager, chief executive or other person who is accountable for the premises and who is responsible for issuing or implementing a general policy statement under the HSW Act 1974.

General

2.10 **Charged** – when the electrical equipment has acquired a charge either because it is “live” or has retained/regained a charge even though it may be disconnected from the rest of the system.

2.11 **Circuit** – an assembly of electrical equipment supplied from the same origin and protected against overcurrent by the same protective device(s).

2.12 **Complex low voltage circuit** – a system which is normally operated at low voltage and which requires more than one point of isolation to ensure safety at the point of work.

2.13 **Conductor** – a conductor of electrical energy.

2.14 **Circuit conductor** – any conductor in a system which is intended to carry electrical current in normal conditions, but does not include a conductor provided solely to perform a protective function by connection to earth or other reference point.

2.15 **Connected equipment** – equipment connected into the low voltage system utilising electrical power to perform its dedicated function.

2.16 **Danger** – a risk of **injury**.

2.17 **Dangerous condition** – a condition that is likely to lead to a dangerous occurrence.

2.18 **Dangerous occurrence** – an incident which involves a source of electrical energy and which gives rise to danger to any person.

2.19 **Dead** – neither “live” nor “charged”.

2.20 **Department** – an abbreviation of the generic term “UK Health Departments” (Scottish Executive Health Department).

2.21 **Earthing** –

a. **earth** – the conductive mass of the earth, whose electric potential at any point is conventionally taken as zero;

b. **earthed** – connected to the general mass of earth in such a manner as will ensure at all times an immediate discharge of electrical energy without **danger**; when applied to electrical equipment and circuit conductors, all phases short-circuited and efficiently connected to earth;

c. **circuit main earth** – a safety earthing connection of an approved type applied by an authorised person and its position recorded before the issue of a safety document;

d. **additional earth** – earthing equipment of an approved type which is applied after the issue of a safety document (for example an earth applied at a point of work).

2.22 **Electrical equipment** – includes anything used, intended to be used or installed for use to generate, provide, transmit, transform, conduct, distribute, control, measure or use electrical energy.

2.23 **Equipment** – abbreviation of “electrical equipment”.

2.24 **Injury** – death or personal injury from electric shock, electric burn, electrical explosion or arcing, or from fire or explosion initiated by electrical energy.

2.25 **Installation** – abbreviation of “electrical installation”. An assembly of associated electrical equipment supplied from a common origin to fulfil a specific purpose and having certain co-ordinated characteristics.

2.26 **Isolated** – the disconnection and separation of electrical equipment and circuit conductors, by use of an isolating device(s) or alternative means, from every source of electrical energy in such a way that its disconnection and separation is secure.

2.27 **Isolating device** – a purpose-designed item of equipment which provides a secure method of disconnecting and separating electrical contacts and/or circuit conductors at a point of isolation.

2.28 **Logbook** – a pro-forma logbook in which should be recorded:

a. all switching operations;

b. precautionary measures taken prior to the issue of limitation-of-access certificate, safe-to-work permit and certificate of authorisation for live working;

c. dangerous occurrences as required to be reported by the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR). Other unusual occurrences should also be recorded in this logbook.

NOTE: (a) and (b) may be fulfilled by cross-reference to completed filed safety programmes and safety documents.

2.29 **Live** – implies connection to a source of electricity.

2.30 **Mimic diagram** – a permanently displayed single line diagram contained in a lockable enclosure. It shows the principal elements of the low voltage system, with facilities for altering the switch and circuit breaker symbols etc, to show whether each such unit is switched to on (closed), switched to off (open) or earthed. An alternative method approved by the authorising engineer to show the operational state of the LV network may be used.

2.31 **Notices** –

a. Caution notice – a notice in approved form attached to electrical equipment conveying a warning against interference with such equipment, stating, for example, “CAUTION DO NOT INTERFERE”;

b. Danger notice – a notice in approved form attached to electrical equipment or sections when live calling attention to the **danger** of approach to or interference with such equipment or sections, stating, for example, “DANGER LIVE EQUIPMENT”.

Notices shall comply with the requirements of the Health and Safety (Safety Signs and Signals) Regulations 1996 which require an approved pictorial symbol. Supplementary text may be used.

2.32 **Operational restriction** – a specific written instruction, issued either by the authorising engineer or by the Department as appropriate, modifying the normal operating procedures associated with a particular type of equipment, for example ‘Safety Action Notice’, ‘Hazard Notice’, etc.

2.33 **Safety documents** – one of the following:

a. **limitation-of-access certificate** – a safety document which is issued and cancelled by an authorised person. It defines the limits and nature of work which may be carried out in the vicinity of live electrical equipment;

b. **safe-to-work permit** – a safety document which is a form of declaration signed and issued by an authorised person, to a competent person in charge of work to be carried out on any complex low voltage systems or equipment. It defines the scope of the work to be undertaken and makes known to such person exactly what equipment is dead, isolated from all live circuit conductors and safe to work on;

c. **certificate of authorisation for live working** – a safety document which is a form of declaration signed and issued by an authorised person to the competent person in charge of the work to be carried out live. It makes known to that person exactly what equipment should be worked on, with details of the work to be undertaken live, what safety equipment is to be used and the safety precautions to be taken;

d. **permit-to-work (HV)** (for use on high voltage systems) – a safety document which is a form of declaration signed and issued by an authorised person (High Voltage), to the person in charge of work to be carried out on any high voltage electrical equipment. It makes known to such person exactly what equipment is dead, isolated from all live circuit conductors, has been discharged, is connected to earth, and is safe to work on.

NOTE: Model safety documents referred to in 2.33 (a), (b) and (c) are reproduced in Volume 2 of HTM 2020. For details of model safety document 2.33 (d), refer to Appendix 3 of SHTM 2021*; Electrical safety code for high voltage systems (Escode – HV)*, 'Operational management'.

2.34 **Safety sign** – a sign that gives a message about health or safety by a combination of geometric form, safety colour and symbol or text (that is, words, letters, numbers) or both:

a. **prohibition sign** – a safety sign indicating that certain behaviour is prohibited;

b. **warning sign** – a safety sign giving warning of a hazard.

All signs shall comply with the requirements of the Health and Safety (Safety Signs and Signals) Regulations 1996.

2.35 **Sub-station** – any premises, or part of premises or enclosure, in which electrical energy is transformed or converted to or from high voltage, or which contains high voltage switchgear.

2.36 **Supervision** –

a. **immediate supervision** – supervision by a person (having adequate technical knowledge, experience and competence) who is continuously available at the location where work or testing is in progress, and who attends the work area as is necessary for the safe performance of the work or testing;

b. **personal supervision** – supervision by a person (having adequate technical knowledge, experience and competence) who is at all times, during the course of the work or testing, in the presence of the person being supervised.

2.37 **Switching** – the operation of circuit breakers, switchgear or other methods of making (closing) or breaking (opening) circuit conductor(s) and/or the application and removal of circuit main earth conductor(s).

a. **planned switching** – is switching which has been previously planned to allow work to take place on the LV systems.

b. **fault switching** – is switching to disconnect a faulty part of the system and restore supplies to the remaining healthy parts.

c. **emergency disconnection** – is the operation of the switchgear or other methods of breaking circuit conductors to prevent injury.

2.38 **Switching devices (switchgear)** – equipment which is designed and manufactured specifically for the task of switching.

2.39 **System** – a system in which all the electrical equipment is, or may be, electrically connected to a common source of electrical energy. Includes such source and such equipment.

2.40 **Voltage categories:**

a. **high voltage (HV)** – the existence of a potential difference (rms value for ac) normally exceeding 1000 volts ac between circuit conductors or 600 volts between circuit conductors and earth;

b. **low voltage (LV)** – the existence of a potential difference (rms value for ac) not exceeding 1000 volts ac or 1500 volts dc between circuit conductors or 600 volts ac or 900 volts dc between circuit conductors and earth. (This definition for low voltage incorporates the extra low voltage range as defined under the IEE Wiring Regulations, BS 7671.)

3. Management responsibilities

Introduction

3.1 This chapter details key management actions required to meet the legal requirements of the Electricity At Work Regulations 1989. A summary of other relevant legislation is included although a full analysis of the requirements is not within the scope of this document. Managers should make themselves fully aware of their duties and responsibilities under the legislation and take appropriate action. The legislation listed is considered to be directly relevant to electrical safety, but is not intended to be an exhaustive listing.

Management responsibilities

3.2 Management (see paragraph 2.9) and its appropriate staff as “duty holders” (see paragraph 2.7) are responsible for the safety of low voltage electrical systems on their premises. The Electricity at Work Regulations 1989 impose duties on “employers” (see paragraph 2.8) to comply with these insofar as they relate to matters which are within their control. These duties are in addition to those imposed by the Health and Safety at Work etc Act 1974 (HSW Act 1974).

3.3 To satisfy these requirements management must have:

a. a clearly defined electrical safety policy and programme for the operation and servicing of their low voltage system(s) and equipment;

b. a means by which the policy and programme can be managed, implemented, monitored and reviewed.

3.4 Within each management structure a chartered engineer with the appropriate experience or an incorporated electrical engineer shall be formally appointed as an “authorising engineer” (see paragraph 2.2) with the responsibility for advising on and monitoring the application of the requirements of this document ‘Escode – LV’. The person appointed to fill this position needs to have a commitment to the role and the responsibilities which it involves. The management which is responsible for the appointment also has a duty to monitor the effectiveness of the authorising engineer in fulfilling this role. This monitoring requirement is particularly important if the authorising engineer appointed is either self-employed or employed by an organisation outside the management structure.

3.5 It may not be the most efficient utilisation of manpower to have authorising engineers associated with a specific management geographical area. It is recommended therefore that one authorising engineer is appointed for each major geographical area if appropriate.

3.6 In addition to ensuring that all statutory requirements relating to electrical safety are observed, management shall have:

a. a clearly defined electrical safety policy;

b. a structure appropriate to the complexity of the work for implementing the policy – including an outline description of individual responsibilities;

c. procedures for ensuring the effective administration of the policy;

d. a system of monitoring to ensure that the policy is being effectively pursued within the managed premises;

e. a programme of training to ensure the awareness of all staff on the use of electricity and general electrical safety;

f. appropriate training for relevant professional and technical staff;

g. a procedure for dealing with any emergencies that may arise;

h. a procedure for reporting accidents and incidents.

Appendix 5 details a suggested pro-forma for annual on-site checks on operatives.

3.7 Management should formally nominate in writing a designated person (see paragraph 2.6) with responsibility for the LV electrical safety policy. The electrical safety policy should demonstrate the commitment of management to self-regulation and reflect the uniqueness and special needs of the managed premises for which it is written, by:

a. recognising the importance of the subject;

b. ensuring that responsibilities both legal and managerial are clearly defined and understood throughout the organisation;

c. establishing the arrangements for preventing **danger** or **injury** to persons from electrical causes in connection with work activities and ensuring that high standards of electrical safety are reflected in the management, design, installation, operations and maintenance of systems and equipment in respect of premises owned or occupied by them;

d. monitoring and reviewing at regular intervals the effectiveness of the policy and progress concerning its implementation;

e. ensuring that clear and concise written records are kept of all activities involved in the implementation of the policy.

3.8 The electrical safety policy should clearly indicate where appropriate general and technical advice can be obtained, and whether this is available from within the organisation or from an outside source.

3.9 All personnel must be made fully aware in writing of their safety responsibilities, as required by statute, and they must be given the necessary information and training to properly understand and carry them out. This also extends to organisations, or individuals to whom work has been contracted.

3.10 The operation and servicing of low voltage equipment in accordance with clearly defined rules and procedures should be entrusted only to persons who are technically competent and appropriately trained.

3.11 Management should, ideally, aim to become independent in respect of the management of the operation and servicing of their low voltage installations. This could be achieved by recruiting and training suitable staff for the purpose; alternatively, where this is not considered justified, it will be necessary to make arrangements using an independent organisation.

3.12 The extent to which control of systems and/or equipment are delegated to an independent organisation must take into account the complexity of the installation and the inherent risks involved to patients and/or sensitive equipment.

3.13 In situations where the electrical system/equipment is considered complex, or specialist knowledge is required, it is recommended that a level of control commensurate with the risk should be maintained by management personnel.

3.14 It must be emphasised that Regulation 3 of the Electricity at Work Regulations 1989 places duties on all those involved with electrical work insofar as they relate to matters under their control. The employment of contractors to carry out electrical work does not allow management to escape all responsibility.

3.15 Management should establish and maintain a system of equipment registration and control. The system should ensure that all equipment used at establishments which come within their control is not only suitable for its purpose, but is also maintained in an electrically safe and reliable condition. Management should ensure that users have adequate knowledge and ability to enable the equipment to be used safely and with confidence.

3.16 The system of equipment management should apply to:

a. all connected equipment which is provided, by whatever means, for use within the managed premises;

b. other premises for which management has a responsibility;

c. items of connected equipment supplied to patients and employees for use within their own homes or at alternative locations.

3.17 A formal acceptance procedure is essential in order to ensure that the entry of all electrical equipment into service is properly administered. Management should also allocate responsibility for ensuring that the appropriate

acceptance procedures are initiated, coordinated and carried through. This is particularly important in the case of medical electrical and electronic equipment.

3.18 While this Electrical safety code for low voltage systems (Escode-LV) is directed primarily at equipment and connected equipment obtained for use within the management geographical area, it is recognised that to assist with rehabilitation, patients may bring personal items into premises for which management is responsible, some of which require an electrical service. Equipment owned by staff may also be used on premises for which management is responsible, for example nurses' homes, etc. Faulty equipment could be responsible for causing **danger** to arise elsewhere in the electrical system. It is strongly recommended, therefore, that a visual inspection (and where appropriate, testing) of the equipment is undertaken by an individual employed by management. This person should have the necessary experience, technical knowledge and (where considered essential) relevant qualifications to determine the equipment's acceptability for connection to the electrical system. The results of the procedures, together with any future test date, must be formally recorded; however, should the equipment fail to satisfy management's requirements, the action taken to prevent its being brought into service must be specifically identified and also recorded.

NOTE: There are difficulties associated with equipment owned by staff, such as the practicalities of keeping track of such equipment, invasion of privacy issues, etc. One way of handling the problem is to add a clause to leases or similar arrangements to the effect that management reserves the right to inspect and test any electrical equipment used on the premises and to remove or have removed any equipment which, in its opinion, is dangerous.

3.19 The reporting of injuries or dangerous occurrences resulting from electrical accidents at work is covered by the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR). Management shall comply with these requirements.

3.20 Every electrical installation should be inspected and tested to verify that the requirements of the Electricity at Work Regulations 1989 are met. Inspection and testing may take place during construction and at completion.

3.21 For new installations, formal completion and inspection certificates, test results and design calculations should be provided at handover and form part of the historical record and documentation.

3.22 The Health and Safety at Work etc Act requires management to monitor the safety performance of their employees. Managers should also conduct regular safety audits. See paragraph 5.51.

3.23 Records of planned, routine and emergency maintenance and untoward occurrences, etc, should be formally kept. Without effective monitoring and records, duty holders cannot demonstrate that they have complied with the

requirements for installation and maintenance of electrical systems and equipment.

3.24 In the event of proceedings for an offence which contravenes the Electricity at Work Regulations 1989, these records may be the duty holder's main defence in proving that he/she took all reasonable and procedural steps, and exercised due diligence to avoid committing an offence.

Summary of management action

The following management actions are considered essential to comply with the requirements of the Electricity at Work Regulations 1989:

a. Appoint a "designated person" and an "authorising engineer";

b. Prepare, issue (in whole or in part as appropriate to individual roles and duties) and implement an electrical safety policy which covers the following topics:

   (i) management responsibilities for implementation, enforcement, monitoring and revision;

   (ii) staff training to ensure that individuals have the necessary knowledge and skills to fulfil their duties (including professional/technical updating) and refresher training to maintain high levels of safety awareness;

   (iii) appointment and control of contractors;

   (iv) operational electrical safety policy and rules;

   (v) electrical maintenance policy including testing of fixed wiring/equipment and portable equipment;

   (vi) reporting of accidents (RIDDOR);

   (vii) records including: staff training, electrical equipment types and maintenance, individual safety appointments, operational activities on the electrical system and accidents/injuries;

c. Review (on a regular basis) and revise as necessary a staffing structure and contractor usage policy which ensures that electrical safety standards are maintained to meet all legal requirements;

d. Set relevant, measurable and achievable annual electrical safety targets. Monitor performance throughout each year to manage attainment of objectives.

Statutory requirements

3.25 Owners and occupiers of premises, general managers and chief executives have a legal responsibility for ensuring compliance with all statutes.

The Electricity at Work Regulations 1989

3.26 The Electricity at Work Regulations 1989 ("the Regulations") came into force on 1 April 1990. The purpose of the Regulations is to require precautions to be taken against the risk of death or personal injury from electricity in work activities. The full text of the Regulations, which includes those parts relevant to the mining industries, is set out in Statutory Instrument 1989 No 635 available from HMSO.

3.27 The Regulations are made under the Health and Safety at Work etc Act 1974 (HSW Act 1974). The HSW Act imposes duties principally on employers, the self-employed and on employees including certain classes of trainees. The Regulations impose duties on persons (referred to in the Memorandum of Guidance on the Electricity at Work Regulations 1989 as "duty holders") in respect of systems, electrical equipment and conductors and in respect of work activities on or near electrical equipment. (The above words underlined are defined in Regulation 2.) The duties are in addition to those imposed by the HSW Act 1974.

3.28 Only those who have:

a. sufficient or adequate technical knowledge;

b. the experience to make the right judgements and decisions;

c. the necessary skill and ability to carry them into effect;

should undertake work subject to these Regulations.

3.29 The Regulations state principles of electrical safety in a form which may be applied to any electrical equipment, and any work activity having a bearing on electrical safety, and they apply to all electrical systems and equipment (as defined) whenever manufactured, purchased, installed or taken into use, even if its manufacture or installation pre-dates the Regulations. Where electrical equipment pre-dates the Regulations this does not of itself mean that the continued use of the equipment would be in contravention of the Regulations. For example, much of the equipment to which the Regulations apply may have been made to a standard, such as a British Standard, which has since been modified or superseded: that, in itself, does not mean that the equipment or its associated installation does not comply with the 1989 Regulations.

3.30 General guidance on the application of the Regulations is given in the 'Memorandum of Guidance on the Electricity at Work Regulations 1989' published by the Health and Safety Executive. In particular circumstances advice can be obtained from local offices of the appropriate Health and Safety Inspectorate.

Summary – The Electricity at Work Regulations 1989

The Regulations state what must be implemented and/or achieved to ensure a safe system of work for all electrical activities.

They apply to all aspects of the electrical system, including design, construction, operation, maintenance, records, dismantling and disposal.

There are no voltage level or operator age restrictions.

In the event of criminal proceedings being instituted as a result of a breach of the Regulations, those directly and/or managerially involved must prove their innocence by showing they exercised all due diligence and took all reasonable precautions.

3.31 The guidance given in this document is intended to assist duty holders in meeting the requirements of the Regulations insofar as they relate to low voltage systems in healthcare and social services premises. The purpose of this document is to identify the nature of the precautions necessary for the achievement of high standards of electrical safety, in compliance with the duties imposed through the recommended practice of adopting safe systems of working with properly formulated and regulated written procedures.

Health and Safety at Work etc Act 1974

3.32 This is the prime piece of UK general safety legislation and gives government ministers the legal powers to enact regulations.

3.33 Key requirements are:

a. duties of employer to:
   (i) issue each employee with a safety policy statement;
   (ii) provide a safe system of work;
   (iii) give adequate training and supervision;
   (iv) provide for the health, safety and welfare of all (employees, contractors and public) those affected by their business;

b. duties of employees to:
   (i) use equipment provided correctly;
   (ii) work in accordance with company policy;
   (iii) be responsible for their own acts and omissions;

(iv) co-operate with their employer.

Electricity Supply Regulations 1988 (revised 1994)

3.34 These regulations impose requirements regarding the installation and use of electric lines and apparatus of suppliers of electricity including provisions for connections with earth. These regulations are administered by the Engineering Inspectorate of the Electricity Division of the Department of Energy (now part of the Department of Trade and Industry) and may impose requirements which are in addition to those of the Electricity at Work Regulations 1989.

Management of Health and Safety at Work Regulations 1999

3.35 Further enforced the need to carry out risk assessments for all activities and record significant results. Inform employees of any risks to their health and implement health surveillance when necessary.

Manual Handling Operations Regulations 1992

3.36 Requirement to design-out and/or minimise manual handling operations at work.

Provision and Use of Work Equipment Regulations 1998

3.37 Employers are required to ensure operators of work equipment are adequately trained and competent. Equipment must be adequate for task, guarded and safe to use.

Personal Protective Equipment at Work Regulations 1992

3.38 Employers are required to assess the need for personal protective equipment; provide equipment when necessary and train staff in its use. Employees are required to use and take reasonable care of equipment provided.

Health and Safety (Display Screen Equipment) Regulations 1992

3.39 Requirement to assess each workstation and make modifications to meet the regulations requirements. Employees' rights to eye tests and vision aids are also contained within the regulations.

Workplace (Health, Safety and Welfare) Regulations 1992

3.40 Specifies minimum standards for the workplace in terms of: temperature, cleanliness, lighting, space, sanitary facilities etc.

Construction (Design and Management) Regulations 1994

3.41 Requires the client to appoint a planning supervisor, designer and principal contractor to produce a health and safety plan for each construction project.

4. Roles and duties of personnel

Role of the authorising engineer

4.1 Within the geographical area for which the "authorising engineer" (see paragraph 2.2) has been appointed, he/she will be responsible for advising on and monitoring the application of this guidance. The authorising engineer's roles include those described below:

a. appoint in writing sufficient "authorised persons" (see paragraph 2.3) to provide the necessary cover for all systems and installations for which management has responsibility;

b. define the exact extent of the systems and installations for which each authorised person is responsible;

c. if necessary, suspend or cancel the appointment of an authorised person and withdraw the certificate (see paragraph 4.16);

d. maintain a register of all authorised persons;

e. ensure that candidates for appointment as authorised persons:

   (i) meet the qualification requirements (see Appendix 4 and Appendix 7);

   (ii) meet the training and familiarisation requirements (see Appendix 4 and Appendix 7);

   (iii) can demonstrate adequate knowledge of each system and installation for which authorisation is sought;

   (iv) have satisfied the authorising engineer as to their competence and ability.

4.2 The authorising engineer also issues to each authorised person, on appointment, a certificate valid for a period not exceeding three years and in the form given in Appendix 4. Additional guidance is given in Appendix 7.

4.3 They must also report to the management any deficiency in the number of suitably trained and experienced authorised persons that significantly impairs management's ability to provide a safe and effective service.

4.4 Additionally they must review each authorised person's performance and monitor the application of this guidance at intervals of not more than three years.

Duties of an authorising engineer

4.5 On receipt of an "operational restriction" related to low voltage systems and/or equipment, ensure that all authorised persons are made aware of it and receive copies.

4.6 Notify the Department of any known operational restriction issued by a public electricity supply company, equipment manufacturer etc, or which arises locally.

4.7 Initiate and co-ordinate the investigations of reported injuries and dangerous occurrences involving electrical systems and installations within the authorising engineer's sphere of responsibility.

4.8 Sanction any interpretation of this guidance, any local house rules, and any deviation, that may be necessary for their application.

4.9 Ensure that any amendments to this guidance are brought formally to the attention of, and are understood by, all appropriate personnel.

Appointment of an authorising engineer

4.10 A model form of letter for appointing an authorising engineer is given in Appendix 4.

Role of authorised persons

4.11 The authorised person will be responsible for practical implementation of the requirements contained within the management electrical safety policy for the systems and installations for which management has a responsibility and for which the authorised person has been specifically appointed.

4.12 The authorised person's instructions and decisions on electrical matters within their jurisdiction are final. In the case of any objections on safety grounds to an authorised person's instructions, the authorised person should stop any work or test to which the objection is related and refer the matter to the authorising engineer for adjudication.

4.13 With large or complex installations, more than one authorised person may be appointed for a system or installation. Where this situation occurs, procedures for the control of instructions given in relation to tasks, by whatever means, shall be carefully controlled and regulated to prevent danger. Any transfer of responsibility between authorised persons must be recorded. To aid management efficiency it may be appropriate to nominate one authorised person as being in overall charge and with responsibility for control of records, etc.

Duties of authorised persons

4.14 Because of the widely variable and complex nature of the various installations involved, it is impractical to specify within a document of this type the individual duties of an authorised person in relation to low voltage systems. The extent of these duties should therefore be agreed with the authorising engineer and defined in writing, giving consideration to the following:

a. the preparation of inspection, maintenance and (where appropriate) safety programmes;

b. ensuring that all records concerning the low voltage system for which the authorised person is appointed are regularly updated;

c. ensuring that test equipment is maintained in good condition;

d. co-operating with the authorising engineer in matters of policy concerning the low voltage installation, to ensure compliance with the Electricity at Work Regulations 1989;

e. reporting any dangerous and/or unusual occurrences to the authorising engineer;

f. appointment of competent persons;

g. establishing procedures for low voltage switching operations where the installation is complex or inherent risks exist with patients and/or sensitive equipment, etc;

h. the issue and cancellation of safety documents;

i. the need for an adequate knowledge of, and (within the preceding three years) training in, first aid treatment for electric shock;

j. ensuring that any alterations to systems are designed such that they do not compromise the construction or protection of the system.

Appointment of authorised persons

4.15 The authorised person shall be formally appointed by the authorising engineer for defined systems and installations. Appointment will be by the issue and acceptance of a certificate signed personally by both. Details of the recommended procedure, model format of pro-forma and certificates are given in Appendix 4 together with additional guidance in Appendix 7.

Suspension or cancellation of appointment of an authorised person

4.16 The appointment of an authorised person may be suspended or cancelled for reasons of safety by the authorising engineer, who should take the following action:

a. retrieve from the authorised person their certificate of appointment, and all related items issued under the appointment procedure;

b. in the case of cancellation, destroy the original certificate and overwrite all other copies of the certificate with the word 'CANCELLED'. This must be followed by the date of cancellation and the signature of the authorising engineer responsible for the action;

c. inform in writing the authorised person, giving the reasons for the suspension or cancellation, details of any further training or experience or any further action considered necessary before re-appointment, and the expected duration of the suspension (if appropriate);

d. notify in writing the suspension or termination of the appointment to all other authorised persons appointed for all systems and installations with which the authorised person was associated;

e. arrange a meeting with the authorised person to discuss the suspension and, where necessary, the cancellation;

f. take the necessary action to ensure alternative cover is provided.

Role and duties of competent persons

4.17 A competent person will be responsible for undertaking duties on low voltage systems. The limitations of these duties will be clearly defined in accordance with an authorised person's instructions. While carrying out these duties, the competent person must ensure that all safety measures are taken to prevent **danger**, avoid **injury** and prevent damage to equipment. A competent person will normally be able to receive all forms of safety document; this should be specified on the certificate of appointment.

Qualifications for appointment of competent persons

4.18 To be eligible for appointment, competent persons shall:

a. be competent to undertake work on the types of systems and equipment for which the appointment is sought;

b. be familiar with the types of systems and equipment on which work is required to be undertaken;

c. possess technical knowledge and sufficient experience to avoid any **danger** that may be presented by the work to be undertaken;

d. have an adequate knowledge of:

   (i) the relevant parts of this 'Electrical safety code for low voltage systems";

   (ii) any local house rules which are applicable to the systems and equipment on which work or tests are required to be undertaken;

e. have an adequate knowledge of, and within the preceding three years have received training in, first aid treatment for electric shock.

Appointment of competent persons

4.19 A competent person should be formally appointed in writing by an authorised person for duties which are to be clearly defined on the "Certificate of appointment". Appointment will be by the issue and acceptance of the certificate signed by an authorised person.

4.20 Details of the recommended procedure, model format of pro-forma and certificates are given in Appendix 4 together with additional guidance in Appendix 7.

4.21 A copy of the certificate is to be held by the authorised person and be available for inspection by the authorising engineer.

4.22 The authorised person shall maintain a register of all competent person appointments. Each competent person's appointment is to be reviewed by the authorised person at intervals not exceeding three years, and as soon as practicable after the appointment of each new authorised person.

4.23 A copy of the appointment record and review details should be held by the authorised person.

Suspension or cancellation of appointment of a competent person

4.24 The appointment of a competent person may be suspended or cancelled by an authorised person or the authorising engineer, who should take the following action:

a. retrieve from the competent person the certificate of appointment, and all related items issued under the appointment procedure;

b. destroy the original certificate and overwrite all other copies of the certificate with the word "CANCELLED". This must be followed by the date of cancellation and the signature of the authorised person or authorising engineer responsible for the action;

c. note the cancellation on the competent person's appointment record;

d. notify in writing the suspension or termination of the appointment to all other authorised persons appointed for all systems and installations with which the competent person was associated;

e. inform in writing the competent person, giving the reason for the suspension or cancellation, details of any further training or experience or any further action considered necessary before re-appointment, and the expected duration of the suspension;

f. arrange a meeting with the competent person where appropriate to discuss the suspension and, where necessary, the cancellation.

Contractors' competent persons

4.25 Where a contractor has been appointed to provide competent persons for a system it will be the authorised person's responsibility to ensure that each competent person is of a standard equivalent to that required by this guidance.

4.26 If the authorised person is of the opinion that a contractor's competent person is working in an unsafe manner, the authorised person has the authority to stop the work.

4.27 Where a contractor is providing the services of a competent person, the contractor should also be advised of any suspension or cancellation proceedings and be invited to attend any meetings.

Skilled person

4.28 An individual who a) has received the necessary training, b) has the necessary knowledge and experience, and c) has been given permission in writing to carry out defined duties. These duties may be defined in a certificate of appointment or a limitation-of-access certificate. A skilled person can receive limitation-of-access certificates, but not safe-to-work permits or certificates of authorisation for live working.

4.29 The authorised person will determine the level of supervision (immediate or personal) to be provided in relation to the nature of the work involved. The supervision may be provided by a competent person.

Other persons at work

4.30 Other persons at work shall be made aware of the limitations of their work activity and their responsibilities with regard to electrical safety.

Contractors' staff

4.31 Contractors' staff may act as competent persons (see paragraphs 4.25 to 4.27 above) and/or skilled persons providing the authorised person in overall charge of job safety is satisfied that they meet the standards detailed in this safety code.

5. Safe working practices

Safety procedures

5.1 It is a requirement of the Electricity at Work Regulations 1989 that properly formulated and regulated safety procedures are instituted as a prerequisite to a safe system of working.

5.2 Management should initiate a review and update on a regular basis their existing procedures with regard to safe working practices, and the competence of staff for their assigned duties, which may reveal some deficiencies that require to be addressed.

5.3 It is essential that all work on low voltage systems, including electrical equipment, is correctly controlled. Where appropriate, safety procedures must be formalised in written instructions and/or safety rules. This process requires those persons issuing and receiving instructions to address both the manner in which the work is to be done and the precautions adopted for preventing **danger** and/or **injury**. It also provides documentary evidence of the procedures adopted, which may be vital in any subsequent inquiry following a dangerous occurrence.

5.4 The extent to which formalised written instructions need to be given must reflect the competence of the particular employee(s) and the complexity of the task involved.

5.5 Where appropriate, management's 'Electrical safety rules for low voltage systems' should be utilised, referring to the safe working practices contained therein.

5.6 Persons concerned with work on management's electrical systems and equipment must be capable of carrying out safely the duties assigned to them. This means that with respect to these duties they must have:

a. adequate knowledge of the technicalities of electricity;

b. sufficient experience of work in connection with electricity;

c. detailed knowledge of the equipment upon which work is being carried out;

d. an understanding of the hazards which may arise during the work and the precautions which need to be taken;

e. the ability to recognise at all times whether it is safe for work to continue.

5.7 Each of these requirements is equally important and must be carefully weighed by all staff responsible for appointing persons for duties under this document. Formal or on-the-job training prior to appointment may be required, but it is not necessarily a prerequisite for persons with appropriate experience.

Safety programme

5.8 The authorised person who will be responsible for issuing safety documents for all programmed work or tests on low voltage circuits shall prepare in duplicate a safety programme detailing the activities which are to be carried out.

5.9 When the safety programme has been completed it should be countersigned by another authorised person who has a detailed working knowledge of the particular system involved. In the case of a very simple system or other situations where countersigning may not be considered essential, it could be the subject of local house rules.

5.10 Further guidance on safety programmes is contained in Volume 2 of HTM 2020.

Safety documents

5.11 The function of the safety documents is to ensure that work authorised on complex low voltage circuits or equipment is strictly controlled.

5.12 The paper to be used for permits/certificates in these documents should be of adequate weight and quality to withstand handling on site and a minimum standard of 80 gsm (grammes per square metre) is recommended.

5.13 Only one pad of each type of safety document should be in use for each low voltage system.

5.14 When not in use, the pads are to be kept under lock in a lockable cabinet.

5.15 The issue and cancellation of every safety document shall be recorded in the logbook.

5.16 Completely filled safety document pads are to be retained in a lockable cabinet for a minimum period of three years after the date of the cancellation of the last safety document issued.

5.17 Further guidance on safety documents and completed examples are contained in Volume 2 of HTM 2020.

Electrical safety rule book for low voltage systems

5.18 All authorised or competent persons concerned with operating, maintenance or work on the low voltage systems of the managed premises shall be provided with a personal copy of management's 'Electrical safety rules for low voltage systems' (the Safety rule book (LV)) and be required to sign for its receipt. These rules are contained in Volume 2 of HTM 2020.

5.19 The Safety rule book (LV) should be of a loose leaf format of a size that can be carried around easily and have a durable cover to allow for robust handling. It should be complete with a ring mechanism to facilitate the inclusion of local house rules and amendments records. Each section may be segregated using durable index dividers.

5.20 Each Safety rule book (LV) should be customised to identify the management responsible for its issue.

Safety equipment

5.21 Safety equipment listed in Appendix 3 to facilitate the safe operation and servicing of low voltage systems and equipment should be readily available.

Operational restrictions

5.22 An operational restriction is a specific written instruction issued by the authorising engineer or the Department in the form of a Hazard Notice, Safety Action Notice or similar official instruction modifying the normal operating procedures associated with a particular type of equipment.

5.23 Any known operational restriction imposed or advised by an electricity supply or distribution company or equipment manufacturer must be notified without delay to the authorising engineer and to the Department.

5.24 On receipt of an operational restriction, the authorised person should:

a. acknowledge receipt to the authorising engineer, indicating whether or not the equipment is included in the local system(s) or installations;

b. record the receipt in the logbook and the action taken;

c. place a copy signed by each authorised person in the 'Operational procedure manual'.

5.25 Where the equipment covered forms part of the local systems and installations, the authorised person should take copies of the inspection reports and details of any remedial work undertaken.

5.26 Where the operational restriction arises locally from within the management organisation, it should, when relevant, be forwarded to the Department for circulation nationally.

Termination of an operational restriction

5.27 The termination of an operational restriction is to be noted in the 'Operational procedure manual', and:

a. the copy of the operational restriction held in the 'Operational procedure manual' shall be overwritten with the word "CANCELLED" followed by the date of cancellation, countersigned by each of the authorised persons and retained in the manual;

b. any copy held with equipment or maintenance and operating instructions is to be overwritten with the word "CANCELLED" followed by the date of cancellation, and retained with the instructions;

c. any standing instructions which incorporate the conditions of the operational restriction should be withdrawn and replaced by new standing instructions if considered necessary.

Coolant and arc extinguishing media

5.28 The availability of economic and non-flammable substitutes for hydrocarbon insulating oil, as coolant and arc extinguishing media, has led to the production of equipment containing these alternative agents and their installation within healthcare and social services premises.

5.29 A number of these substitutes under certain conditions can be injurious to the health of employees. The Health and Safety legislation requires employers to ensure, so far as is reasonably practicable, the health, safety and welfare of their employees. It is essential when using alternative cooling or arc extinguishing media to ensure that the potential effects under all conditions have been fully investigated, and safe working procedures produced to indicate the required action under both normal and emergency situations, taking into account the environmental conditions.

5.30 Members of the rescue services who may attend site must be made aware of any risks and advised accordingly.

5.31 Information on a selection of alternative cooling and extinguishing agents and their potential effects is given in Scottish Health Technical Memorandum (SHTM) 2007; *Electrical services: supply and distribution*.

5.32 The information contained in SHTM 2007 must not be taken as an exhaustive list, as inevitably developments in this area will produce alternatives.

5.33 The requirements of the Control of Substances Hazardous to Health (COSHH) Regulations 1999 must be considered when employing alternative cooling or arc extinguishing agents etc, within electrical equipment. In addition, appropriate procedures and actions necessary to protect the health and safety of individuals must be taken. (It should be noted that, under the COSHH Regulations, while the extinguishing agent may not be a listed

substance in the formal sense it may still be a “hazardous substance” in the sense of creating a hazard which is comparable to that caused by a listed substance. The approved Code of Practice on the COSHH Regulations should be referred to for guidance.)

Reporting of injuries or dangerous occurrences

5.34 The reporting of injuries or dangerous occurrences resulting from electrical accidents at work comes within the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR), and management must comply with the legislation’s requirements.

5.35 Formal procedures exist within the NHS for the reporting of accidents with and defects in medical products, buildings and plant and other medical and non-medical equipment and supplies. These should be followed where appropriate.

5.36 An investigation shall be carried out into each incident to establish the facts and consider what measures if any are necessary to improve the safety arrangements, and a full report of the incident prepared for submission to management.

5.37 The investigation will be initiated and coordinated by the authorising engineer where it involves electrical systems and installations within his sphere of responsibility.

5.38 To alleviate potential problems or criticism which may arise at any inquiry into a dangerous occurrence or incident, management should consider:

a. the questionable conflict of interests and impartiality of any investigation or subsequent report where it is carried out by those directly involved;
b. the liability of evidence involving self-judgement.

Security and admittance to sub-stations

5.39 The security of, and admittance to, sub-stations is outside the scope and application of this document and reference should be made to *Electrical safety code for high voltage systems (Escode – HV)* for the safety procedures to be adopted.

5.40 The exception to paragraph 5.39 above is when the sub-station contains a combination of both low and high voltage electrical equipment which, while within the same space, is segregated by a dedicated, locked, physical barrier, access through which into the high voltage section is controlled in accordance with safety procedures contained within Escode – HV. Where these conditions apply, the procedures governing security and access to low voltage switchgear rooms, enclosures, etc, may be used subject to the supplementary conditions of paragraph 5.41 below.

5.41 Where the space referred to in paragraph 5.40 above is provided with automatic fire extinguishing equipment, an authorised person or competent person with the appropriate authority as defined on their certificate of appointment must render the system inoperative before entry is allowed.

Security and access to low voltage switchgear rooms, enclosures, etc

5.42 All access doors of each room or enclosure containing electrical equipment shall be kept securely locked when unattended where this is necessary to prevent unauthorised operation and to avoid **danger**.

5.43 Each authorised and competent person will be issued with a key and, where considered appropriate under local house rules, skilled and other suitably trained persons with approved authorisation may also be issued with a key for access to particular areas which come within their responsibility.

NOTE: Approved authorisation implies a written instruction that is documented and logged.

5.44 Where automatic fire extinguishing equipment is provided, an authorised or competent person with the appropriate authority as defined on their certificate of appointment must render the system inoperative before entry is allowed.

Mimic diagram (low voltage)

5.45 The provision of a basic mimic diagram specifically related to the principal elements of the low voltage distribution system should be considered for locations where a complex low voltage distribution system either exists or is to be provided, and where the use of such a device and the information which it conveys is an essential requirement for ensuring compliance with management's safety procedures (see Appendix 1).

First Aid facilities

5.46 The Health and Safety (First Aid) Regulations 1981 state that "An employer shall provide, or ensure that there are provided, such equipment and facilities as are adequate and appropriate in the circumstances for enabling First Aid to be rendered to his employees if they are injured or become ill at work".

5.47 Practical guidance on the application of these regulations may be found in the following Health and Safety Executive publication: First Aid at Work. Health and Safety (First Aid) Regulations 1981, Approved Code of Practice and Guidance.

5.48 Different work activities involve different hazards and consequently have different first aid requirements. These important factors will require consideration when reviewing the adequacy of existing facilities together with their relationship to the type of work to be carried out at specific locations.

5.49 When employees are sent to work away from their "home base" it is still incumbent upon management to ensure adequate and appropriate first aid provision is available to them. The requirements will vary according to the nature of the work activity, its associated risks and the size of the group involved.

Monitoring safety performance

5.50 Health and Safety legislation requires that management monitor the safety performance of their employees. A more pro-active approach than simply monitoring accident trends is required. Managers and supervisors should regularly conduct on-site formal/informal safety inspections. A positive safety culture is essential for the safety of those at work and others (patients, visitors etc,) on management-controlled property. Such a culture can only effectively be engendered and sustained by managers and supervisors taking an active interest in all safety issues and particularly from an electrical safety viewpoint by them:

a. visiting work sites and communicating on safety issues:
   – praise for safe working;
   – discussion of concerns;
   – immediate action to correct any breeches of safety policy;
b. visiting workshops, substations and switchrooms and insisting on high standards of tidiness together with all other appropriate safety requirements. Not allowing substations or switchrooms to be used as stores;
c. being seen by the workforce as taking a positive safety attitude and giving effective safety leadership.

5.51 It is recommended that an annual on-site safety check is conducted by an appropriate manager/supervisor on all competent persons (employees) who work on the LV network. This should be in addition to continuous checks on safety standards. The safety check should cover work requiring isolation of a circuit (i.e. no safe-to-work permit required) and on a live working job which is not subject to the requirements of a certificate of authorisation for live working.

A suggested pro-forma is attached as Appendix 5.

6. Division of responsibilities between management and others

General

6.1 Whenever there is a division of responsibilities between management and others, the management's authorised person will issue instructions to others as necessary to prevent **danger**.

6.2 Where a specialist contractor has been appointed under contract by management, they shall be required under the contract to comply with:

a. management's electrical safety rules for low voltage systems;

b. the requirements of this safety code;

c. any instruction issued by management's authorised person in accordance with management's electrical safety rules for low voltage systems.

6.3 Alternative arrangements to those described in paragraph 6.2 shall be acceptable provided that the same levels of safety can be achieved.

Before the system or installation is accepted from a contractor

For new work

6.4 If the contractor has control of the system he may not be required to comply with this guidance. The contractor shall comply with any relevant statutory regulations.

6.5 Prior to management accepting control of the system, it is essential that the appropriate level of personnel becomes familiar with the system or installations for which responsibility is to be taken. The extent of familiarisation required will vary considerably and will need to reflect the size and complexity of the system involved.

6.6 In the case of complex or major capital projects it will be necessary for the authorising engineer to nominate an authorised person to liaise with the contractor in order to become familiar with the system or installation for which responsibility is to be taken.

6.7 Where the contractor is responsible for part of a system or installation, the exact extent of the contractor's responsibility should be defined as part of the contract.

7. Signs and notices

Safety signs

7.1 It is a legal requirement that all safety signs must comply with the Health and Safety (Safety Signs and Signals) Regulations 1996. Any existing safety signs which do not satisfy this requirement must be replaced.

7.2 All permanently fixed signs installed with the intention of displaying a health or safety message shall be safety signs (see paragraph 2.34) having a geometric shape, colour and pictorial symbol conforming to the requirements of the Health and Safety (Signs and Signals) Regulations 1996.

7.3 If supplementary text is considered necessary it shall be in accordance with BS 5378 'Safety signs and colours'.

7.4 A warning sign should be fixed in a prominent position outside every low voltage switchroom, accommodation where low voltage is generated, and, where considered appropriate, on switchgear, distribution equipment, control equipment, etc.

7.5 Where a gas flooding system is installed in accommodation, a safety sign with appropriate text shall be installed in a prominent position.

Temporary notices

7.6 Work on systems or equipment which is to be the subject of a safe-to-work permit must have **danger** and **caution** notices displayed at necessary positions before starting work or testing, and prior to the issue of the permit.

7.7 The need for danger and caution notices in other circumstances should be related to the task involved. They should be provided when considered relevant to augment the other precautionary measures taken to prevent **danger** or **injury**.

7.8 Where management decides to use temporary safety signs instead of notices, these safety signs shall comply with the requirements of the Health and Safety (Safety Signs and Signals) Regulations 1996. Where this occurs the references within the code to **danger** and **caution** notices shall consequently be redesignated "Warning" and "Prohibition" signs respectively.

7.9 Where joint access occurs, the appropriate organisations should agree the display method to be adopted. A mixture of safety signs and notices must not be used in these locations in any circumstances.

7.10 Where joint access occurs, it is recommended that management's logo is included on their temporary safety signs and notices to provide a clear differentiation.

7.11 Loops used for affixing "temporary notices" to equipment should be purpose-designed and of a non-conducting material.

8. Operating records

General

8.1 The Memorandum of guidance on the Electricity at Work Regulations 1989 recommends that accurate maintenance and operating records be maintained.

8.2 These records may, in the event of proceedings for an offence consisting of a contravention of the absolute requirements contained in the Regulations, be a duty holder's (see paragraph 2.7) main defence. It is a defence to the absolute requirements of the Regulations for any person to prove that they took all reasonable steps and exercised all due diligence to avoid the commission of the offence.

8.3 Other records which are considered essential, some of which will only be a requirement when a permit/certificate system is operated, are a logbook, safety documents, 'Low voltage system operational procedure manual' (the 'Operational procedure manual') and 'Operating and maintenance' manuals.

8.4 The logbook should be kept in the mimic diagram cabinet where the latter is provided, or a lockable cabinet at an agreed location if this is not available.

8.5 Entries in the logbook are to be made in chronological order, and are to show:

a. operation or a sequence of operations of low voltage switchgear which is the subject of a permit/certificate. This may be satisfied by reference to a completed and retained safety programme;

b. adjustment of the mimic diagram, where applicable, to indicate the present state of the system or installation;

c. the transfer and acceptance of responsibility between authorised persons;

d. the issue and cancellation of a safety document (unless detailed on a completed and retained Safety Programme);

e. the withdrawal of a safety document, with the reason and the action taken;

f. the receipt and termination of an operational restriction;

g. any inspection and remedial action associated with an operational restriction;

h. the annual inspection of safety equipment;

i. the annual inspection of first aid equipment where applicable;

j. the loss of a safety document.

8.6 Completely filled record books are to be retained in the mimic diagram cabinet or other lockable cabinet for a minimum period of three years after the date of the last entry.

Operational procedure manual

8.7 For each of management's low voltage systems for which an authorised person is appointed, a ring binder file titled 'Operational procedure manual' should be kept in the mimic diagram cabinet or other lockable cabinet.

8.8 The manual is to contain, where relevant, a copy of each of the following (this list is not exhaustive):

a. certificate of appointment of a competent person;
b. operational restriction;
c. inspection report, and details of any remedial work undertaken in connection with operational restrictions;
d. cancelled operational restriction;
e. demarcation agreement with clients;
f. demarcation agreement with contractors;
g. operational agreement with the regional electricity company;
h. completed safety programme.

8.9 Each copy added to the manual must be sequentially numbered.

8.10 Copies of information contained within the manual should be retained for a minimum period of three years after the date of their cancellation or termination.

8.11 The manual is also to contain a copy of the current edition of the 'Electrical safety code for low voltage systems (Escode – LV)'.

Operating and maintenance manuals

8.12 The need for accurate operating and maintenance manuals including "as installed" drawings is an intrinsic requirement of the Electricity at Work Regulations 1989, which states that "the employee must be fully informed on equipment for which he is responsible".

NOTE: See Construction (Design and Management) Regulations 1994.

8.13 The Construction (Design and Management) Regulations 1994 also specify the provision of full operating and maintenance information together with a record of all commissioning test reports. This information must be provided by the installer (principal contractor) and maintained and updated by management following handover.

8.14 The importance of these documents, and the need for them to be regularly updated to take account of any developments, changes or modifications which may occur, cannot be over-emphasised. They not only provide a vital reference source for those who initially operate and maintain the system but are also essential to their successors to enable them to acquire a rapid and clear understanding of the system and the operational and maintenance needs involved.

9. Servicing and maintenance

General

9.1 All low voltage equipment and installations should be regularly inspected, serviced and tested to ensure that they are maintained in a safe and serviceable condition. To achieve this, a comprehensive system of equipment management is considered an essential feature of any maintenance programme.

Equipment management

9.2 The purpose of equipment management is to ensure that all equipment used within management's geographical area is maintained in a safe and reliable condition. Guidance on the objectives and principles of such a system, together with other useful related information, is contained within the "Health equipment information" publications.

Manufacturer's instructions

9.3 It is essential that personnel engaged on maintenance of any piece of equipment ensure that they have ready access to the relevant manufacturer's manual and that it is used as the major reference guide to methods of working, dismantling, re-assembly and restoring to service.

Newly commissioned equipment

9.4 All newly installed equipment should have a full and detailed inspection and a complete range of tests and operational checks as part of the commissioning procedure. From a subsequent maintenance point of view the most important factor is to keep careful records of the condition of the equipment and, in particular, to record the initial test results and the actual settings of any adjustable components. These factors will provide benchmarks against which all later test results may be judged, and allow any deterioration in performance to be recognised and remedial action to be taken as necessary.

NOTE: See also Construction (Design and Management) Regulations 1996.

Frequency of maintenance

9.5 Because of the widely varying conditions of operation of individual installations, it is not possible to lay down precise recommendations for the intervals between maintenance in all circumstances. However, the manufacturer should be requested to specify the minimum maintenance frequency under specified conditions and give guidance on how this may vary under other conditions. These intervals may vary greatly depending upon the design of the equipment, the duty that it is called on to perform and the environment in which it is situated.

9.6 For continuously operating plant it may be necessary to co-ordinate routine maintenance with the demands of operational schedules, but where there are regular periods during which the plant is shut down, maintenance schedules may be arranged to coincide with these.

9.7 The intervals between maintenance operations may be based on the number of operations performed or on fixed time intervals, the preferred basis being determined by the electrical, mechanical and environmental duties imposed. In practice, a combination of these criteria may be used in the light of service experience with individual installations. While abnormally frequent operations may necessitate an increase in maintenance frequency, the converse is not necessarily true.

9.8 It is strongly recommended that as a minimum, a record book or card or computer record be maintained for every item of equipment. This record should contain brief details of all inspections, routine servicing, repair and modifications. The equipment log will be of use in providing the following:

a. a record for user department(s) of all repairs and modifications;

b. a means of ensuring that routine inspections and servicing are carried out by the due date;

c. an indication of any unreliability that may be indicated by frequent breakdown.

9.9 Portable equipment, because of its nature, may be subject to more onerous conditions of use and abuse than some fixed equipment, and consequently the users must be advised to be constantly vigilant for any defects which may put them at risk. See paragraphs 9.14, 9.17 and 9.22.

9.10 Examples of sources of information which may be useful in assisting with the compilation of any schedules or procedures are:

a. the manufacturer's handbook;

b. BS 6626:1985;

c. Estates Information Management System;

d. HEI publications;

e. IEE code of practice for in-service inspection and testing of equipment;

f. IEE Guidance Notes on 16th Edition Wiring Regulations (BS 7671).

Records

9.11 Records are of value in establishing the frequency of maintenance, therefore careful note should be taken of relevant items each time maintenance is performed. These records should also form part of the Health and Safety file which is required by the CDM Regulations.

9.12 Records should be started when the equipment is installed and should contain at least the following information, where relevant:

a. manufacturer's details, including nameplate particulars of the equipment installed, its serial number and manufacturer's order number (if known), and the date of installation;

b. location of the manufacturer's manual and list of recommended spares;

c. date of last maintenance operation and note of the operation counter reading at that time, or an estimate of the number of operations;

d. type of maintenance carried out;

e. record of any findings where the condition of the equipment varied from the expected, action taken, and the condition of important components when the equipment was put back in service;

f. details of fuse-link type and ratings, and relay settings;

g. any special safety requirements.

9.13 Every significant fault or breakdown should be recorded and analysed with a view to taking action to prevent its recurrence.

Portable equipment

General

9.14 All portable electrical equipment shall be maintained in a safe condition in accordance with the requirements of the Electricity at Work Regulations 1989.

9.15 Portable equipment shall include:

a. extension leads;

b. portable appliances, i.e. appliances which can be easily moved while connected to their supply, such as vacuum cleaners, toasters and food mixers;

c. movable equipment, i.e. equipment which does not weigh more than 18kg and which is not fixed, such as electric fires and equipment with wheels or castors;

d. stationary equipment/appliances, i.e. appliances which weigh more than 18kg and which do not have carrying handles, such as refrigerators and washing machines;

e. hand-held appliances, such as electric drills, kettles and hair dryers;

f. IT equipment, such as computers, VDUs, and printers.

9.16 Defective plugs, socket-outlets, flexible cords/cables and other accessories are a major cause of electrical accidents. Portable electrical equipment, because it may be subject to greater use and abuse, is particularly prone to becoming defective. It cannot be too strongly emphasised that although a good level of safety can be achieved by care, selection and use, this will have little result unless the subsequent maintenance and control is of a high standard.

9.17 The primary responsibility for day-to-day safety of portable equipment when in service lies with the user(s), who should be trained in its use and made aware of the need to be constantly vigilant for defects which may put individuals at risk. Any person using portable electrical equipment should, before using it, personally check that the equipment, including the flexible cable and plug top, is free from mechanical damage and that the in-date test label is attached. The user(s) must be made aware that any obviously defective equipment must not be used and should be returned for examination and repair by the appropriate department or organisation.

Inspection and testing procedures

9.18 A regular system for the examination and testing of portable equipment shall be operated. The system shall include suitable means of recording and identifying individual items of portable equipment, provision for their recall for periodic examination and distinctive marking to show when an item is next due for examination. The system shall be established and maintained to the approval of the authorised person, based on the principles of this *Electrical safety code for low voltage systems*.

9.19 The frequency of inspection will depend on the type of equipment, its use and working environment, and is best determined by a qualified person in the light of experience together with manufacturer's recommendations. In no circumstances, however, should the frequency of inspection be allowed to exceed one year, except for IT equipment which may be tested every four years. Portable hand-held tools and main kitchen and dining room electrical equipment should be inspected and tested at least every six months or more frequently if considered necessary.

9.20 It is recommended that the portable equipment be categorised to indicate those items which are subject to frequent use and/or where the working environment is hostile to the equipment and supply lead integrity.

9.21 Any test programme for portable equipment should consist of the following:

a. a visual inspection;

b. essential tests;

c. optional tests such as pressure, operational and **earth** leakage tests;

d. a functional test.

9.22 The testing procedure should commence with a visual inspection of the interior of the mains plug top, where practicable, to ensure correct termination and fuse rating; then a visual inspection of the flexible lead and casing of the equipment to verify the mechanical integrity. Visual signs that the equipment is not in a sound condition may include:

a. damage (apart from light scuffing) to the cable sheath;

b. a damaged plug, for example the casing is cracked or the pins are bent;

c. inadequate joints, including taped joints in the cable;

d. an ineffectively secured outer cable sheath, for example the coloured insulation of the internal cable cores is showing where it enters the plug or equipment;

e. evidence that the equipment has been subjected to conditions for which it is not suitable, for example, it is wet or excessively contaminated;

f. damage to the external casing of the equipment, or loose parts or screws;

g. evidence of overheating (burn marks or discoloration).

These checks also apply to extension leads and associated plugs and sockets. The electrical testing of the equipment should commence only when the above visual checks are satisfactory.

9.23 Prior to commencing tests it should be established that any proposed test can be applied to the equipment without causing damage to components.

9.24 Of the essential tests, the insulation test should always be carried out, but the **earth** bond test is only performed on a Class 1 appliance.

9.25 The inability of equipment to satisfy the **earth** bonding test should not be taken automatically as an indication of equipment failure, and consultation with the manufacturer may be justified to establish if:

a. the non-provision of bonding is a design feature;

b. compliance with the Electricity at Work Regulations 1989 is achieved by other means, such as satisfying the requirements of national or international standards.

9.26 The optional tests should be performed at the discretion of the person responsible for testing if they think that the appliance may have become unsafe. Some optional tests should not be carried out more than is

necessary, as they may weaken the insulation of the appliance. Also, in the case of the pressure test, it should only be carried out by fully trained personnel, preferably under workshop conditions.

9.27 All test results should be recorded and judged against benchmark readings taken when the equipment was initially commissioned, or some alternative form of acceptable data.

9.28 On completion of inspections and tests, a label should be fixed to the plug top indicating when the equipment was tested and the date of the next test. The label should be signed by the person carrying out the test.

9.29 More information on this subject is given in the IEE's Code of Practice for the In-Service Inspection and Testing of Electrical Equipment.

New portable equipment

9.30 All new electrical equipment delivered to stores or direct to the user shall be forwarded to the appropriate testing department's test bay for visual inspection and cataloguing before use.

9.31 On completion of inspections and tests, a label should be fixed to the plug top, as described in paragraph 9.28. An appliance number should also be fitted to identify the equipment.

Personal property

9.32 Local managers are to inform the testing department of any electrical equipment brought in by patients or visitors, and to ensure that it is not used until it has been tested and cleared for use.

9.33 It is the responsibility of each member of staff to ensure that his/her own personal electrical items are not used at work until tested and cleared for use.

Defective portable equipment

9.34 Any equipment failing inspection and testing which cannot be repaired immediately is to be fitted with a warning label and made secure to prevent use. The appropriate testing department should be informed.

Fire extinguishing installations and equipment

9.35 Inspections and checks should be made as recommended in the relevant British Standard, or International and/or European Standards or other appropriate guidance.

9.36 Safety signs should be maintained at the entrance to any space protected by a gas flooding system (CO_2 or Halon), advising of its installation.

Circuit identification

9.37 Circuit breakers and switches on main and sub-main switchboards shall be identified by engraved labels securely fixed to the equipment. Distribution boards controlling final outlet circuits shall be accurately identified by labelling of each board and circuit. The labels used shall be securely attached to the equipment in a manner that gives a permanent indication of circuit identity – printed adhesive labels may be used. Hand written labels are not recommended but if used must be clearly legible and written using permanent marker ink. A (typed) circuit chart may be used in conjunction with numbered ways on a distribution board to identify each outgoing circuit. The labelling of cables to indicate circuit, type and size of cable should also be considered.

9.38 Final outlets (e.g. 13A sockets) should be clearly identifiable, e.g. by labelling, to allow them to be referenced to their point of isolation from normal voltage supply.

9.39 Appendix 6 illustrates a switchgear labelling method designed to allow identification of each controlling switch and circuit in a logical manner using a switch number and circuit name combination.

9.40 Schematic circuit diagrams clearly and accurately showing the complete LV distribution system for each managed site must be available for use by those required to operate on the network.

Fixed wiring

9.41 All fixed LV electrical systems on management controlled property shall be periodically inspected and tested in accordance with BS 7671, (IEE Wiring Regulations).

9.42 The frequency of inspections and testing shall not exceed five years. Those parts of the electrical system which can be considered as industrial shall be tested every three years.

9.43 Details of the requirements and records for inspection and testing are given in BS 7671 and Guidance Note No 3 to the regulations.

Appendices

These appendices contain guidance on the possible methods of ensuring safe working practices and compliance with the Electricity at Work Regulations. Although they are intended as helpful suggestions and may be adapted to local circumstances the principles will continue to apply and any modifications should ensure equivalent levels of safety.

Appendix 1: Mimic diagram (low voltage)

Mimic diagram

1. The mimic diagram shall be:

   a. provided at a secure location designated for the system;

   b. a single line diagram indicating the principal elements comprising the low voltage system;

   c. fully equipped with switch, circuit breaker, low voltage generator and large UPS systems etc, symbols complying with the requirements of BS 3939. The switching equipment symbols shall incorporate the facility to indicate whether the switch contacts are switched to on (closed) or switched to off (open);

   d. the diagram shall be an accurate representation of the system referred to in (b) with all switching devices shown in their relative positions;

   e. drawn to show all equipment and switching devices, clearly and correctly labelled;

   f. totally enclosed within a cabinet having full width transparent doors complete with integral lock. The cabinet may incorporate a lower section, either desktop console or drop-down door arrangement, secured by an integral lock, to accommodate **danger/caution** notices together with the logbook, operational procedure manual, safety documents, etc, as required.

Notices

2. The cabinet shall be equipped with “Work on low voltage system in progress” and “Authorised person on site” notices so arranged that they can only be displayed by an authorised person having a key to the key locker.

   Name labels showing the authorised person(s) switching are also recommended.

3. Where it is not practicable to keep in the mimic diagram cabinet all the documents specified in this appendix, some of these documents may be kept in a locked cabinet retained within the authorised person’s office.

Other arrangements

4. Alternative arrangements approved by the authorising engineer to show the operational state of the LV network may be used to those described above, e.g. a file of LV schematic diagrams contained in individual plastic sleeves and use of marker pens.

Appendix 2: Local house rules

1. Since low voltage systems associated with health care and personal social services premises, by their nature, vary in size and complexity, the 'Electrical safety rules for low voltage systems' ('Safety rules (LV)') advocated in this document cannot cover every circumstance and will require to be supplemented by local written procedures.

2. These procedures or 'House rules' may take the form of:

   a. standing orders defining safety procedures that are tailored for or exclusive to a particular site or sites and require incorporating with the 'Safety rules (LV)';

   b. a strategy or policy document which contains instructions applicable to both direct and contract labour working within management's geographical area of control.

3. The house rules should contain procedural guidance for circumstances where they are not applicable and a variation is necessitated. Such variations should always be in writing and ensure that safety requirements are satisfied in some other way.

4. It is recommended that compliance with the house rules is made mandatory, and it is emphasised that:

   a. all persons concerned with work to which the house rules apply must make themselves conversant with the requirements of the document;

   b. ignorance of the requirements shall not be accepted as an excuse for neglect of duty;

   c. failure to comply will involve disciplinary procedures for direct labour and, in the case of contractors or other persons, an immediate appraisal of their competency to proceed.

5. Healthcare and social services premises are unique environments in that the safety procedures outlined in this 'Electrical safety code for low voltage systems (Escode LV)' to prevent **danger** or **injury** in respect of work activities on or near electrical equipment could, if considered without their consequential effects, have serious or possibly fatal repercussions. Procedural guidance should therefore be given not only on the isolation of supplies but also on the need for prior notification of those departments which may be affected. Where any doubt exists as to the extent of the area which will be isolated, those departments which may be affected should also be warned and precautionary measures taken where appropriate.

   This is particularly (but not exclusively) important in the case of medically sensitive areas.

6. The rules should not be written in such a way that they prevent the use of any alternative safety devices to those which may be identified, always provided that the alternative leads to the same or greater standard of safety then that identified within the house rules.

7. The following list provides a selection of items which are considered suitable for inclusion within any house rules. The list must not be taken as either definitive or exhaustive, but provides a number of topics which may form the basis from which the house rules can be formulated:

   a. procedures for work on equipment made **dead**;
   b. procedures for **live** functional checking;
   c. procedures for work on or near **live** conductors;
   d. procedures for work on generating plant, uninterruptible supply systems, battery systems, etc;
   e. procedures related to the use, testing and servicing of portable equipment;
   f. hazardous situations or dangerous atmospheres;
   g. test procedures and test equipment standards;
   h. repair of electronic equipment;
   i. procedures for acceptance of electrical equipment into service;
   j. procedures for entering into any area protected by automatic fire extinguishing equipment;
   k. procedures for registering any temporary electrical installations and re-registering following a safety assessment every three months;
   l. requirements for insulated tools and their standards which are considered necessary for different categories of work;
   m. safety procedures associated with the use of metallic access equipment, when working on or in close proximity to electrical equipment;
   n. cleaning and relamping procedures associated with luminaires;
   o. procedures to be adopted in the event of accidents and emergencies;
   p. reporting procedures for untoward occurrences related to work activities.

8. The provision of a flow chart may be an alternative method of indicating a particular procedure, since it provides an easily definable checklist. An example of a flow chart indicating the safe working procedure for equipment made **dead** prior to commencement of work is given at the end of this appendix.

9. Guidance should be given, by examples, of acceptable methods of making electrical equipment and conductors **dead** and practical steps to prevent them being made **live** while work is in progress. Examples of methods of making **dead** and **isolated** are:

   a. the withdrawal of fuse links;
   b. the removal of solid links;
   c. the operation of circuit breakers (suitable types of circuit breaker only);
   d. the opening of switch fuses/fuse switches (and where visible, checking to ensure that the blades have opened);
   e. the opening of isolators (and where visible, checking to ensure that the blades have opened);
   f. physical disconnection of conductors (only to be carried out when made **dead**);
   g. the withdrawal of a plug from the socket-outlet.

10. Automatic closing switching devices, such as time switches, must not be used as a means of making circuit conductors or electrical equipment **dead** and **isolated**.

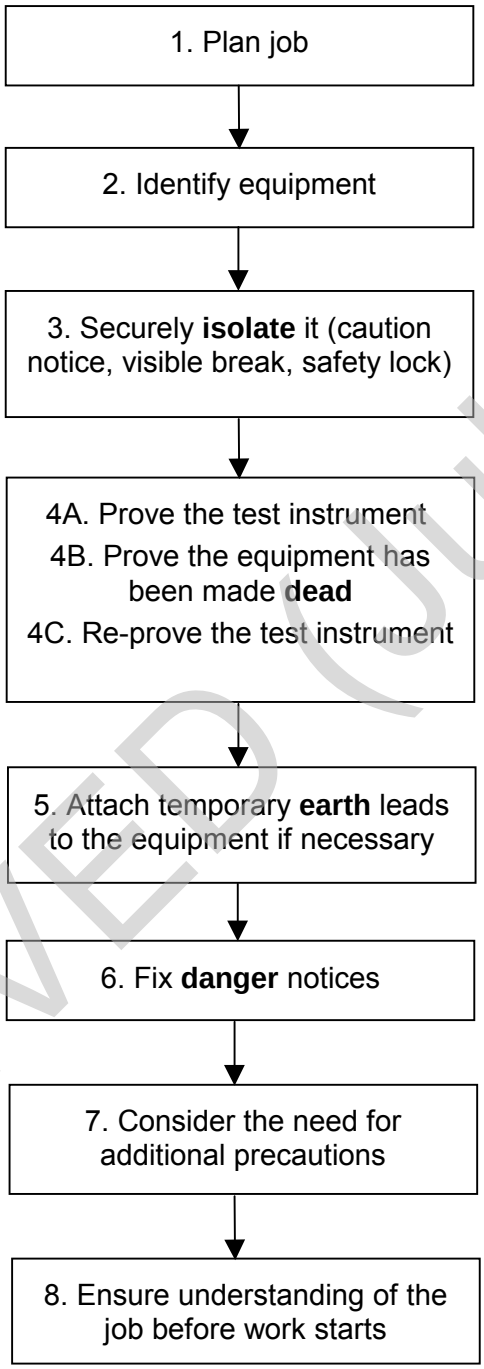
11. Practical steps to prevent electrical equipment and circuit conductors being made live while work is in progress can include:

   a. the retention of fuse links/solid links and withdrawable circuit breakers;
   b. locking circuit breakers in the OFF (open) position and the personal retention of keys;
   c. locking of distribution board and consumer unit doors and the personal retention of keys;
   d. locking of switchroom doors and the personal retention of keys, with suitable steps taken to prevent unauthorised access;
   e. padlocking of switch fuses/fuse switches and the personal retention of keys;
   f. removal and personal retention of interlocking keys where these mechanically interlock with switches or circuit breakers;
   g. the removal and retention of the plug top for the electrical equipment being worked on, where it is within sight of the person carrying out the work;
   h. specially designed interlocking facilities, for example lock-out boxes;
   i. the use of safety notices.

12. The previously identified means of preventing re-energising should be adopted while work is in progress. Where their application is impractical, alternative procedures such as the use of **caution** notices, supplemented possibly by continuous supervision of the point of **isolation**, may need to be considered to satisfy the Electricity at Work Regulations 1989.

13. Notices shall be in an acceptable format. House rules, however, should indicate where tape notices may be appropriate; these should generally be restricted to use on individual ways of consumer units and distribution boards, and locations where larger notices are impractical.

Safe working procedure for electrical equipment which is to be made *dead* prior commencement of work



Appendix 3: Safety equipment

1. The Electricity at Work Regulations 1989, Regulation 4(4) states that "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".

2. The term "any equipment" has such a wide interpretation that it would be impossible, because of the extensive variation and complexity of electrical equipment employed within health care and personal social services premises, to identify the requirements for every location. The list of equipment recommended in this Appendix, therefore, can only be an indication of what is considered a minimum basic requirement, and is not exhaustive.

3. In some instances, expensive sophisticated proprietary equipment may be required or considered justified; in others, very basic equipment costing only a few pounds will suffice, and management will need to consider the individual requirements within its own geographical area of control.

4. The quality of construction and maintenance of any equipment provided is as vital for personal safety as the training and practical skills in its use. Items of equipment should, where possible, comply with an approved standard, for example British Standards or European equivalent, Electricity Supply Industry Standards, HEI recommendations, or those of other nationally or internationally recognised authorities or bodies.

5. The following equipment should be provided and, when not in use, safely stored from unauthorised interference, maintained in a serviceable condition ready for use, and recorded in an inventory:

   a. 1 set of cable location equipment;
   b. 1 null balance earth meter;
   c. 1 insulation tester 500 volt dc;
   d. 1 insulation tester 1000 volt dc;
   e. 1 heavy current low reading ohmmeter;
   f. 1 low voltage indicator with proving unit;
   g. 1 line earth loop tester;
   h. 1 RCD tester;
   i. 1 continuity tester;
   j. 1 phase rotation meter;
   k. 1 heavy duty hand torch;

l. 2 pairs 650 V safety rubber gloves to BS 697;

m. 1 key for switchrooms;

n. 1 key for key locker, if provided;

o. 1 portable appliance tester (optional);

p. locking devices, keys and safety notices as required;

q. 1 copy of the Memorandum of Guidance on the Electricity at Work Regulations 1989;

r. 1 copy of management's 'Electrical safety rules for low voltage systems';

s. 1 copy of *Electrical safety code for low voltage systems (Escode – LV)*.

6. Where live working is to be sanctioned by the issue of a certificate of authorisation for live working, the authorised person must ensure that the appropriate protective safety equipment is available, including rubber gloves, mats, barriers, eye protection and a set of insulated tools type tested to ESI Standard 26-3 'Hand Tools for Live Low Voltage Working' current edition or BS EN 60903.

7. It is recommended that the above list of safety equipment should be retained at a suitable location and be available for use by persons authorised to work on low voltage systems.

Appendix 4: Model forms, letters and certificates

A. Model letter for appointing an authorising engineer (LV)
B. Model letter for accepting an appointment as an authorising engineer (LV)
C. Appointment of an authorised person (electrical – LV)
   - Part 1 – Nomination procedure
   - Part 2 – Personal details
   - Part 3 – Certification of satisfactory training and familiarisation
   - Part 4 – Certificate of approval
D. Model letter for appointing an authorised person (electrical – LV)
E. Model letter for accepting an appointment as an authorised person (electrical – LV)
F. Model letter of certificate of appointment for an authorised person
   - Part 1 – Appointment record
   - Part 2 – Certificate of appointment
   - Part 3 – Record of refresher training
   - Part 4 – Record of first aid training
G. Appointment of a competent person (electrical – LV)
   - Part 1 – Nomination procedure
   - Part 2 – Personal details
   - Part 3 – Approval and scope of appointment
H. Model letter for appointing a competent person (electrical – LV)
I. Model letter for accepting an appointment as a competent person (electrical – LV)
J. Certificate of appointment as a competent person (electrical – LV)

Annex A: Model letter for appointing an authorising engineer (LV)

Letters of appointment should be on management's headed paper.

Management should check that proposed appointees are suitably qualified (see paragraph 2.2).

Dear [(1)]

Appointment as authorising engineer (Low Voltage)

You are hereby appointed as the authorising engineer for

[(2)] to undertake the duties set out

[(3)] [until further notice (4)].

Please confirm your acceptance of the appointment by signing and returning to me a copy of the attached letter.

Signed _____

(on behalf of the management)

Notes

(1) Insert name of person being offered the appointment.

(2) Insert the title of the (Management).

(3) Either include a complete reference to the duties as detailed in this document "Definitions" (paragraph 2.2), or provide a separate list of the duties.

(4) A fixed period may be inserted. However, since management has a duty to monitor and review the performance of the authorising engineer, this terminology provides the facility to cancel the appointment at any time.

Annex B: Model letter for accepting an appointment as an authorising engineer (LV)

Dear [(1)]

Appointment as an authorising engineer (Low Voltage)

I acknowledge receipt of the appointment letter dated [(date)] as my authority to act as authorising engineer for [(2)] and will to the best of my ability carry out the authorising engineer's duties as set out [(3)].

Signed _____

Notes

(1) Insert name or title of person to whom the letter has to be returned.

(2) Insert title of the management.

(3) Same wording as item (3) on the model letter of appointment.

Annex C: Appointment of an authorised person (electrical – LV)

Appointment of an authorised person (electrical – LV)

Part 1: Nomination procedure

Details of proposed appointment

Type: New appointment/Renewal/Revised coverage* *Delete as appropriate

Dear _____

You have been nominated for the appointment as an authorised person in respect of the systems(s), installation(s) and location(s) indicated below.

1._____
2._____
3._____

Voltage	Types of system or installation (insert details of systems/installations for which the authorised person is to be appointed)	Location (Enter X)				
		1	2	3	4	5
LV	Ring distribution system					
	Radial distribution system					
	Single generating set installation					
	Multiple generating set installation					
	Others (give details of any other LV systems or installations)					

If you agree to be considered for appointment as an authorised person for the system(s) and installation(s) indicated at the above location(s), and are willing to accept the appointment if offered, please complete Part 2 of this form, and return it to me a soon as possible.

Yours faithfully,

Authorising engineer.

(On completion of Part 1 pass to the prospective authorised person for completion of Part 2.)

Part 2: Personal details

(To be completed by the prospective authorised person or on his/her behalf by the organisation by whom they are employed)

Name _____

Current grade and job title _____

Technical qualifications

Details of apprenticeship

Details of previous experience as an authorised person (if any)

Details of training received

Courses	Location	Dates

First aid training for
treatment of electric shock

I confirm that I would be willing to accept the appointment as an authorised person (electrical) for the system(s), installation(s), and location(s) listed in Part 1 of this form.

Signed _____ Date_____

Address _____

_____

(On completion of Part 2, return this form to the management representative as indicated in Part 1.)

Part 3: Certification of satisfactory training and familiarisation

Dear _____ (Authorising engineer)

I wish to nominate _____ for appointment as an authorised person for the system(s), installation(s) and location(s) indicated in Part 1 of this form. Authorised person training familiarisation and on-site training have been satisfactorily completed, and I know of no impediment to the discharge of authorised person duties. Would you please arrange to interview the candidate as soon as possible.

Signed _____ Date_____

Address _____

_____

_____

(On completion of Part 3, send this form to the authorising engineer.)

Part 4: Certificate of approval

The application for the appointment of _____ as an authorised person for the system(s), installation(S) and location(s) indicated in Part 1 is/is not approved*, and is to take effect from _____ for a period of _____ years.

Signed _____ Date _____

Address _____

_____

_____

* Delete as appropriate

Date for appointment to be reviewed	Satisfied/Not Satisfied	Cert. issued date

Annex D: Model letter for appointing an authorised person (electrical – LV)

Letters of appointment should be on management's headed notepaper

Dear _____

Offer of appointment as an authorised person (electrical – LV)

You are hereby offered appointment as an authorised person for the duties identified in management's 'Electrical safety code for low voltage systems (Escode – LV)' for the _____ (systems and installations) _____at_____ (locations) _____for a period of _____(not more than 3) years, commencing on _____(date).

Please confirm your acceptance of the appointment and receipt of the enclosed Certificate of Appointment by signing and returning a copy of the attached letter.

Yours sincerely

Authorising Engineer

Annex E: Model letter for accepting an appointment as an authorised person (electrical – LV)

Dear (Authorising Engineer)

Acceptance of appointment as an authorised person (electrical – LV)

I accept the appointment as an authorised person for the systems, installations and locations listed in your letter dated _____

I acknowledge receipt of the Certificate of appointment no _____ as my authority to act, while on duty, as an authorised person for the systems, installations and locations listed on that certificate.

I note that, while on duty as an authorsied person, I will be responsible for the practical implementation and operation of management's *Electrical safety code for low voltage systems (Escode – LV)* for the systems and installations for which [(1)] has control of the safety, and for which I have been appointed.

I will to the best of my ability follow the procedures set out in the above Safety code and any written local variations notified to me or agreed with the authorising engineer.

Yours sincerely

(1) Insert title of the management

Annex F: Model letter of certificate of appointment for an authorised person (electrical – LV)

The certificate issued to the authorised person should be in the form of a small card which should be available at all times if challenged to produce it for inspection. A copy of the information contained on the certificate shall be retained by the authorising engineer.

Certificate of appointment
as a [(1)] authorised person (electrical – LV)

Certificate No._____

This is to certify that

_____ is appointed a [(1)] authorised person for the purposes of the duties identified in management's 'Electrical safety code for low voltage systems'.

The appointment applies only to the locations and to the electrical systems and installations set out in Part 2 of this certificate.

The appointment is valid only until the expiry date indicated in Part 1.

Signed _____
(Authorising engineer)

Authorised person's signature

Name _____

Date_____

If found please return this Certificate to:

_____

_____

(1) *Insert the management's title if required*

Appointment record Part 1

This certificate is valid only until the last expiry date indicated below

Issue	Issue date	Validity (years)	Expiry date	Authorising engineer's signature
First issue				
First review				
Second review				
Third review				

Notes:

Certificate of appointment Part 2

Location(s)	Exact extent of the systems* and installations to which this appointment relates

* *Identify LV systems and installations*

Record of refresher training Part 3

To be completed by the authorising engineer

Each authorised person's operational experience is to be reviewed by the authorising engineer at intervals of not more than 3 years and refresher training in authorised person's duties arranged as necessary.

Course title	Date completed

Record of first aid training Part 4

To be completed by the authorising engineer or his/her representative

Each authorised person is to receive refresher training at not more than three-yearly intervals in First Aid treatment for electric shock.

First aid training	Date completed

Annex G: Appointment of a competent person (electrical – LV)

Part 1: Nomination procedure

(to be completed by the authorised person)

Details of proposed appointment
Type: New appointment/Renewal/Revised coverage* *Delete as appropriate
Dear _____ You have been nominated for the appointment as an authorised person in respect of the systems(s), installation(s) and location(s) indicated below. 1._____ 2._____ 3._____
The duties which acceptance of this post will involve are: (a) (b) (c) (d) [*Add specific rules if required*] If you agree to be considered for appointment as a competent person for the system(s) and installation(s) at the above location(s), and are willing to accept the appointment if offered, please complete Part 2 of this form, and return it to me as soon as possible. Yours faithfully, **(On completion of Part 1, pass to the prospective competent person for completion of Part 2)**

Part 2: Personal details

Name _____

Current grade and job title _____

Technical qualifications

Details of apprenticeship

Details of previous experience as an authorised person (if any)

Training received

I have attended the following relevant training courses:

Course	Date(s)

First aid training for
treatment of electric shock

I confirm that I would be willing to accept the appointment as an authorised person (electrical) for the system(s), installation(s), and location(s) listed in Part 1 of this form.

Signed _____ Date_____

Address _____

_____

(On completion of Part 2, return this form to the authorised person.)

Part 3: Approval and scope of appointment

(To be completed by the authorised person)

I hereby confirm that _____

(i) is competent to undertake work on the types of systems and equipment for which the appointment is sought;

(ii) is familiar with the types of systems and equipment on which work is to be undertaken

(iii) possesses technical knowledge or sufficient experience to avoid any **danger** that may be presented by the work undertaken;

(iv) has an adequate knowledge of those parts of management's 'Electrical safety code for low voltage systems' and any local house rules;

(v) has adequate knowledge of and within the last three years has received training in First Aid treatment for electric shock, and is suitable for appointment as a competent person to work on or test the following systems and equipment within the limitations identified (1).

(1) *Indicate where the limitations of the appointment are identified, possibly on an attached sheet*.

Systems and equipment	**Location (as Part 1)** (Enter T)			
	1	2	3	
[Insert details]				
[Insert details]				
[Insert details]				

Signed _____ Authorised person (electrical – LV)

Name _____ Date _____

Address

_____

_____

(On completion of Part 3, send one copy to the authorising engineer)

Annex H: Model letter for appointing a competent person (electrical – LV)

Letters of appointment should be on management's headed paper.

Dear _____

Offer of appointment as a competent person (electrical – LV)

You are hereby offered appointment as a competent person for the duties identified on the enclosed Certificate of appointment no _____ for a period of _____ (not more than three) years, commencing on [(date)].

Your appointment covers the following location(s) _____

_____

_____

Following receipt of your acceptance of this appointment you will be handed switchroom key(s) which you will be required to keep in your custody at all times.

On termination of this appointment you will return the key(s) to the authorised person.

Please accept the appointment and acknowledge receipt of the enclosed certificate by signing and returning a copy of the attached letter.

Yours sincerely,

Signed _____

Authorised person

Date_____

Annex I: Model letter for accepting an appointment as a competent person (electrical – LV)

Dear _____

Acceptance of appointment as a competent person (electrical – LV)

I hereby accept appointment as a [(1)] competent person for the duties identified on the enclosed certificate of appointment for a period of _____ (not more than three) years, commencing on _____, and acknowledge receipt of my certificate of appointment no _____.

I note that the appointment covers the following location(s) _____

_____

I have been made aware of the dangers that exist and I will to the best of my ability ensure that I, and any others working under or with me, prevent danger or where appropriate injury to ourselves and others, and do not cause damage to electrical equipment.

I will not carry out any work beyond the limitations specified on the Certificate of appointment unless I am appointed the competent person for a particular task by the issue and acceptance of a safe-to-work permit or a Certificate of authorisation for live working, or unless I am under the personal supervision of a competent person so appointed.

I also accept responsibility for the switchroom key(s) which will be handed to me following receipt of my acceptance of the appointment and will keep these in my custody at all times.

On termination of this appointment I will return the key(s) to the authorised person.

Yours sincerely.

Signed _____

Date _____

Copy to authorising engineer.

(1) *Insert the management's title if required.*

Annex J: Certificate of appointment as a competent person (electrical – LV)

Certificate no _____

Certificate of appointment as a competent person (electrical – LV)

This is to certify that _____
is appointed a competent person for the following location(s) until the expiry date shown overleaf.

1. _____

2. _____

3. _____

Duties:

(a)

(b)

(c)

Signed _____ Authorised person

Name _____ Date _____

Signed _____ Authorised person

Name _____ Date _____

Signed _____ Authorised person

Name _____ Date _____

(A copy of this certificate is to be placed in the operational procedure manual)

Appointment record

(to be completed by the authorised person(s))

This certificate is valid only until the last expiry date shown below.

Issue	Issue date	Validity (years)	Expiry date	Signatures
First issue				
First review				
Second review				
Third review				

Appendix 5: Suggested format for annual on-site operational safety check

NON-PERMIT TO WORK JOBS

NAME:_____ (SKILLED PERSON) DATE:_____

_____ (SUPERVISOR)

WORK LOCATION:_____

SUPERVISOR TO COMPLETE PARTS 1 OR 2 THEN PART 3 ONLY

PART 1

1. DEAD WORKING

1.1 DESCRIPTION OF WORK IN PROGRESS

_____
_____
_____

1.2 IDENTIFICATION:

a. Was point of isolation identified by reference to

- circuit drawing? Yes/No
- labels? Yes/No
- other? – please give details

_____
_____
_____

b. In your view, are circuit drawings and/or labels up-to-date, accurate and sufficient?

If 'No', give details: _____

_____
_____

1.3 ISOLATION:

a. Is isolation correctly and effectively established? Yes/No

b. Is a Caution Notice (or caution tape/shroud, etc,) posted? Yes/No

c. If applicable, have fuses been removed from fuse way and retained under personal control? Yes/No/N/A

d. If applicable, has a Safety Lock (or locking device) been applied? Yes/No/N/A

1.4 PROVING DEAD:

a. Are approved Test Lamps available at place of work? Yes/No

b. Is a functioning Test Lamp Tester available at point of work? Yes/No

c. Was circuit proved dead at point of work immediately before work began? Yes/No

d. Was test instrument proved before and after proving the circuit dead? Yes/No

PART 2

2. LIVE WORKING (not requiring a safety document)

2.1 DESCRIPTION OF WORK:

Which type of work was being undertaken?

a. testing Yes/No

b. fault finding? Yes/No

c. adjustments? Yes/No

d. other – give details

_____

_____

e. do you agree that work must be done “live”? Yes/No

if ‘No’, state reasons

_____

_____

2.2 SAFETY PRECAUTIONS:

a. Is individual trained and authorised? Yes/No

b. Is authorisation less than 3 years old? Yes/No

Which of the following safety precautions were adopted?

a. accompanied Yes/No/N/A
b. rubber gloves worn Yes/No/N/A
c. static clothing (to wrist) worn Yes/No/N/A
d. insulated tools used Yes/No/N/A
e. temporary insulation applied Yes/No/N/A
f. barriers erected? Yes/No/N/A
g. fused leads used on voltage testing instruments Yes/No/N/A

2.3 LIVE WORKING POLICY:

a. Does this job fully meet the management's live working policy? Yes/No

If 'No', state reasons _____

_____

_____

b. Reason(s) given by individual for work are: _____

_____

_____

c. Has Form LW1 (Live Work – Self-Check safety Precautions) been completed before work started? Yes/No

Part 3

3. GENERAL

3.1 WORK INSTRUCTIONS:

a. Were written job instructions issued for this work? Yes/No
b. If written instructions issued, were they correct and suffucient? Yes/No/N/A

If 'No', give details: _____

_____

_____

c. Were verbal instructions given for this work? Yes/No
d. If verbal job instructions were given were they accurate and sufficient? Yes/No

If 'No', give details:_____

_____

_____

3.2 TOOLS AND INSTRUMENTS

a. Are all tools and instruments on site safe to use? Yes/No

If 'No', give details:_____

_____

_____

b. Are all the tools and/or instruments available on site to complete the job? Yes/No

Additional Tool Check:

c. Is individual's tool kit complete and fit for the purpose? Yes/No

If 'No', give details:_____

_____

_____

NOTE:

1. 3.2 (c) may need to be completed when the job is finished and access to workshop stored tools/instruments etc, available.
2. 3.2 (c) need not be completed if undertaken within previous 12 months: in this case give date of last inspection only.

SIGNATURES

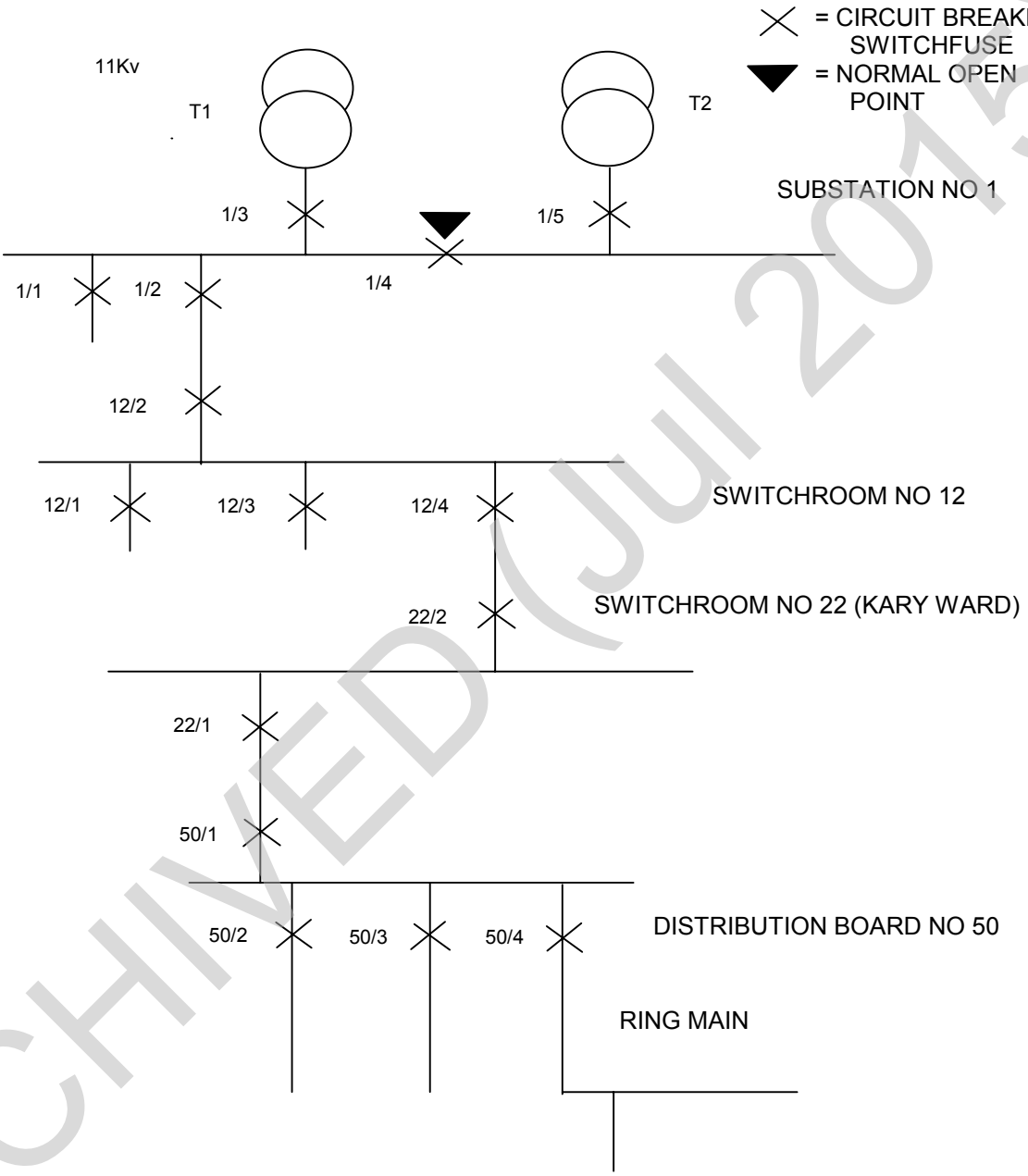
1. I HAVE COMPLETED ENTRIES TO Parts 1*, 2* and 3* (* delete as appropriate) of this form.

Signed _____ Date_____
(Supervisor)

2. I have seen the completed entries to Parts 1*, 2* and 3* (* delete as appropriate) of this form.

Signed _____ Date_____
(Skilled Person)

Appendix 6: Switchgear labelling



SEE NEXT PAGE FOR LABEL FORMAT

LOCATION	ACB/SWITCH/ FUSEWAY	LABEL
S/S No 1	1/3	1/3 T1 INCOMER
S/S No 1	1/2	1/2 SUPPLY TO SW-ROOM 12 (MATERNITY)
SW-ROOM 12	12/2	12/2 INCOMER SUPPLY FROM 1/2 (SUBSTATION NO 1)
SW-ROOM 12	12/4	12/4 SUPPLY TO SW-ROOM 22 (KARY WARD)
SW-ROOM 22	22/2	22/2 INCOMER SUPPLY FROM 12/4 (SW-ROOM 12)
SW-ROOM 22	22/1	22/1 SUPPLY TO DISTRIBUTION BOARD 50
DISTRIBUTION BOARD	50/4	50/4 13A RING MAIN RED PHASE

NB: Each 13A outlet on ring to be labelled 50/4/R

Appendix 7: Nominated personnel duties, roles, appointment, training and examination

Duties and roles

Skilled Person	Activities which may apply to relevant person
AUTHORISED PERSON	• issue and cancel safe-to-work permits, certificates of authorisation for live working, limitation-of-access certificate • switching to the LV network • access to substations (HV and LV separated) and switchrooms (LV) • appoint competent persons • control automatic fire extinguishing equipment
COMPETENT PERSON	• receive and clear safe-to-work permits, certificates of authorisation for live working, limitation of access certificates • switching of non-comples LV networks • control automatic fire extinguishing equipment in LV switchrooms
SKILLED PERSON	• act as a member of a working party working under a safe-to-work permit or limitation-of-access certificate • control key access to electrical switchrooms • receive and clear limitation-of-access certificates

1. The prime roles and duties of each category of nominated personnel are shown above. The following factors should be considered:-

   a. roles/duties are hierarchical for authorised and competent staff i.e. a competent person can fulfill all the duties of a skilled person. Also an authorised person can fulfill all the duties of a competent person;

   b. individual authorities may be restricted;
   e.g. an authorised person may be appointed to undertake all the above listed duties except appointment of competent persons;

   or

   a competent person's authorisation may exclude the ability to receive and clear a certificate of authorisation for live working;

   or

   a competent person's authorisation could be severely restricted to allow access to switchrooms and control of associated automatic fire control equipment only (i.e. individual undertakes meter reading and general cleaning work only).

APPOINTMENT

2. The extent of an individual's authorisation should be clearly stated on their certificate of appointment. It is recommended that these certificates should be issued in a form which allows them to be carried by individuals while at work e.g. encapsulated in clear plastic and of an appropriate size.

3. Appointment for up to three years will follow completion of necessary training and successfully passing the authorisation examination comprising practical exercises and interview with the examining officer. The authorising engineer shall appoint authorised persons and authorised persons may appoint competent persons.

4. Suitability of staff for appointment will be assessed by the appointment process but in general terms appointments will usually be within the following categories:-

   Authorised person: manager, supervisor, technician

   Competent person: technician, electrician (general assistants can also be given a restricted authorisation as described in (1) above).

5. Technical electrical qualification for appointment will generally be within the following range:

   Authorised person: Degree, HND/HNC, OND/ONC, B Tec 4 or 3, City and Guilds, NVQ at level 3 or above.

   Competent person: NVQ level 3, B Tec 3, City and Guilds. IEE Wiring Regulations (BS 7671) update training.

6. Comprehensive knowledge of the organisation's electrical safety policy and electrical network and systems appropriate to the individual's roles and duties is of vital importance and must be confirmed prior to appointment.

TRAINING

7. Management have a general duty to ensure that their employees receive training necessary to allow them to safely perform their duties.

8. The authorising engineer should approve the content and location of safety training for all individuals who are to be appointed or re-appointed as authorised or competent persons.

9. Training may take place at a training establishment and/or locally on site. On-site training is an important element so that staff can see how safety policy will be applied to their LV system. The authorising engineer should be involved in the on site training.

10. Training should include the following areas:

Authorised persons

a. all aspects of management's electrical safety policy;
b. comprehensive study of the requirements of SHTM 2020 and practical methods of achieving these objectives;
c. preparation, checking and use of safety programmes;
d. LV switching on the local network and familiarisation with network features (e.g. standby generator operation) and schematic diagrams/mimic diagram;
e. preparation and issue of safety documents and questioning techniques to confirm recipient understanding;
f. completion of log book and filing of documentation;
g. monitoring of electrical safety work by staff/contractors;
h. requirements to test circuits prior to energisation and phase-out complex networks following alteration/repair;
i. items listed below for competent persons.

Competent persons

a. overview of management's electrical safety policy with emphasis on requirements of SHTM 2020;
b. comprehensive study of LV safety rules;
c. duties of a competent person;
d. duties of the recipient of a safety document;
e. LV switching on non-complex systems to establish isolation;

f. use of approved tools and equipment and personal protective equipment. Means/method of proving dead at the point of work;

g. control of automatic fire extinguishing systems installed in electrical switchrooms;

h. completion of Live Working Self Check Safety Precautions (form LW1) before testing, fault finding or making adjustments on live LV circuits;

i. type of live working which requires the issue of a LV certificate of authorisation for live working by an authorised person;

j. testing of circuits prior to energisation;

k. use of a phase rotation meter to confirm phase rotation;

l. requirement to phase-out using test lamps/voltmeter on complex networks prior to closing a switch to make a parallel;

m. identification of circuits/switchgear from labels and circuit charts/schematic diagrams.

EXAMINATION

11. Examination of authorised and competent persons to determine suitability for appointment should take the form of practical exercises and an interview.

12. Exercises and interview questions will cover those topics and to a level appropriate to the proposed duties and responsibilities of the appointment.

13. Practical exercises for an authorised person appointment should include:

a. preparation and issue (to authorising engineer acting as a competent person) a safe-to-work permit and a limitation-of-access certificate;

b. preparation and use of a safety programme for work on a complex circuit which requires:- issue of a safe-to-work permit, insulation testing repair and phasing-out across an open switch before making a parallel;

c. proving dead at the point of work.

NOTE:

1. Items (b) and (c) will be carried out using the local on-site LV network. If it is not practical to arrange isolation of the circuit (chosen for the safety programme) then the candidate and authorising engineer will physically visit each switching location etc, and the candidate will describe to the satisfaction of the authorising engineer actions they would take to ensure safety.

2. The authorising engineer shall witness the candidate physically switching to achieve isolation, testing to prove dead and phasing-out using other circuits on the local network if the dispensation described in note 1 above is used.

14. Practical exercises for a competent person appointment should include:

    a. issue by the authorised person conducting the examination to the candidate a safe-to-work permit including questioning to confirm candidates knowledge. The candidate should then explain how he will brief and supervise members of the working party working under his control. This exercise should be carried out in a switchroom with danger notices posted to simulate conditions described in the safe-to-work permit but without the need to actually isolate the circuit.

    b. isolation of a circuit and proving dead at the point of work.

    c. receipt of a limitation-of-access certificate.

15. Interview, questions and candidate (summary) replies should be recorded by the examining officer.

16. The examination procedure shall be repeated prior to re-appointment of individuals.

Appendix 8: HTM 2020 Vol 2 Forms

Safety Rule Book (LV)

Electrical safety rules for low voltage systems

These Rules must be read in conjunction with SHTM 2020 Volume 1: 'Electrical safety code for low voltage systems (Escode-LV)' and any other electrical safety rules contained within the operational procedure manual.

This Safety rule book (LV) is the property of [(1)]

and is issued to the appointed person identified below.
This Safety rule book (LV) must not be transferred to any other person and shall be returned to the authorising engineer/authorised person* on suspension or cancellation of the appointment.
[(2)] has satisfied the undersigned that he understands these Electrical safety rules for low voltage systems.

Signed _____ Date _____
(Signature of authorising engineer/authorised person*)

I hereby confirm that I understand these Electrical safety rules for low voltage systems and acknowledge receipt of this copy of the Safety rule book (LV).

Signed _____ Date _____
(Signature of authorised/competent person*)

**Delete as appropriate*

Notes

(1) The Electrical safety rule book (LV) should be customised by including the name of the management.
(2) Name of authorised/competent person.

Receipt of Safety rule book (LV)
Safety rule book (LV)
Serial no [(1)]

Electrical safety rules for low voltage systems

These Rules must be read in conjunction with SHTM 2020 Volume 1: 'Electrical safety code for low voltage systems (Escode-LV)' and any other electrical safety rules contained within the operational procedure manual.

This Safety rule book (LV) is the property of [(2)]

and is issued to the appointed person identified below.
This Safety rule book (LV) must not be transferred to any other person and shall be returned to the authorising engineer/authorised person* on suspension or cancellation of the appointment.
[(4)] has satisfied the undersigned that he understands these Electrical safety rules for low voltage systems.

Signed _____ Date _____
(Signature of authorising engineer/authorised person*)

I hereby confirm that I understand these Electrical safety rules for low voltage systems and acknowledge receipt of this copy of the Safety rule book (LV).

Signed _____ Date _____
(Signature of authorised/competent person*)

**Delete as appropriate*

Notes

(3) Copies of the Safety rule book (LV) will be serially numbered and available separately in pocket book form for each authorised and competent person.
(4) The Electrical safety rule book (LV) should be customised by including the name of the management.
(5) Any Operational procedure manuals or other Electrical safety rules may be added if required.
(6) Name of authorised / competent person.

(This page will be removed from the Safety rule book (LV) following signature by both parties and will be retained by the authorising engineer/authorised person.)

Local house rules and amendment record

This section contains all additions/amendments to the 'Safety Rules (LV)'

Sheet 1

Addition/ Amendment No	Rule No	Page No	Date Received	Name and Signature

Model safety programmes and documents – Safety programme

front – original	**Safety programme**	Serial No	
	(Complete precisely and legibly in BLOCK CAPITALS)	Location	

1. Purpose of proposed work/test* *(*Delete as appropriate)*

Enter details

2. Equipment which the proposed sequence of operations will make safe to work on or test

Enter details

3. Date countersigned programme is required to commence

4. Sketch of isolating arrangements

back - original

4. Sequence of operations (use continuation sheets if necessary)

ITEM NO	LOCATION OF OPERATOR	EQUIPMENT IDENTITY	OPERATION	TIME OPERATED	OPERATOR	DATE	ITEMS REQUIRED

Notification

I hereby confirm that prior notification has been given to those departments affected by the proposed operation and that contingency arrangement where required for critical areas can be implemented in an emergency.

Signed _____ Name _____

Position/Title _____ Date _____

Originating authorised person

Signed _____ Address _____

Name _____ _____

Date _____ _____

Countersigning authorised person*

I hereby declare that I have checked the above Safety Programme and am satisfied that, to the best of my knowledge, it will enable the proposed work or tests to be carried out safely and in accordance with the "Electrical safety code for low voltage systems". I have knowledge of, and have access to a current diagram of, the System and Equipment concerned.

Signed _____ Address _____

Name _____ _____

Date _____ _____

*Countersignature is required only for work or tests on complex low voltage systems etc where considered justified.

Model safety programmes and documents – Safe-to-work Permit

Front – original

Safe-to-work Permit

(Complete precisely and legibly in BLOCK CAPITALS)

Serial No

Location

Part 1: Issue

Issued to:

I hereby declare that it is safe to work on the following low voltage electrical equipment which has been made dead and isolated.

All other electrical equipment is dangerous to work on

The points of isolation are Note: fix caution notices, always use safety locks and obtain visible break if reasonably practical.	
Danger notices and/or screening of live parts are in place at the following points.	
Is automatic fire protection rendered inoperative? If yes, state conditions for restoration.	Yes | No | N/A
Presence of any other hazards and precautions taken eg. fire extinguisher on site etc.	
The following works shall be carried out.	

No other works shall be carried out

Authorised Person

Signed _____ Time _____ Date _____

Note: The back of the original of this form is blank

back - copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out the work on the electrical equipment as detailed on the Safe-to-Work permit and that no attempt will be made by me or persons under my control to work on any other electrical equipment.

Signed _____ Status _____

Time _____ Date _____

Part 3: Clearance

I hereby declare that the work for which this Safe-to-Work permit was issued is now suspended/completed* and that all persons under my charge have been withdrawn and warned that it is no longer safe to work on the electrical equipment specified on this Safe-to-Work permit and that all gear, tools etc have been removed.

Signed _____ Status _____

Time _____ Date _____

**Delete as appropriate*

Part 4: Cancellation

This Safe-to-Work permit is hereby cancelled. The original has been returned to me and destroyed in the presence of the signatory to Part 3.

Signed _____ Status _____

Time _____ Date _____

Model safety programmes and documents – Certificate of authorisation for live working

front – original

Serial No

Certificate of authorisation for live working

(Complete precisely and legibly in BLOCK CAPITALS)

Location

Part 1: Issue

Issued to: _____

I hereby authorise the above-named authorised or competent person to work on the low voltage electrical equipment specified below whilst it is **live** but only if accompanied by one or more members of the working party while the work is in progress.

Working Party members	
Location of equipment	
Details of equipment to be worked on	
Precautions to be taken, for example rubber gloves, mats, **insulated** tools, screening etc	
Details of work to be undertaken **live**	

No other work shall be carried out

Authorised Person

Signed _____ Time _____ Date _____

Note: the back of the original of this form is blank

back - copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out the defined work on the electrical equipment as detailed on this Certificate of authorisation for live working and fully understand the precautions to be taken.

Signed _____ Status _____

Time _____ Date _____

Part 3: Clearance

I hereby declare that the work for which this Certificate of authorisation for live working was issued is now suspended/completed* and that all persons under my charge have been withdrawn, all gear, tools etc have been removed and the electrical equipment has been left in a safe condition.

Signed _____ Status _____

Time _____ Date _____

Reason for suspending work and action taken (if applicable)

**Delete as appropriate*

Part 4: Cancellation

This Certificate of authorisation for live working is hereby cancelled. The original has been returned to me and destroyed in the presence of the signatory to Part 3.

Signed _____ Authorised Person

Time _____ Date _____

Model safety programmes and documents – Limitation-of-access certificate

front – original

Serial No

Limitation-of access certificate

Location

(Complete precisely and legibly in BLOCK CAPITALS)

1. This form must not be used for work on electrical equipment.
2. On completion of the work, the holder must surrender this Limitation-of-access certificate as directed for cancellation, after which no work shall be done.

Part 1: Issue

Issued to:

_____

In the employ of:

_____

being a named person, is hereby given permission to carry out the work described below:

Location	
Work	
Is automatic fire protection rendered inoperative?	Yes / No / N/A
If Yes, state condition for restoration	

No other work shall be carried out

Remarks	

Authorised Person
Signed _____ Time _____ Date _____

Note: the back of the original of this form is blank

Limitation-of access certificate

continuation sheet for Remarks section

Serial No

back - copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out work in accordance with this Limitation-of-access certificate and no other work will be done by me or the persons under my charge at the location referred to in Part 1 of this document.

Signed _____
(being the person to whom this certificate is issued)

Time _____ Date _____

Part 3: Clearance

I hereby declare that the work for which the Limitation-of-access certificate was issued is now suspended/completed* and that all persons under my charge have been withdrawn.

Signed _____
(being the person to whom this certificate is issued)

Time _____ Date _____

*Delete as appropriate

Part 4: Cancellation

Signed _____
(being the person authorised to cancel this certificate)

Time _____ Date _____

On completion of the work, the holder must surrender this Limitation-of-access certificate as directed for cancellation, after which no work shall be done.

Logbook for low voltage systems (HTM 2020 Volume 2)

Date	Time	Location	Circuit or switch concerned	Operation and/or remarks (including Safe-to-work permits, Certificate of authorisation for Live working, etc)

Safety measures taken Sketches or other details, telephone or radio messages etc.	Names of persons authorised to work on electrical equipment	Safety Programme No.	Safety document Type and Serial No.	To whom issued	Signature of issuing officer

Form LW1 Live Working – Self Check Safety Precautions

All sections to be read and completed before proceeding.

Note: This is not a certificate of authorisation for live working. No fixed components are to be removed or replaced.

Department _____ Location _____

Task _____

		Tick	(Delete as appropriate)
1.	Is live working necessary?		YES/NO
	Reason (please tick): Disruption of services Fault diagnosis not practical dead Contradiction of other statutory regulations Other (please state)	 ____ ____ ____ ____	
2.	Have unnecessary personnel been removed from work area?		YES/NO/NA
3.	Are you a competent person who is authorised for LIVE LV WORKING?		YES/NO
4.	Can you control the work area to achieve safe working?		YES/NO
5.	Do you have all the information required to do the work?		YES/NO
6.	Are you using the correct equipment? (please tick) Rubber gloves/eye protection Insulated tools Rubber mats Test gear/probes (fused) Screens/barriers Suitable clothing to wrist	 ____ ____ ____ ____ ____ ____	YES/NO
7.	Is the above equipment legal/dated/certified/calibrated as appropriate?		YES/NO
	Note: If you have answered NO to any of the above questions, LIVE WORKING CANNOT TAKE PLACE		
8.	Are assistants required for the following: (If YES, tick appropriate reason) Isolation purposes only? Assisting actual work? Controlling work areas? Monitoring remote area?	 ____ ____ ____ ____	YES/NO
9.	Are assistants aware of points of isolation?		YES/NO
10.	Are your assistants competent/trained in First Aid?		YES/NO

I have carried out the above checks and am satisfied that it is safe to proceed.

Signed _____ Date _____ Time _____

Note: If your tests indicate that a component needs to be removed or replaced, this may only be done live following the issue of a CERTIFICATE OF AUTHORISATION FOR LIVE WORKING by an authorised person. The management policy is that such work will normally be done with equipment etc, DEAD or ISOLATED.

PLEASE RETURN COMPLETED FORMS TO YOUR SUPERVISOR

References

NOTE:
Where there is a requirement to address a listed reference, care should be taken to ensure that all amendments following the date of issue are included.

Publication ID	*Title*	*Publisher*	*Date*	*Notes*
Acts and Regulations				
	The Building (Scotland) Act	HMSO	1959	
	Clean Air Act	HMSO	1993	
	Electricity Act	HMSO	1989	
	Registered Establishments (Scotland) Act	HMSO	1998	
	The Water (Scotland) Act	HMSO	1980	
	Health and Safety at Work etc Act	HMSO	1974	
SI 3146	The Active Implantable Medical Devices Regulations	HMSO	1992	
SI 2179 & 187	The Building Standards (Scotland) Regulations (as amended)	HMSO	1990	
	The Building Standards (Scotland) Regulations: Technical Standards Guidance	HMSO	1998	
SI 1460	Chemicals (Hazard Information and Packaging for Supply) Regulations (CHIP2)	HMSO	1997	
SI 3140	Construction (Design and Management) Regulations	HMSO	1994	
SI 437	Control of Substances Hazardous to Health Regulations (COSHH)	HMSO	1999	
SI 635	Electricity at Work Regulations	HMSO	1989	
SI 1057	Electricity Supply Regulations (as amended)	HMSO	1988 (amd 1994)	
SI 2372	Electromagnetic Compatibility Regulations	HMSO	1992	
SI 2451	Gas Safety (Installation and Use) Regulations	HMSO	1998	
SI 917	Health & Safety (First Aid) Regulations	HMSO	1981	
SI 1380	Health & Safety (Training for Employment) Regulations	HMSO	1992	

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SI 682	Health & Safety (Information for Employees) Regulations	HMSO	1989	
SI 2792	Health and Safety (Display Screen Equipment) Regulations	HMSO	1992	
SI 341	Health and Safety (Safety Signs and Signals) Regulations	HMSO	1996	
SI 1380	Health and Safety (Training for Employment) Regulations	HMSO	1990	
SI 2307	Lifting Operations and Lifting Equipment Regulations (LOLER)	HMSO	1998	
SI 3242	Management of Health and Safety at Work Regulations	HMSO	1999	
SI 2793	Manual Handling Operations Regulations	HMSO	1992	
SI 3017	The Medical Devices Regulations	HMSO	1994	
SI 1790	Noise at Work Regulations	HMSO	1989	
SI 3139	Personal Protective Equipment (EC Directive) Regulations (as amended)	HMSO	1992	
SI 2966	Personal Protective Equipment at Work (PPE) Regulations	HMSO	1992	
SI 128	Pressure Systems Safety Regulations (PSSR)	Stationary Office	2000	
SI 2306	Provision and Use of Work Equipment Regulations (PUWER)	HMSO	1998	
SI 3163	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)	HMSO	1995	
SI 3004	Workplace (Health, Safety and Welfare) Regulations	HMSO	1992	
British Standards				
BS 697	**Rubber gloves for electrical purposes**	BSI Standards	1977	
BS 3939-1	**Graphical symbols for electrical power, telecommunications and electronics diagrams. General information, general index**	BSI Standards	1986	
BS 5378	**Safety signs and colours** **Part 1:** Specification for colour and design **Part 3:** Specification for additional signs to those given in BS 5378 Part 1	BSI Standards	1980 (1995) 1982 (1995)	

Publication ID	*Title*	*Publisher*	*Date*	*Notes*
BS 5499	**Fire safety signs, notices and graphic symbols** **Part 1:** Specification for fire safety signs	BSI Standards	1990 (1995)	
BS 6626	**Code of practice for maintenance of electrical switchgear and control gear for voltages above 1kV and up to and including 36 kV**	BSI Standards	1985	
BS 7671	**Requirements for electrical installations. IEE wiring regulations**	HMSO	1992	16th edition
BS EN 60903	**Specification for gloves and mitts of insulating material for live working**	BSI Standards	1993	
Scottish Health Technical Guidance				
SHTM 2007	Electrical services supply and distribution	P&EFEx	2001	CD-ROM
SHTM 2011	Emergency electrical services	P&EFEx	2001	CD-ROM
SHTM 2014	Abatement of electrical interference	P&EFEx	2001	CD-ROM
SHTM 2021	Electrical safety code for high voltage systems (Escode – HV)	P&EFEx	2001	CD-ROM
SHPN 1	Health service building in Scotland	HMSO	1991	
SHPN 2	Hospital briefing and operational policy	HMSO	1993	
SHTN 1	Post commissioning documentation for health buildings in Scotland	HMSO	1993	
SHTN 4	General Purposes Estates and Functions Model Safety Permit-to-Work Systems	EEF	1997	
	NHS in Scotland – PROCODE	P&EFEx	2001	Version 1.1
NHS in Scotland Firecode				
SHTM 81	Fire precautions in new hospitals	P&EFEx	1999	CD-ROM
SHTM 82	Alarm and detection systems	P&EFEx	1999	CD-ROM
SHTM 83	Fire safety in healthcare premises: general fire precautions	P&EFEx	1999	CD-ROM
SHTM 84	Fire safety in NHS residential care properties	P&EFEx	1999	CD-ROM
SHTM 85	Fire precautions in existing hospitals	P&EFEx	1999	CD-ROM
SHTM 86	Fire risk assessment in hospitals	P&EFEx	1999	CD-ROM
SHTM 87	Textiles and furniture	P&EFEx	1999	CD-ROM
SFPN 3	Escape bed lifts	P&EFEx	1999	CD-ROM
SFPN 4	Hospital main kitchens	P&EFEx	1999	CD-ROM

Publication ID	*Title*	*Publisher*	*Date*	*Notes*
SFPN 5	Commercial enterprises on hospital premises	P&EFEx	1999	CD-ROM
SFPN 6	Arson prevention and control in NHS healthcare premises	P&EFEx	1999	CD-ROM
SFPN 7	Fire precautions in patient hotels	P&EFEx	1999	CD-ROM
SFPN 10	Laboratories on hospital premises	P&EFEx	1999	CD-ROM
UK Health Technical Guidance				
EH 40	HSE Occupational Exposure limits	HSE	Annual	
MES	Model Engineering Specifications	NHS Estates	1997	As required
	Contacts and commissions for the NHS Estate – contract procedures	HMSO	1994	
HTM 2020	Electrical safety code for low voltage systems (Escode – LV): Volume 2	HMSO		
Department of Health Publications				
	Management of medical equipment and devices (Health Equipment Information 98). Medical Devices Agency	Dept. of Health	1991	
	First aid at work. Health and safety (First Aid) regulations 1981. Approved code of practice and guidance (L 74)	HSE	1997	