

Scottish Health Technical Memorandum 06-02

Electrical safety guidance for low voltage
systems

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Disclaimer

The contents of this document are provided by way of general guidance only at the time of its publication. Any party making any use thereof or placing any reliance thereon shall do so only upon exercise of that party's own judgement as to the adequacy of the contents in the particular circumstances of its use and application. No warranty is given as to the accuracy, relevance or completeness of the contents of this document and Health Facilities Scotland, a Division of NHS National Services Scotland, shall have no responsibility for any errors in or omissions therefrom, or any use made of, or reliance placed upon, any of the contents of this document.

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Preface

About Scottish Health Technical Memoranda

Scottish Engineering Health Technical Memoranda (SHTMs) give comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare.

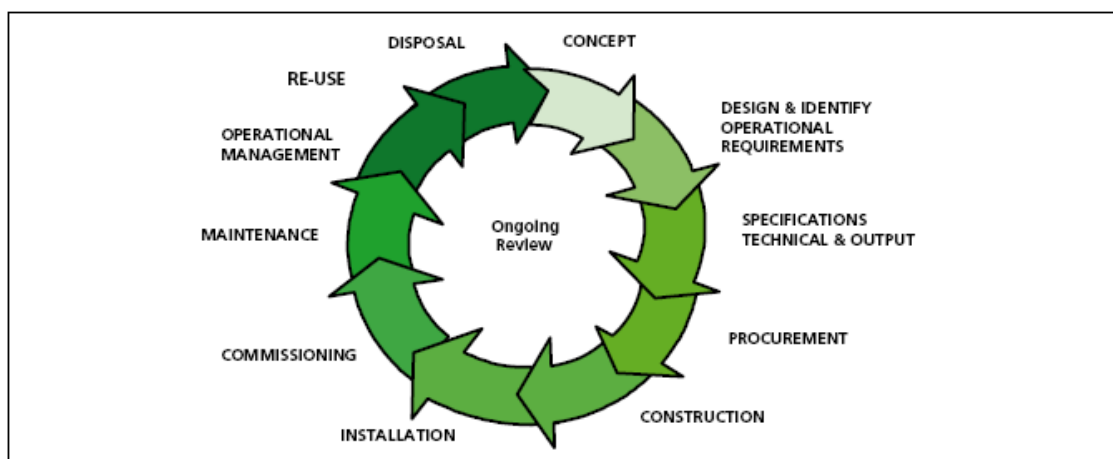
The focus of SHTM guidance remains on healthcare-specific elements of standards, policies and up-to-date established best practice. They are applicable to new and existing sites, and are for use at various stages during the whole building lifecycle. Healthcare providers have a duty of care to ensure that appropriate engineering governance arrangements are in place and are managed effectively. The Scottish Engineering Health Technical Memorandum series provides best practice engineering standards and policy to enable management of this duty of care.

It is not the intention within this suite of documents to repeat unnecessarily international or European standards, industry standards or UK Government legislation. Where appropriate, these will be referenced.

Healthcare-specific technical engineering guidance is a vital tool in the safe and efficient operation of healthcare facilities. Scottish Health Technical Memorandum guidance is the main source of specific healthcare-related guidance for estates and facilities professionals.

The core suite of eight subject areas provides access to guidance which:

- is more streamlined and accessible;
- encapsulates the latest standards and best practice in healthcare engineering;
- provides a structured reference for healthcare engineering.



Healthcare building life-cycle

Structure of the Scottish Health Technical Memorandum suite

The series of engineering-specific guidance contains a suite of eight core subjects pending a re-assessment of Firecode SHTMs 81-86.

Scottish Health Technical Memorandum 00: Policies and principles (applicable to all Scottish Health Technical Memoranda in this series)

Scottish Health Technical Memorandum 01: Decontamination

Scottish Health Technical Memorandum 02: Medical gases

Scottish Health Technical Memorandum 03: Heating and ventilation systems

Scottish Health Technical Memorandum 04: Water systems

Scottish Health Technical Memorandum 05: Reserved for future use

Scottish Health Technical Memorandum 06: Electrical services

Scottish Health Technical Memorandum 07: Environment and sustainability

Scottish Health Technical Memorandum 08: Specialist services

Some subject areas may be further developed into topics shown as -01, -02 etc and further referenced into Parts A, B etc.

Example: Scottish Health Technical Memorandum 06-02 Part A will represent Electrical Services - Electrical safety guidance for low voltage systems.

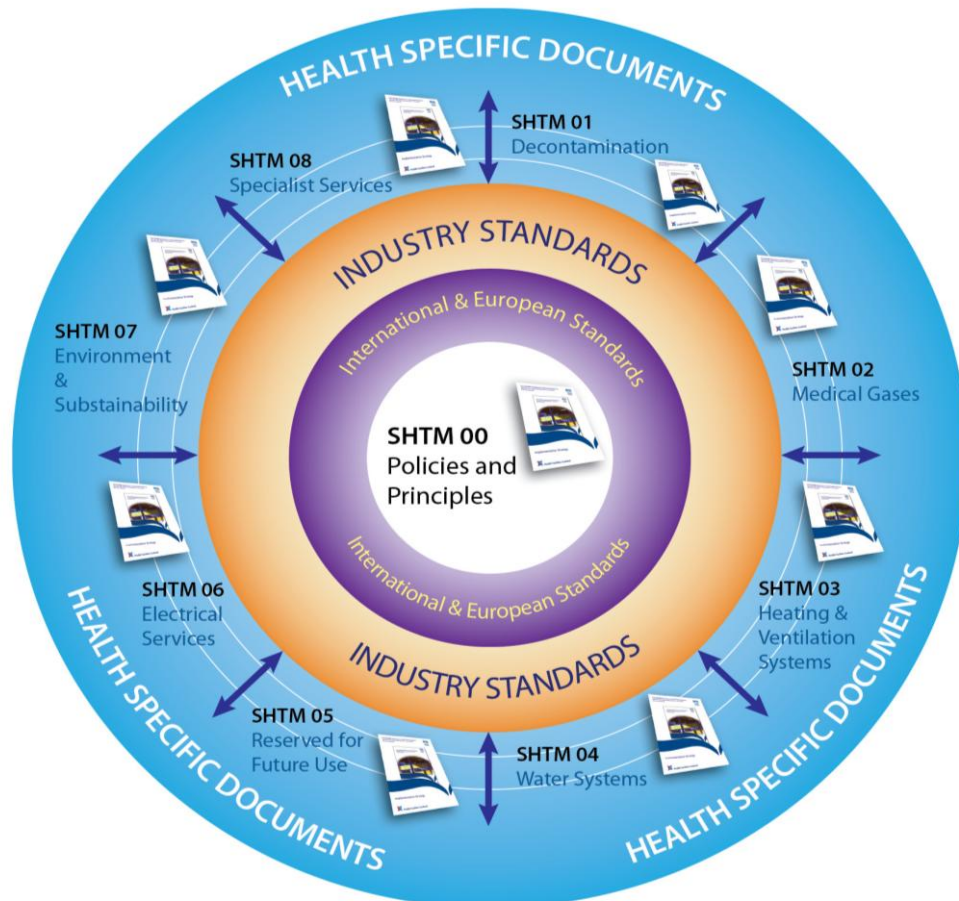
In a similar way Scottish Health Technical Memorandum 07-02 will simply represent Environment and Sustainability – EnCO₂de.

All Scottish Health Technical Memoranda are supported by the initial document Scottish Health Technical Memorandum 00 which embraces the management

and operational policies from previous documents and explores risk management issues.

Some variation in style and structure is reflected by the topic and approach of the different review working groups.

Health Facilities Scotland wishes to acknowledge the contribution made by professional bodies, engineering consultants, healthcare specialists and NHS staff who have contributed to the review.



Engineering guidance structure

Executive summary

Scottish Health Technical Memorandum 06-02 replaces and supersedes all previous versions of Scottish Health Technical Memorandum 2020: ‘Safety code for low voltage systems’.

This Scottish Health Technical Memorandum gives operational guidance on electrical safety requirements for low voltage systems in healthcare 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.

This document will be of interest and practical help to those involved in the design, operation and maintenance of electrical systems and equipment.

Scottish Health Technical Memorandum 06-02 consists of this main guidance document and a “Safety guidance handbook” (published separately).

This main guidance document provides information and statutory guidance for those responsible for meeting the requirements of the Electricity at Work Regulations 1989.

The management policy section outlines the overall responsibility of managers of healthcare premises and details their legal and mandatory obligations in setting up and operating reliable low voltage electrical safety procedures.

The Department of Health publication “Electrical services Health Technical Memorandum 06-02: “Electrical safety handbook” (ISBN 0-11-322759-4) should be issued to all staff with responsibilities for electrical safety. The booklet is effectively an A5-sized abridged version of this document.

1. Scope

General

- 1.1 Guidance in this Scottish Health Technical Memorandum applies to all healthcare facilities containing a low voltage system.
- 1.2 Guidance is intended to assist Duty Holders (see [Section 2](#) for definitions) 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. Only the courts can make such interpretation.
- 1.3 Inadequate control and/or improper use of electricity are a danger to life and property. Owners, occupiers, general managers/chief executives and those responsible for electrical services as “Duty Holders” are accountable for ensuring control; they are also responsible for the safe management, design, installation, operation and maintenance of the electrical systems.
- 1.4 As an employer, the management of a healthcare facility has a legal responsibility to ensure that relevant regulations are complied with. Statutory instruments referred to within this document should be deemed to include any revisions or amendments which have occurred since the date of the original statute.
- 1.5 The reliance on electrical supplies has increased to a point where they are essential for the operation of any organisation. In hospitals, there has been a substantial increase in the use of modern technologies – diagnostic equipment, intensive care, computer systems and bed-head services to name a few. The loss of supplies to these services would be unacceptable, and most hospitals would be unable to function without electrical supplies. Scottish Health Technical Memorandum 06-01: ‘Electrical services supply and distribution’ addresses the security of supply and emergency-generation issues; however, this would be of little use if the distribution circuits were compromised. This document not only has procedural guidance on the correct isolation of electrical equipment but also includes guidance on ensuring the security of supplies.
- 1.6 The roles of the Authorising Engineer (LV) and Authorised Person (LV) are twofold: first, they should provide professional advice (AE) and directly manage issues (AP) related to electrical installations to ensure that the electrical systems and equipment are fit for use; second, they should ensure the safety of personnel who are using, or who are near, such equipment.
- 1.7 To ensure systems are fit for use, the Authorising Engineer (LV) and the Authorised Person (LV) should be consulted before major alterations or the procurement of major plant (which could adversely affect the existing installation) are made.

Purpose

- 1.8 The provision of effective procedures and their formalising into written instructions are 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.

Procedures

- 1.9 Low voltage systems associated with healthcare and social services premises vary considerably in size and complexity. The procedures advocated in this document therefore cannot cover every circumstance and consequently, in specific instances, may need to be supplemented by local written procedures. These local arrangements should only be considered when, in the opinion of the “Authorising Engineer (LV)”, the guidance given in this document is inadequate for the particular circumstances. Any such supplementary procedures should therefore maintain the same standards of electrical safety outlined in this guidance.
- 1.10 Because of the specialist nature of the risks, it is important that a carefully prepared procedure exists for dealing with the routine servicing of low voltage installations and with any emergencies that arise.
- 1.11 The consequences – in terms of patient safety and well being – of undertaking electrical maintenance or switching operations should be fully considered following appropriate consultation with medical and administrative staff.

Standards

- 1.12 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:
- complies with the appropriate British Standards and, where applicable, international and/or European Standards;
 - has been satisfactorily tested.

Duties

- 1.13 There is a legal obligation on all persons who may be concerned with the operation of, or who work on, 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 that they may have to undertake.

Security of information

- 1.14 The Electricity at Work Regulations 1989 highlight 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 of the Duty Holder's main defence. Consequently, management should consider its policy for the retention of information and contemplate how it will maintain, if at all, back-up copies of documents.

Application of this safety guidance

- 1.15 Safety guidance (LV) as detailed in this document should be applied to:
- the low voltage switchgear cables from the first isolation point on the low voltage system. Prior to the first point of isolation cabling is either part of the high voltage system or part of the supply company network. Paragraph 1.17 of SHTM 06-03: 'Electrical safety guidance for high voltage installations' also refers;
 - associated electrical equipment under the ownership or control of the management under whose authority they have been issued.
- 1.16 Where operation of high voltage switchgear is associated with low voltage work, the requirement for safety documents as indicated in this safety guidance (LV) does not apply, and reference should be made to Scottish Health Technical Memorandum 06-03: 'Electrical safety guidance for high voltage systems'.
- 1.17 This safety guidance should be considered as representing best practice for all persons (whether or not directly employed by the management) working on, working near, testing or operating electrical equipment and systems for which management is in control of electrical danger, unless the Authorising Engineer (LV) has deemed in writing that other guidance is equal and equivalent.
- 1.18 This guidance is designed to provide a safe framework within which work or testing can be carried out with safety on permanently connected electrical equipment (equipment which has been isolated via a switch or disconnector is considered to be permanently connected).
- 1.19 In case of an apparent conflict between this guidance and a statutory requirement, the latter is to be followed, and the Authorising Engineer (LV) is to advise the Designated Person.
- 1.20 If it is necessary to depart from any requirement of this guidance, the Authorising Engineer (LV) is to agree such departure in writing with the Designated Person before it is implemented.
- 1.21 Where control of electrical danger is divided between management and others, [Section 5](#) of this guidance should be followed.
- 1.22 Further advice on the application of this guidance can be obtained from the Authorising Engineer (LV).

Other safety guidance, related documents and procedures

- 1.23 Where management employees are required to work near electrical systems and associated electrical equipment not owned or controlled by the management, this document (LV) and related procedures should be used as a guide to safe working practice.

Information and instruction

- 1.24 Arrangements should be made by management to ensure:
- that all employees concerned are adequately informed and instructed as to the systems and electrical equipment which are affected by a particular operation or work (whether or not they are owned or operated by the management) and which legal requirements, safety guidance, related documents and procedures should apply;
 - so far as is reasonably practicable, that other persons who are not employees, but who may be exposed to danger by the operations or work, also receive adequate information and instruction.

Issue of this safety guidance (LV)

- 1.25 A copy of this safety guidance (LV) and, as appropriate, related documents and procedures should be issued to certain management employees and other persons as determined by the Authorising Engineer (LV). Such employees and other persons should sign a receipt for a copy of this guidance (LV), related documents and procedures (plus any amendments), keep them in good condition, and have them available for reference as necessary when work is being carried out under this guidance (LV).

Variation of safety guidance (LV)

- 1.26 In exceptional or special circumstances, this safety guidance (LV) may be varied to such an extent as is necessary and approved by the Authorising Engineer (LV). Such variation should always be in writing and should ensure that safety requirements are satisfied in some other way.

Issue of the safety guidance handbook

- 1.27 The Department of Health publication “Electrical services Health Technical Memorandum 06-02 “Electrical safety handbook” (ISBN 0-11-322759-4) should be issued to all Authorised and Competent Persons (LV) working on or near electrical equipment. The booklet is effectively an A5-sized abridged version of this document.

The safety guidance handbook (LV) should be issued by an Authorised Person (LV). The recipient should sign a receipt for a copy of the safety guidance handbook and they should keep it in good condition and have it available for reference as necessary when work is being carried out under this safety guidance (LV).

Objections

- 1.28 When any person receives instructions regarding the operation of, or work on, the low voltage system and associated electrical equipment at the managed premises, they should report any objections (on safety grounds) to the carrying out of such instructions to the persons issuing them, who should then have the matter investigated and, if necessary, referred to a more senior level for a decision before proceeding.

Definition of 'should'

- 1.29 Where “should” is used in this guidance with no qualification, this indicates a recommendation or that which is advised but not required.

Definition of 'reasonably practicable'

- 1.30 Where a statement is qualified by the words “reasonably practicable”, a slightly less strict standard is imposed. It means that an assessment should be made considering, on the one hand, the magnitude of the risks of a particular work activity or environment and, on the other hand, the cost in terms of the physical difficulty, time, trouble and expense which would be involved in taking steps to eliminate or minimise those risks. The greater the degree of risk, the less weight that can be given to the cost of measures needed to prevent that risk.

Associated regulations and documents

- 1.31 This safety guidance (LV) is based on and complies, where applicable, with the Regulations and documents listed in [Appendix 1](#).

2. Definitions

- 2.1 With regard to this safety guidance (LV), the following definitions apply.

Personnel

Designated Person

- 2.2 The Designated Person is an individual appointed by a healthcare organisation (a board member or a person with responsibilities to the board) who has overall authority and responsibility for the low voltage electricity system within the premises and who has a duty under the Health and Safety at Work etc 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 (LV).

Duty Holder

- 2.3 The Duty Holder is a person on whom the Electricity at Work Regulations 1989 impose a duty in connection with safety.

Management

- 2.4 Management is defined as the owner, occupier, employer, general manager, chief executive or other person in a healthcare organisation, or their appointed responsible contractor, who is accountable for the premises and who is responsible for issuing or implementing a general policy statement under the Health and Safety at Work etc Act 1974.

Authorising Engineer (LV)

- 2.5 An Authorising Engineer (LV) is appointed in writing by the Designated Person to take responsibility for the effective management of the safety guidance (LV). The person appointed should possess the necessary degree of independence from local management to take action within this guidance.

Authorised Person (LV)

- 2.6 An Authorised Person (LV) is appointed in writing by the management on the recommendation of the Authorising Engineer (LV) in accordance with this safety guidance (LV) and is responsible for the implementation and operation of this guidance with regard to work on, or the testing of, defined electrical equipment.

Competent Person (LV)

- 2.7 A Competent Person (LV) is approved and appointed in writing by an Authorised Person (LV) for defined work, comprising a core trade electrical craftsman possessing the necessary technical knowledge, skill and experience relevant to the nature of the work to be undertaken, who is able to prevent danger or, where appropriate, injury, and who is able to accept a permit-to-work from an Authorised Person (LV).

Accompanying Safety Person (LV)

- 2.8 An Accompanying Safety Person is a person not involved in the work or test who has received training in emergency first-aid for electric shock and who has adequate knowledge, experience and the ability to avoid danger, keep watch, prevent interruption, apply first-aid and summon help. The person is to be familiar with the system or installation being worked on or tested, and is to have been instructed on the action to be taken to rescue a person safely in the event of an accident.

Safety documents

Certificate of authorisation for live working

- 2.9 This is a safety document, which is a form of declaration, signed and issued by an Authorised Person (LV) to the Competent Person (LV) 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.

Limitation-of-access

- 2.10 This is a safety document, which is a form of declaration, signed and issued by an Authorised Person (LV) to a person in charge of work to be carried out in an area or location which is under the control of an Authorised Person (LV) and for which a permit-to-work (LV) is not appropriate.

Permit-to-work (electrical LV)

- 2.11 This is a safety document, which is a form of declaration, signed and issued by an Authorised Person (LV) to a Competent Person (LV) in charge of work to be carried out. It defines the scope of the work to be undertaken and makes known exactly what equipment is dead, isolated from all live circuit conductors and safe to work on.

Safety signs

Caution sign

- 2.12 This is a temporary, non-metallic sign bearing the words 'caution – persons working on equipment' and 'do not touch' which is to be used at a point-of-isolation.

Danger sign

- 2.13 This sign is a temporary, non-metallic sign bearing the words 'danger live equipment' and 'do not touch' which is to be used where there is adjacent live equipment at the place of work.

Switchroom sign

- 2.14 This is a permanent, non-metallic sign bearing the words 'electrical switchroom' and 'no unauthorised access'.

Voltage range

- 2.15 The ranges of voltage are defined as follows:
- **extra low voltage:** a potential not exceeding 50V ac or 120V ripple-free dc whether between conductors or to earth;
 - **low voltage (LV):** a potential not exceeding 1,000V ac or 1,500V dc between conductors, or 600V ac or 900V dc between a conductor and earth;
 - **high voltage (HV):** a potential normally exceeding low voltage.

General definitions

Additional earth: earthing equipment of an approved type applied after the issue of a safety document (for example an earth applied at a point-of-work).

Audit: the structured process of collecting independent information on the efficiency, effectiveness and reliability of the safe system of work, and drawing up plans for corrective action (see [Appendix 4](#)). ('Independent' does not necessarily mean external to the organisation.)

Authorised Person (LV)'s key: a key that controls access to the key cabinet.

Authorised Person (LV)'s key box: a single locked box that is used for the control of the Authorised Person (LV)'s key.

Complex circuit: a circuit which is normally operated at low voltage and which requires more than one point-of-isolation from known voltage sources to ensure safety at the point-of-work.

Conductor: a conductor of electrical energy.

Danger: risk of injury or death.

Dangerous condition: a condition that is likely to lead to a dangerous occurrence.

Dangerous occurrence: an incident involving a source of electrical energy that may be dangerous to any person, whether or not an accident has occurred.

Dead: a conductor that is neither 'live' nor 'charged'.

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.

Electrical equipment: anything used, intended to be used or installed for use in order to generate, provide, transmit, transform, rectify, convert, conduct, distribute, control, store, measure or use electrical energy.

Final Circuit: a final circuit is the circuit feeding the load directly, that is, the final distribution circuit supplying an individual lighting or power load. These are sometimes also called final sub-circuits. A final circuit has to be on the load side of the final fitted circuit protection of the system.

HFS: Health Facilities Scotland or its appointed agent.

Injury: death or personal injury from electric shock, electric burn, electrical explosion or arcing, or from fire or explosion initiated by electrical energy, where any such death or injury is associated with the generation, provision, transmission, transformation, rectification, conversion, conduction, distribution, control, measurement or use of electrical energy.

Isolate: disconnect and separate electrical equipment from every source of electrical energy in such a way that this disconnection and separation is secure.

Isolation and earthing diagram: a diagram attached to a permit-to-work illustrating the safety measures taken.

Key cabinet: a cabinet for the sole purpose of retaining all keys relative to the site's LV system(s) to which the Authorised Person (LV) has control.

Live: implies connection to a source of electricity.

Live functional testing: the testing of electrical equipment while live which does not involve live working.

Live working: the connection/disconnection of electrical equipment while live.

Lockable document cabinet: a lockable cabinet suitable for storing the electrical safety documents, temporary safety signs, distribution system records etc used in the application of this safety guidance (LV). This cabinet should not be used to store anything not associated with this guidance.

LV logbook: a book in which all matters relating to the electrical system should be recorded.

NEMA 3S: enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, and windblown dust; and in which the external mechanism(s) remain operable when ice-laden.

Operational procedure manual: a ring-binder containing information relating to the control and operation of the low voltage system.

Operational restriction: a written safety instruction, issued via the Authorising Engineer (LV), modifying or prohibiting the normal operating procedures associated with a particular make and type of equipment.

Personal supervision: supervision is given by a person having adequate technical knowledge and experience, who is present at all times.

Practice improvement notice: a notice issued by the auditor requiring improvements to be made in the observed working practices. The notice will relate to specific task(s) and will give a target date and/or time by which the improvements must be in place before similar task(s) can continue to be carried out.

Protective equipment: equipment used to protect persons from danger in the working environment. Protective equipment includes items such as special tools, protective clothing, insulating screens, safety harnesses, temporary safety signs etc.

Prove dead: demonstrate with the use of approved test equipment designed for the purpose that no electrical potential liable to cause danger is present.

Risk assessment: the analysis of the risks to health and safety inherent in a system and their significance in a particular context.

Safety key box: a box having two locks, each of which is to have only one key: one being labelled 'safety key box – Competent Person (LV)'; and the other 'safety key box – Authorised Person (LV)'. It is to be so arranged that both locks must be released before access can be gained to the contents of the box.

Safety locks: these are padlocks having only one key, which is different from all other keys in use on the electrical distribution system. Safety locks are to be indelibly coloured red, and each safety lock and its key are to have the same unique serial number for ease of identification. They are used for securing the means of isolation.

Safety programme: a written programme issued by an Authorised Person (LV) setting out the sequence of operations to be followed before a permit-to-work is issued.

Single line drawing: a single line drawing of the whole site system showing all major LV equipment in its normal state of operation (that is, switched on-off etc).

Spiking gun: an item of safety equipment used to confirm that a cable is dead.

Suspension notice: a notice issued by the auditor requiring specified works in progress to be suspended immediately pending action to ensure that compliance with the existing safe system of work can be achieved or a modified system introduced. This may follow an auditor's system improvement notice being issued.

Switchroom: a room or enclosure designated by an Authorised Person (LV) which contains low voltage distribution switchgear that can be operated without the use of a tool or key.

System: an electrical system in which all the equipment is, or may be, connected to a common source of electrical energy, including the source and its associated equipment.

3. Management policy

- 3.1 Management and its nominated staff as 'Duty Holders' are responsible for the safety of low voltage (LV) electrical systems on their premises. The Electricity at Work Regulations 1989 impose duties on 'employers' to comply with these insofar as they relate to matters that are within their control. These duties are in addition to those imposed by the Health and Safety at Work etc Act 1974.
- 3.2 To satisfy these requirements, management should have:
- a clearly defined electrical safety policy and programme for the operation and servicing of their low voltage system(s) and equipment;
 - means by which the policy and programme can be managed, implemented, monitored and reviewed.
- 3.3 In addition to ensuring that all statutory requirements relating to electrical safety are observed, management should have:
- a clearly defined electrical safety policy;
 - a structure, appropriate to the complexity of the work, for implementing the policy – including an outline description of individual responsibilities;
 - procedures for ensuring the effective administration of the policy;
 - a system of monitoring to ensure that the policy is being effectively pursued within the managed premises;
 - a programme of training to ensure the awareness of all staff on the use of electricity and general electrical safety;
 - appropriate training for relevant professional and technical staff;
 - a procedure for dealing with any emergencies that may arise.
- 3.4 Management should formally nominate in writing a Designated Person with responsibility for the LV electrical safety policy.
- 3.5 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:
- recognising the importance of the subject;
 - ensuring that responsibilities both legal and managerial are clearly defined and understood throughout the organisation;
 - 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, operation and maintenance of systems and equipment in respect of premises owned or occupied by them;

- monitoring and reviewing at regular intervals the effectiveness of the policy and progress concerning its implementation;
- ensuring that clear and concise written records are kept of all activities involved in the implementation of the policy.

- 3.6 Within each management structure, an electrical engineer should be formally appointed as an Authorising Engineer (LV) with the responsibility for implementing, administering and monitoring the application of the requirements of this document. The person appointed to fill this position needs to have a commitment to the role and the responsibilities which it involves, and should preferably be independent of the organisation. The management who are responsible for the appointment also have a duty to monitor the effectiveness of the Authorising Engineer (LV) in fulfilling this role. [Appendix 4](#) contains an audit procedure and forms.
- 3.7 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. These will be appointed in writing as 'Authorised Persons (LV)' or 'Competent Persons (LV)'.
- 3.8 It is strongly recommended that management should, through an appointed Authorising Engineer, be independent in respect of the management of the operation of their low voltage installations. This should 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 (that is, a local distribution network operator or other suitable contractor). In all instances, it is essential that Authorised Persons (LV) are appointed to ensure competency levels of all staff working on electrical equipment within healthcare facilities.
- 3.9 The extent to which control of systems and/or equipment is delegated to an independent organisation may take into account the inherent risks involved to patients and/or sensitive equipment and the complexity of the installation. Accordingly, it is recommended that a level of control, commensurate with the risk, should be maintained by management personnel.
- 3.10 It should 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 responsibility.
- 3.11 Management should establish and maintain a system of equipment registration and control. The system should ensure that all LV electrical equipment and associated buildings for which they have a responsibility, and which is 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.
- 3.12 A formal acceptance procedure is necessary 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.

4. Appointment, roles and duties of personnel

General

- 4.1 Anybody who works on – and is concerned with the control, operation or testing of – equipment to which this safety guidance (LV) applies has the responsibility to ensure that they comply with, and implement, the principles outlined in this guidance together with any relevant codes and procedures. Ignorance of the relevant legal requirements, codes and procedures, and the guidance given in this Scottish Health Technical Memorandum may not be accepted as an excuse for neglect of duty.
- 4.2 The responsibilities placed on persons may include all or part of those detailed in this section, depending on the role of the persons.
- 4.3 Any written authorisation given to persons to perform their designated role in implementing this safety guidance (LV) should indicate the class of operation and/or work permitted and the section of system to which the authorisation applies.
- 4.4 Persons involved in achieving safety from the inherent dangers of the system in order to allow work or testing to commence on equipment and its subsequent restoration to service will have separate, broadly identifiable areas of responsibility as follows:
- control – including:
 - before work commences – giving instructions on how to implement precautions, and sanctioning the issue of safety documents;
 - after completion of work – acknowledging cancellation of safety documents and giving instructions on how to restore equipment to service;
 - making safe or restoring equipment – including:
 - before work commences – taking action to make equipment safe for work, and issuing safety documents;
 - after completion of work – cancelling safety documents, and taking action to restore equipment to service;
 - work – which includes receipt of a safety document, execution of the required work to its completion, or termination and clearance of the safety document.
- 4.5 It is strongly recommended that the personnel assigned to these roles and duties are only appointed to undertake the duties associated with a single role.

Roles and duties of the Designated Person

4.6 Each healthcare organisation should appoint a person as Designated Person. The roles in relation to this Scottish Health Technical Memorandum are described below.

- appoint in writing an Authorising Engineer (LV) for all systems and installations for which management has responsibility;
- review the Authorising Engineer (LV)'s appointment annually to ensure the Authorising Engineer (LV)'s duties have been carried out in accordance with this Scottish Health Technical Memorandum;
- agree any local variations from this guidance.

Role and duties of the Authorising Engineer (LV)

4.7 The Authorising Engineer (LV) will be responsible for implementing, administering and monitoring the application of this guidance. The Authorising Engineer (LV)'s roles include the following:

- assess and recommend in writing sufficient Authorised Persons (LV) to provide the necessary cover for all systems and installations for which management has responsibility;
- define the exact extent of the systems and installations for which each Authorised Person (LV) is responsible and, where appropriate, any part of the system which is excluded from the Authorised Person (LV)'s responsibilities;
- if necessary, recommend the suspension or cancellation of the appointment of an Authorised Person (LV) and withdraw the certificate;
- maintain a register of all Authorised Persons (LV);
- ensure that candidates for appointment as Authorised Persons (LV):
 - satisfy the qualification requirements;
 - satisfy the training and familiarisation requirements;
 - can demonstrate adequate knowledge of each system, installation and type of equipment for which authorisation is sought;
 - have satisfied the Authorising Engineer (LV) as to their competence and ability.

4.8 The Authorising Engineer (LV) also:

- issues to each Authorised Person (LV), on appointment, a certificate valid for a period not exceeding three years; reports to the management any deficiency in the number of suitably trained and experienced Authorised Persons (LV) where this significantly impairs management's ability to provide a safe and efficient service;

- reviews each Authorised Person (LV)'s operational experience at intervals of not more than three years by examining the relevant operating records of the system(s), and recommends refresher training as necessary;
- on receipt of an 'operational restriction' related to low voltage systems and/or equipment, ensures that all Authorised Persons (LV) are made aware of it and receive copies;
- notifies Health Facilities Scotland of any known operational restriction issued by a distribution network operator or equipment manufacturer etc, or one which arises locally;
- initiates and coordinates the investigations of reported injuries and dangerous occurrences involving electrical systems and installations within the Authorising Engineer (LV)'s sphere of responsibility.

4.9 They should:

- sanction any interpretation of this guidance, any local house rules and any deviation that may be necessary for their application;
- ensure that any amendments to this guidance are brought formally to the attention of, and are understood by, all appropriate personnel;
- notify the management of any known defect reports or operational restrictions issued by a distribution network operator, manufacturer or supplier of electrical equipment which is applicable to equipment within the areas for which the Authorising Engineer (LV) is responsible;
- ensure that a system is in place to circulate relevant information on operating restrictions and dangerous occurrences to all Authorised Persons (LV);
- investigate all dangerous occurrences involving electrical equipment, systems and installations for which the Authorising Engineer (LV) is responsible;
- where live working is considered appropriate, and a certificate of authorisation for live working is being considered, give written authority to an Authorised Person (LV) before the live working takes place;
- agree in writing any local deviation from this guidance that may be necessary for their application to a particular item of equipment or location;
- ensure that any amendments to this guidance are brought to the attention of, and understood by, all Authorised Persons (LV).

4.10 At random intervals not exceeding 12 months, the Authorising Engineer (LV) is to review the operational experience of all Authorised Persons (LV). These reviews should pay particular attention to operating records and the issue and cancellation of permits. He/she should formally advise on any training or retraining considered necessary, including when it should be received. These reviews should include a meeting with the Authorised Person (LV) and a brief review of the systems or installations to which their appointment refers.

- 4.11 At intervals not exceeding three years, the Authorising Engineer (LV) is to undertake comprehensive audits of the safe systems of work and safety procedures required by this guidance. Separate audits are to be carried out for each site or geographical area to which the Authorising Engineer (LV) has been appointed.
- 4.12 A written report of the audit is to be compiled, listing satisfactory items seen and any deficiencies found, and recommendations made. This is to be issued to an Authorised Person (LV) for action as necessary. A copy of the report with a summary of the findings is to be issued to the Designated Person.
- 4.13 The Designated Person is to acknowledge receipt of the audit report, make any comments considered necessary and compile an action plan in consultation with the Authorising Engineer (LV). The Authorising Engineer (LV) should review the progress on the action plan at the next audit.

Roles and duties of the Authorised Person (LV)

- 4.14 The Authorised Person (LV) should be solely responsible for:
- the practical implementation and operation of this guidance; and
 - the systems and installations for which management is in control of danger and for which the Authorised Person (LV) has been appointed.
- 4.15 The Authorised Person (LV)'s instructions and decisions on electrical matters may be considered final and should be complied with. In the case of a dispute, the Authorised Person (LV) is to stop the work or test and make safe the installation or equipment. The Authorising Engineer (LV)'s opinion should be sought for adjudication.
- 4.16 More than one Authorised Person (LV) may be appointed for a system or installation but, at any one time, only one Authorised Person (LV) is to be on duty. Each transfer of responsibility between Authorised Persons (LV) is to be recorded in the LV logbook. The name of the Authorised Person (LV) on duty is to be readily available and is to be displayed on or near the working key cabinet in a position that can only be altered by an Authorised Person (LV) using an Authorised Person (LV) key.
- 4.17 Where there is more than one Authorised Person (LV) appointed for a system or installation, the Authorising Engineer (LV) should be advised of any Authorised Person (LV) who is nominated as being in overall charge with responsibility for control of records etc.
- 4.18 The duties of Authorised Persons (LV) may be summarised as follows:
- control the work on low voltage systems, prepare inspection, maintenance and safety programmes and progress the work;
 - ensure that any alterations or installation of equipment do not compromise the electrical system;
 - ensure that all records concerning low voltage systems are kept up-to-date;

- ensure that any person working on the system is competent to do so;
- ensure that test equipment is maintained in good condition;
- cooperate with the Authorising Engineer (LV) in matters of policy concerning low voltage systems;
- report in writing any dangerous and/or unusual occurrences to the Designated Person and Authorising Engineer (LV);
- appoint in writing Competent Persons (LV) and maintain a register of all appointments;
- make routine inspections of switchrooms;
- define the duties of appointed Competent Persons (LV) on the certificate of appointment;
- ensure that the necessary safety posters are displayed in switchrooms at all times;
- issue and cancellation of safety documents when necessary;

4.19 Inform the Authorising Engineer (LV) of:

- any defects found in electrical equipment;
- any dangerous occurrence;
- any dangerous practices observed in the course of his duties.

4.20 The Authorised Person (LV) also:

- arranges for, supervises or undertakes cable detection or location work within the geographical area of the Authorised Person (LV)'s appointment;
- appoints Competent Persons (LV) for defined work and maintains a register of Competent Person (LV) appointments including dates of appointment, the date the appointment is due to expire, details of training and training dates. This register is to be kept in the operational procedure manual with copies of all current Competent Person (LV) certificates;
- ensures that all records for the system for which the Authorised Person (LV) is appointed are completed and kept up-to-date.

4.21 Authorised Persons (LV) are to monitor the performance of all Competent Persons (LV) annually by completing the audit form in [Appendix 4](#). Monitoring is to be carried out continuously and is to include:

- visiting work sites and communicating on safety issues;
- visiting switchrooms and electrical enclosures to ensure high standards of tidiness and availability of appropriate safety equipment every three months.

4.22 Authorised Persons (LV) are to take action to rectify and report in writing to the Authorising Engineer (LV) on any deficiencies found. A copy of this report is to be placed in the operational procedure manual.

Role and duties of the Competent Person (LV)

- 4.23 Competent Persons (LV) should comply with this safety guidance (LV) when carrying out work, whether instructions are issued orally or in writing.
- 4.24 Competent Persons (LV) should use safe methods of work, safe means of access and the personal protective equipment and clothing provided for their safety.
- 4.25 Competent Persons, when recipients of a safety document, should:
- be fully conversant with the nature and the extent of the work to be done;
 - read the contents and confirm to the person issuing the safety document that they are fully understood;
 - during the course of the work, adhere to, and instruct others under their charge to adhere to, any conditions, instructions or limits specified on the safety document;
 - keep the safety document and (where appropriate) keys in safe custody, and correctly implement any management procedure to achieve this;
 - when in charge of work, provide immediate or personal supervision as required;
 - warn all persons as quickly as possible to withdraw from, and not to work on, the equipment concerned until further notice if, during the course of work, a hazard which could result in danger arises or is suspected. The situation should be reported immediately by the Competent Person (LV) to an Authorised Person (LV).
- 4.26 Competent Persons (LV) should not start or restart work under a safety document issued to another Competent Person (LV).
- 4.27 Having accepted a permit-to-work, the Competent Person (LV) may only undertake or supervise the work or test specified until the task is complete and the Competent Person (LV) has signed part 3 of the permit retained in the pad. Neither the Competent Person nor any person under the direct control of the Competent Person (LV) is to attempt to undertake any other duties.
- 4.28 Unless it is unavoidable, the Competent Person (LV) is not to leave the location of the work or test until the task is completed. If the Competent Person (LV) has to leave the location of the work or test temporarily, the task is to be suspended and adequate safety precautions taken to prevent danger. The work or test is not to be resumed until the Competent Person (LV) has returned to the location of the work or test.
- 4.29 Competent Persons (LV) clearing a safety document should do so only after all persons working under the safety document have been withdrawn from, and warned not to work on, the equipment concerned. Where appropriate, they should ensure that all tools, gear and loose material have been removed, guards and access doors replaced, and the workplace left tidy.

Role and duties of the Accompanying Safety Person (LV)

- 4.30 The Accompanying Safety Person is a person, not directly involved in the work or test, who should have adequate knowledge, experience and the ability to avoid danger. They are required to keep watch, prevent unauthorised interruption of the work or test, be able to apply first-aid and summon help.
- 4.31 The Accompanying Safety Person is to have received training in emergency first-aid in accordance with this safety guidance (LV).
- 4.32 The Authorised Person (LV) or the Competent Person, as appropriate, who will be responsible for the work or test to be attended is to ensure that the Accompanying Safety Person understands their intended role and fully understands how to disconnect the equipment being worked on or tested from all sources of supply and how to switch off any test equipment or disconnect it from its source of supply.
- 4.33 The Accompanying Safety Person is to be in attendance when the Authorised Person (LV) considers it necessary and in the following circumstances:
- while equipment is being proved or confirmed dead;
 - where equipment cannot be confirmed dead until the Competent Person (LV) has made conductors accessible. An Accompanying Safety Person will not normally be required if the conductor to be made accessible is connected to an accessory such as a lighting switch plate, spur or socket outlet which is part of a final circuit;
 - where working or testing in accordance with [Table 1](#) when the means of isolation is not positively identified;
 - while inspection, fault-finding or testing is being undertaken on live low voltage equipment;
 - while work is being undertaken on live low voltage equipment;
 - while the Authorised Person (LV) is spiking a cable.

Appointment of an Authorising Engineer (LV)

- 4.34 An Authorising Engineer (LV) should be appointed in writing by the management. Details of the recommended procedure, model letters and certificates are given in [Appendix 4](#) together with additional guidance in [Appendix 7](#).
- 4.35 An Authorising Engineer (LV) is to be appointed or re-appointed for defined systems and installations for no longer than three years.
- 4.36 A person should be nominated by the Authorising Engineer (LV) and appointed by the management to provide absence cover or deputise for the Authorising Engineer (LV). Any person appointed should, as far as is reasonably practicable, meet the criteria set out in this guidance and be acceptable to the management.

4.37 A copy of the certificate is to be placed in the operational procedure manual.

Appointment of an Authorised Person (LV)

4.38 The Authorised Person (LV) should be formally appointed by the management or on the recommendation of the Authorising Engineer (LV) 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 letters and certificates are given in [Appendix 4](#) together with additional guidance in [Appendix 7](#).

4.39 An Authorised Person (LV) is to be appointed or re-appointed for defined systems and installations for no longer than three years.

4.40 A copy of the certificate is to be placed in the operational procedure manual.

Appointment of a Competent Person (LV)

4.41 Appointment of a Competent Person (LV) will be by the issue of a Competent Person (LV) certificate, using the appointment procedures and the model letters of appointment and acceptance suggested in [Appendix 6](#).

4.42 The prospective Competent Person (LV) is to attend a formal interview with an Authorised Person (LV) appointed for the system or installations for which the appointment is sought.

4.43 A Competent Person (LV) is to be appointed or reappointed for defined systems and installations for no longer than three years.

4.44 A copy of the certificate is to be placed in the operational procedure manual.

Contractor's Competent Persons

4.45 Where a contractor has been appointed to provide a Competent Person (LV) for a system and installation, it will be the Authorised Person (LV)'s responsibility to ensure that each Competent Person (LV) is of a standard equivalent to that required by this guidance.

4.46 The contractor is responsible for ensuring that the contractor's Competent Person (LV) employed on company work is of a standard equivalent to that described in [Appendix 7](#), and is to provide the Authorised Person (LV) with a certificate or letter of competence detailing the technical knowledge and experience of the person involved.

4.47 A copy of the employer's letter is to be placed in the operational procedure manual.

4.48 The Authorised Person (LV) is to assess the contractor's Competent Person (LV) for defined work on defined equipment, and issue a personal copy of the Electrical safety handbook, ensuring a signature for receipt is obtained from the Competent Person. A note of this action is to be recorded in the logbook.

- 4.49 If the Authorised Person (LV) believes that a contractor's Competent Person (LV) is not working in accordance with the requirements of this Scottish Health Technical Memorandum or is working in a dangerous manner, the Authorised Person (LV) has the authority to stop the work.
- 4.50 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.

Suspension or cancellation of appointment of an Authorised Person (LV)

- 4.51 The appointment of Authorised Persons (LV) may be suspended or cancelled for reasons of safety by the Authorising Engineer (LV), who should take the following action:
- retrieve from the Authorised Person (LV) their certificate of appointment and all related items issued under the appointment procedure;
 - 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 person responsible for the action;
 - inform the Authorised Person (LV) in writing, 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);
 - (with regard to the suspension or termination of the appointment) notify in writing all other Authorised Persons (LV) appointed for all systems and installations with which the Authorised Person (LV) was associated;
 - arrange a meeting with the Authorised Person (LV) to discuss the suspension and, where necessary, the cancellation;
 - take the necessary action to ensure alternative cover is provided.

5. Demarcation of responsibilities between the management and others

General

- 5.1 Whenever there is a division of responsibilities between management and others, the Authorised Person (LV) appointed by management should issue instructions to other parties, as necessary, to prevent danger.
- 5.2 Where a specialist contractor has been appointed under contract or other arrangement by management, they should be required to comply with:
- management's electrical safety guidance for low voltage systems;
 - the requirements of this Scottish Health Technical Memorandum;
 - any instructions issued by management's Authorised Person (LV) in accordance with their electrical safety guidance for low voltage systems.
- 5.3 Where there is a demarcation of responsibilities between the management and others, the Authorised Person (LV) is, on matters relevant to Authorised Person (LV) duties, to liaise with the other party (or parties) as necessary to avoid danger.
- 5.4 Each demarcation of responsibilities is to be recorded in writing and precisely described on a diagram. The point of demarcation must be at a cable termination and is to be at the outgoing terminals of a switch or circuit breaker.
- 5.5 Each proposed demarcation of responsibilities is to be approved by the Authorising Engineer (LV) before it is finally agreed with the other party (or parties) involved.
- 5.6 A copy of the diagram is to be prominently displayed at each substation and switchroom under joint control.
- 5.7 One copy of the agreement, including the diagram, is to be sent to the Authorising Engineer (LV) and another is to be placed in the operational procedure manual.
- 5.8 Where another organisation transfers control of electrical danger to the management for the duration of a contract, the Authorised Person (LV) appointed by the management to be in control of the electrical danger is to request from the other organisation, details in writing of any known hazards (including potentially explosive atmospheres, polychlorobiphenyls (PCBs) etc) that are, or may be, present. A copy of these details is to be placed in the operational procedure manual and another copy is to be given to the management contractor(s), if appointed.

Note 1:- The other organisation has a duty to provide such details under Section 4 of the Health & Safety at Work etc Act 1974.

Where the management has control of the danger for part of another organisation's system or installation

- 5.9 The Authorised Person (LV) (or, for a new site, the Authorised Person (LV) Designate) is to liaise with the other organisation's Duty Holder to agree the point of demarcation and the points of contact for both parties. Once the Authorising Engineer (LV) has approved this, the formal agreement is to be drawn up and signed by both parties.

Where the management does not have control of the danger for a system or installation

- 5.10 The management staff and the management contractor's staff who are to undertake work or tests on parts of systems or installations for which the management does not have control of the electrical danger are not required to comply with this guidance, but are to comply with the statutory regulations and/or any safety rules and procedures issued by the organisation having control of the electrical danger.

Where contractors are to undertake installation work on an existing system or installation for which the management has control of the danger

- 5.11 Before any installation work is undertaken by contractors on an existing system or installation for which the management has control of the danger, it is recommended that the person responsible for that installation work is to liaise directly with the Authorised Person (LV) to ensure that the work is undertaken in accordance with this guidance and that contractor's method statements agree and are included in the safety programme.

For new work before the system or installation is accepted from the contractor

- 5.12 During the construction period of the contract, the contractor(s) will have control of the electrical danger and is to comply with all relevant statutory regulations. The contractor(s) is not required to comply with this guidance unless it is imposed by the conditions of contract.
- 5.13 Where it is known that the management will eventually accept control of the electrical danger, it is recommended that the Authorising Engineer (LV), in conjunction with the Duty Holder for the site involved, appoints an Authorised Person (LV) to take responsibility for the new systems or installations when they are officially handed to the management for day-to-day operation and maintenance.

- 5.14 The Authorised Person (LV) should liaise with the contractor's Duty Holder in order to become familiar with the systems or installations for which they will eventually take control of the electrical danger.
- 5.15 Where the contractor's Duty Holder is responsible for part of a system or installation, the exact extent of the contractor's responsibility is to be agreed in writing.

Note 2: Electrical test certificates and the appropriate hand-over certificates for the new installations are to be formally accepted from the contractor by the management before the installation is connected to a permanent supply for which management has responsibility.

6. General precautions

Admittance to switchrooms

- 6.1 All access doors to each switchroom must be kept securely locked when unattended.
- 6.2 Locks are to be identical so that a single key will enable access to be gained to any switchroom over which the Authorised Person (LV) has control or a degree of control on a site.
- 6.3 Each Authorised Person (LV) and Competent Person (LV) should be issued with a key; when a safety document is issued, the recipient of the document may also be issued with a key.
- 6.4 No person other than an Authorised Person (LV) or Competent Person (LV) may enter a switchroom unless they are accompanied by an Authorised Person (LV) or have receipt of a safety document issued by an Authorised Person (LV).
- 6.5 The exception to paragraph 6.4 is when the switchroom is provided with “automatically controlled fire protection”, when the person must be trained for entry into such room.

Security of electrical equipment

- 6.6 All electrical equipment should be secured against unauthorised operation. If the electrical equipment is not located within a switchroom, operation of such equipment should only be by the use of a tool or key.

Availability of electrical supplies

- 6.7 If the supplies of electricity are to be made unavailable or are to be put at risk via working on stand-by generators or uninterruptible power supplies, the Authorised Person (LV) or Competent Person (LV) responsible for the work should contact the person in charge of the area, and a signed “permission to disconnect” form should be obtained before the equipment is isolated.

Safety key boxes

- 6.8 The number of safety key boxes provided for each site for which Authorised Persons (LV) have been appointed is to be decided by the Authorising Engineer (LV):
 - each safety key box is to bear the name of the site and a serial number ensuring positive identification within the site;
 - when in use, each safety key box is to contain the keys to safety locks associated with only one permit-to-work;
 - after the safety locks have been applied, and before a permit-to-work is issued, the keys to all the safety locks are to be placed in a safety key box,

and both locks of the box are to be secured. When the permit is issued, the Authorised Person (LV) is to retain the Authorised Person (LV)'s key and give the Competent Person (LV)'s key to the Competent Person (LV);

- the Competent Person (LV) is to retain the Competent Person (LV)'s key until the permit-to-work is cancelled;
- when not in use, the keys to safety key boxes are to be kept in the working key cabinet.

Dangerous occurrences

- 6.9 The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR) requires certain dangerous occurrences and accidents to be reported to the Health & Safety Executive.
- 6.10 A dangerous occurrence is to be reported to the Authorised Person (LV) by Competent Persons (LV) as soon as reasonably practicable.
- 6.11 The Authorised Person (LV) is, without delay or as soon as practicable, to send a preliminary report of the dangerous occurrence to the Authorising Engineer (LV) and Designated Person.
- 6.12 Any notifications and reports required to satisfy statutory or other management requirements are to be issued.
- 6.13 The Authorising Engineer (LV) is to investigate each dangerous occurrence and issue a report to the Designated Person. The report is to be sufficiently detailed to enable the sequence of events leading to the occurrence to be determined. Where reasonably practicable, the report is to include photographs taken before any items of equipment involved in the dangerous occurrence are disturbed.
- 6.14 To alleviate potential problems or criticism that may arise at any enquiry into a dangerous occurrence or incident, management should consider:
- the questionable conflict of interests and impartiality of any investigation or subsequent report where it is carried out by those directly involved;
 - the reliability of evidence involving self-judgement.

Operational restrictions

- 6.15 An operational restriction is a specific written instruction issued via the Authorising Engineer (LV) or Health Facilities Scotland in the form of a 'hazard notice', 'safety action bulletin' or similar official instruction modifying the normal operating procedures associated with a particular type of equipment. Where the operational restriction is initiated by the Authorising Engineer (LV), it should, when relevant, be forwarded to Health Facilities Scotland for circulation nationally.
- 6.16 On receipt of an operational restriction, the Authorised Person (LV) should:

- acknowledge the receipt to the Authorising Engineer (LV), indicating whether the equipment is included in the local system(s) or installations;
- record the receipt in the logbook and the action taken;
- place a copy signed by each Authorised Person (LV) in the operational procedure manual.

6.17 Where the equipment to which the operational restriction refers forms part of the local systems and installations, the Authorised Person (LV) is to:

- place a copy of the operational restriction, signed by each Authorised Person (LV), in the operating and maintenance manual;
- arrange for any inspection and remedial work required;
- where considered necessary, fix warning signs on each item of equipment involved and report the satisfactory completion of any remedial works to the Authorising Engineer (LV).

Location of underground cables

6.18 Where it is proposed to carry out excavation work on sites for which Authorised Persons (LV) have been appointed, it is the responsibility of the Authorised Person (LV) when advised to ensure that all underground power cables within the proposed areas of excavation are located and their positions marked before the ground is disturbed.

6.19 No person should use cable location and tracing devices unless they are competent to do so and have been specifically trained in their use. A certificate should be issued by the instructor on successful completion of the training. A copy of this should be placed in the operational procedure manual.

6.20 Training in the use of cable location and tracing devices should normally be given by the manufacturers of the equipment, but alternatively it may be given by a Competent Person (LV) who has been trained and certified by the manufacturers or an approved training provider.

Switching methods

Safety switching

6.21 Planned switching on any complex circuit or switching in preparation for the issue of a permit-to-work should be in accordance with the following sequence of events:

- write a safety programme (which details all switching and requires notification to users of any disconnections) and arrange for another Authorised Person (LV) to check the programme if reasonably practical;
- the programme should be written a reasonable period in advance of the proposed start of the job;

- complete necessary switching and issue of safety documents as detailed in the safety programme. Record times of each switching action/document issue;
- enter summary details of switching undertaken and safety documents issued in the logbook. Reference serial numbers of safety programme and permit(s);
- on completion of work, cancel safety documents (destroy permit original) and complete switching to restore supplies to normal as detailed in the safety programme. Record times of each action;
- file completed safety programme (which shows times of each switching action and issue/ cancellation of permit(s)) in the operational procedure manual;
- place permit-to-work book containing cancelled permit in the copy key cabinet (or agreed store).

Fault-switching

- 6.22 Fault-switching is the switching on of the LV network to disconnect a faulty part of the network and restore supply to the remaining healthy part of the system that was affected by the fault. Fault-switching is not emergency switching. Healthcare premises should have stand-by generators and uninterruptible power supply systems (UPS) to enable them to cope with a sudden unexpected loss of supply without an immediate life-threatening situation being created. However, loss of supply is a serious problem which could develop into an emergency – prompt action is therefore required to restore supply.
- 6.23 If more than one person is switching, one Authorised Person (LV) should be in overall command of the fault-switching and should maintain an accurate record of the operational state of the network. This person will act as a control engineer and will direct and sanction all fault-switching.
- 6.24 The essential steps in fault-switching are:
- remain calm and assess the situation as it develops;
 - record in writing what protection operated as the result of the initial fault;
 - inspect all switchgear for signs of distress before operating it;
 - plan fault-restoration switching a few steps at a time and write down planned switching before carrying it out. Record all switching times;
 - reset lifts, pumps etc as required.

Emergency switching

- 6.25 Emergency switching is switching that is required to remove an immediate threat to life, for example opening an incoming switch to disconnect supplies to an LV board in which an electrician has accidentally made contact with live busbars.

- 6.26 Emergency switching, when required, may be undertaken without the need to complete any of the sequence steps detailed for planned or fault-switching.
- 6.27 Persons who undertake emergency switching should do so in a manner that does not put themselves or others at risk of injury.

Fire protection equipment

Automatic control

- 6.28 Before work or inspections are carried out in any enclosures protected by automatic fire-extinguishing equipment:
- the automatic control must be rendered inoperative by the Authorised Person (LV) and the equipment left on hand-control. A caution sign should be attached and displayed whenever the automatic fire-extinguishing system is inoperative;
 - precautions taken to render the automatic control inoperative must be noted on any safety document issued for work in the protected enclosure;
 - the automatic control will be restored by the Authorised Person (LV) immediately after the persons engaged on the work or inspections have withdrawn from the protected enclosure.

Portable extinguishers

- 6.29 Only carbon dioxide (CO₂) or dry-powder extinguishers may be used near live electrical equipment and a safety clearance of at least 300 mm should be maintained. After the discharge of portable extinguishers in an enclosed space, personnel must withdraw from that space.
- 6.30 After any explosion or fire, or after the discharge of extinguishers in an enclosed space, the space must be thoroughly ventilated before entry of personnel, unless suitable breathing apparatus is worn.

Access to, and work in, underground chambers, vessels and confined spaces

- 6.31 The following points apply:
- barriers, doors or gates restricting access to underground chambers or similar confined spaces, in which dangerous fumes or other hazards are present or likely to be present, should normally be kept locked and the control of keys should be maintained in accordance with an approved procedure;
 - when any person has to enter any such place or similar confined space in which the above dangers are present or likely to be present, to such an extent as to involve risk of persons being overcome or otherwise endangered, precautions should include the issue of a limitation-of-access safety document in accordance with this document;

- arrangements for access and work, and the precautions to be taken, should be in accordance with the Confined Spaces Regulations 1997.

Protective equipment

- 6.32 Appropriate protective equipment is to be provided by management. It should be readily available at all times to those who need it and have training in its use. It is to be worn or used whenever necessary to avoid danger and injury, and as required by this safety guidance (LV).
- 6.33 Only protective equipment suitable for the purpose is to be provided by the management and its contractors. Protective equipment provided by the Competent Person (LV) employed by a contractor may be used if the Authorised Person (LV) agrees. Such use is to be recorded on the permit.
- 6.34 Protective equipment is to be inspected by the user for visible defects before and after use. Any suspect item is not to be used; suspect items are to be reported to the Authorised Person (LV), who is to consider its withdrawal and its replacement.
- 6.35 Unless more frequent intervals are specified, an Authorised Person (LV) is to inspect each item of safety equipment provided by the management at least once a year for defects and wear, and is to take remedial action where necessary. These inspections are to be recorded in the logbook.

Test equipment

- 6.36 The Authorised Person (LV) on duty is to arrange for the necessary test equipment to be available when required.
- 6.37 Test equipment is to be inspected by the user for visible defects on each occasion before and after use.
- 6.38 Unless more frequent intervals are specified, the Authorised Person (LV) is to inspect each item of test equipment provided by the management at least once a year for defects and is to take remedial action where necessary. These inspections are to be recorded in the logbook.
- 6.39 Test equipment is to be maintained and, where appropriate, recalibrated in accordance with the manufacturer's instructions.
- 6.40 The location of protective equipment, test equipment and portable earthing equipment is to be prominently displayed adjacent to the working key cabinet.

Cable identification

- 6.41 Phase conductors in a new installation or an alteration/addition to an existing installation should be coloured as in BS7671: 2008. Other phase conductors may be brown, black, red, orange, yellow, violet, grey, white, pink or turquoise.

6.42 In a two- or three-phase power circuit, the phase conductors may all be of one of the permitted colours, and either identified L1, L2, L3 or marked brown, black, grey at their terminations to show the phases:

- brown phase – L1;
- black phase – L2;
- grey phase – L3;
- blue phase – N.

Circuit identification

6.43 The NICEIC (National Inspection Council for Electrical Installation Contractors) recommend within distribution boards that the circuit number comes first and then the phase identification:

- circuit 6 brown phase is marked – 6L1;
- circuit 8 black phase is marked – 8L2;
- circuit 10 grey phase is marked – 10L3;
- circuit 7 blue (neutral) is marked – 7N.

6.44 Circuit identification on drawings etc should be in the same manner, with the distribution board identification coming first:

- distribution board LP6 on circuit 6 – LP6/6/L1;
- distribution board L4 on circuit 8 – L4/8/L2;
- distribution board P2 on circuit 10 – P2/10/L2;
- distribution board C6 on circuit 7 – C6/7/N.

Note 3: Three-phase circuits should be numbered in a similar manner, that is, LP6/6/L1L2L3.

7. Safety precautions and procedures for work on low voltage systems made dead

General

- 7.1 All work on low voltage electrical equipment including conductors should be carried out while such electrical equipment and conductors are dead and isolated from all sources of supply, and after being proved dead at the point-of-work. The only exceptions to this rule are for the circumstances described in [Sections 8 or 9](#).
- 7.2 Before any work can begin, the electrical equipment and conductors need to be identified and then proved dead at the point-of-work by means of an approved voltage testing device, which must itself be tested in an approved manner immediately before and immediately after its use.
- 7.3 When work is to be carried out on low voltage equipment made dead, all reasonably practicable steps must be taken to prevent the electrical equipment and/or conductors being made live inadvertently during the course of the work, including locking-off any switchgear, removal of any fuses, links or similar approved methods. Unless a key safe is used, the person working on the equipment should retain any locking-off keys, fuses and links.
- 7.4 If electrical equipment and conductors cannot be isolated and proved dead at the point-of-work, the 'live working' guidance given in [Section 8](#) should apply.
- 7.5 Making electrical equipment and/or circuit conductors dead or live by means of a signal or prearranged understanding after an agreed interval of time is not an acceptable practice.

Isolation

- 7.6 In achieving isolation, the following steps should be carried out where reasonably practicable:
- the application of a safety system to prevent the circuit breaker or switch being closed or fuse replaced whenever the equipment allows its use. Use of special locking devices to allow the use of safety locks is recommended;
 - a visible break in air should be obtained (whenever possible);
 - a caution sign should be fixed.
- 7.7 A caution sign should be fixed at each point-of-isolation. It is recommended that an individual's name is added to each caution sign to aid location of the person in charge of the work.
- 7.8 Circuits to be worked on must be isolated from all known voltage sources including alternative energy sources (wind generators, photovoltaic cells etc)

and generators or battery systems. Consideration must also be given to the need to isolate from all possible voltage sources.

Note 4: Work on a final circuit can be safely carried out with isolation at the controlling distribution board fuse-way only – that is, isolation from the known voltage source only, since the likelihood of supply via a generator connected to the same circuit is considered remote. However, work on the busbars of a sub-main switchboard would require isolation of all circuits connected to the board (not just the incomer or known voltage supply), since it is feasible for a generator to be connected to one of the many circuits normally supplied from the sub-main board.

- 7.9 Where a permit-to-work is not required and isolation is achieved by the removal of fuses or links, and it is not practicable to apply a safety lock, the Competent Person (LV) responsible for the work or test must securely retain the removed fuses or links. A caution sign should be displayed.
- 7.10 The Authorised Person (LV) should isolate any circuits before a permit-to-work is issued.
- 7.11 The keys to safety locks should be retained by the Competent Person (LV) who applied them. If an Authorised Person (LV) applies the safety lock before the permit-to-work is issued, the key must be placed in a key safe. One key to the key safe would be retained by the Authorised Person (LV), and the other being issued to the person in receipt of the permit.

Work on low voltage electrical equipment and conductors made dead

- 7.12 When work is to be carried out on low voltage electrical equipment and conductors that have been made dead, suitable precautions additional to those referred to in [paragraphs 7.1](#) and 7.11 should be taken where necessary by approved screening or other approved means in order to avoid danger from inadvertent contact with live conductors in the zone of work.
- 7.13 Caution signs should be securely fixed at all points-of-isolation for the electrical equipment and conductors that have been made dead, and on which work is to be carried out. Danger signs must be attached where reasonably practicable for any adjacent live circuit conductors (or electrical equipment containing live circuit conductors) that are adjacent to the point-of-work.
- 7.14 In cases where the work is concerned only with the external earthed metal parts of electrical equipment and no contact can be made with live conductors, or where the connected electrical equipment is physically removed from its normal location, the Authorised Person (LV) may allow some of the measures under [paragraphs 7.1](#) and 7.11 to be omitted providing they are satisfied that the measures taken are still adequate to prevent danger.

Working on cables

Identification and spiking of LV cables

- 7.15 Before the conductors of a cable are cut or exposed, a point-of-isolation for the cable and the point-of-work on the cable is to be identified with certainty.
- 7.16 Identification of a mains voltage or street-lighting cable other than at a labelled termination point may be regarded as clear and certain if the cable can be seen throughout its length, or if it can be clearly seen between the point-of-isolation and the point-of-work.
- 7.17 In the absence of clear and certain identification of a cable, it is to be spiked at the point-of-work. Before spiking, it may be necessary to carry out signal injection using the cable cores. Further tests can be repeated after spiking and the results compared. Where only one cable exists in a given location and accurate records indicate that only one cable is present, signal injection may be dispensed with if the Authorised Person (LV) agrees.
- 7.18 The spiking of cables may only be carried out under the direct supervision of an Authorised Person (LV) and by a person who has been specifically trained in the operation of the equipment to be used.
- 7.19 Where more than one cable exists on a single route, the Authorised Person (LV) must identify and label the cable to be worked on. All other cables must be regarded as live, and danger signs attached.
- 7.20 Approved live-working methods may be used as an alternative to spiking. Such work is usually only undertaken by specialist contractors (for example electricity supply companies). If these methods are used, a 'certificate of authorisation for live working' should be issued in accordance with [Section 8](#).

Additional precautions for work on generating plant

- 7.21 When work is to be carried out on generating plant, [paragraphs 7.1](#) to 7.11 apply.
- 7.22 When work is carried out on generating plant (including combined heat and power plant) and directly connected equipment, the following additional precautions should be taken:
- the generator must be at rest and isolated from all sources of supply;
 - the field circuit must be isolated and locked off where it is energised from a separate supply;
 - where motor-driven exciters are provided, the switch controlling the motor must be isolated and locked off;
 - the prime mover providing the motive power to the generator, and any associated valves controlling the flow of fuel or steam, should be isolated and locked off;

- in the case of an internal combustion engine prime mover, the starting equipment should also be made inoperative;
- danger and caution signs should be prominently displayed at all points-of-isolation referred to above;
- to ensure a safe system of work, the permit-to work procedures identified in paragraphs 7.28–7.31 should be operated.

7.23 When manual barring gear is to be used on generating plant, a permit-to-work must be issued.

7.24 Generating plant must not be allowed to operate with any part of its protective enclosures (mechanical or electrical) removed – unless for special test purposes, when it should be the subject of a risk assessment by an Authorised Person (LV). The risk assessment should establish whether any additional precautions or procedures to those already being implemented are considered necessary to ensure a safe system of work, and these should be confirmed in writing.

Uninterruptible power supply systems

7.25 Under normal circumstances, any work or test undertaken on uninterruptible power supply systems (UPS) will be carried out with the equipment completely isolated from all sources of supply in accordance with [Table 3](#).

7.26 Equipment of this type is supplied with an internal bypass designed to allow automatic changeover to the mains supply in the event of a UPS failure. In some instances this bypass is arranged to provide a no-break changeover to mains supply for maintenance, which will not allow the complete isolation.

7.27 The Authorising Engineer (LV) in conjunction with the Authorised Person (LV), and where considered necessary the manufacturers of the equipment, is to survey each fixed UPS system and carry out a risk assessment to document the risks involved and to develop operating procedures to be applied before routine maintenance, minor repairs or major repairs can be carried out. In some instances this may involve live working or, in the longer term, modification to the equipment.

Permit-to-work

7.28 A permit-to-work should be issued for work:

- on a complex circuit;
- on a main or sub-main LV switchboard; (this does not include LV Distribution Boards, Consumer Units and Isolators / Switches only controlling final outlet circuits);
- on cable external to a building;
- on stand-by generators;

- whenever the Authorised Person (LV) deems it necessary to ensure a safe system of work.

7.29 A permit-to-work should be issued by an Authorised Person (LV) to a Competent Person (LV). The permit holder (recipient) must immediately supervise all members of the working party so as to ensure that only work as detailed on the permit is undertaken and that this is done in a safe manner.

7.30 The Authorised Person (LV) should ensure that the Competent Person (LV) who is to receive the permit fully understands all details and safety precautions required to undertake the work safely as detailed on the permit. The Authorised Person (LV) should confirm the recipient's understanding of permit requirements by:

- fully explaining at the point-of-work where the circuit has been proved dead and all safety precautions to be taken;
- listening to the recipient read the permit aloud (permits should be completed in capitals, that is, printed to aid clarity) and confirming accuracy;
- questioning the recipient by asking relevant open questions (those which require more than a simple 'yes' or 'no' reply).

7.31 A permit-to-work should only be issued after:

- the electrical equipment/conductors to be worked on have been isolated from all voltage sources and wherever possible the means of isolation secured by locking;
- the equipment/conductors have been proved dead at the point-of-work by the Authorised Person (LV) who is to issue the permit in the presence of the Competent Person (LV) who is to receive it;
- the Authorised Person (LV) is satisfied that the potential recipient fully understands all the necessary safety precautions to complete the task as detailed on the permit.

Issue of a permit to a contractor

7.32 A contractor's employee may be issued with a permit-to-work, providing the Authorised Person (LV) completes the actions required by this Scottish Health Technical Memorandum and is satisfied of the capability and competence of the individual.

7.33 The manager who approved the issue of the contract to the contractor's company clearly also has a duty to ensure the capability and competence of the company and its employees.

7.34 The Authorised Person (LV) should be given confirmation that checks have been made to determine the satisfactory technical and safety competence of the company by taking into account such considerations as:

- company safety policy;
- company accident record;

- qualifications and training of employees – adequate insurance;
- adequate physical resources (tools, safety equipment etc);
- quality assurance checks during the progress of work on site.

Safety programmes and isolation and earthing diagrams

- 7.35 A safety programme together with an isolation and earthing diagram are required for all planned work and/or tests which require the issue of a permit-to-work.
- 7.36 The safety programme and isolation and earthing diagram must be written by the Authorised Person (LV) who is responsible for the issue of the permit-to-work.
- 7.37 If the equipment to be worked on is a complex circuit, the safety programme and isolation and earthing diagram should be countersigned by another Authorised Person (LV) with knowledge of the site and system.

Summary

- 7.38 Tables 1–3 summarise the procedures to be carried out for work/tests undertaken on low voltage systems that have been made dead.

Steps ¹	Procedure ²
1 Identify and inform	Identify circuit to be worked on. Before any work or testing can begin, permission must be obtained from the person in charge of the area to be affected by the work or testing.
2 Isolate and fix signs	<ol style="list-style-type: none"> 1. Isolate from all sources of supply. 2. Make equipment safe to work on or test. 3. Fix caution signs at points-of-isolation and where practicable prevent unauthorised connection or operation by fixing safety locks. 4. Fix danger signs on live equipment adjacent to the point-of-work or test.
3 Prove dead	<ol style="list-style-type: none"> 1. Ensure that the equipment to be worked on or tested is the equipment that has been isolated. 2. Where practicable, prove dead with a voltage test indicator at the points-of-isolation and at the places where the work or test is to be carried out.
4 Confirm dead	Where it was not practicable in Step 3 to prove the equipment dead, the Competent Person, using appropriate tools and protective equipment where necessary, is to confirm it dead at the point-of-work or test as soon as conductors have been made accessible to a voltage test indicator.
5 Undertake the work or test	Undertake or directly supervise the work or test.

Table 1: Procedures for Competent Persons (LV) working on, or testing, cables and other equipment on the load side of a final circuit

Notes referring to Table 1: 1. The competent person (LV) is responsible for all tasks.

2. For main intake switches, switchboards, and equipment having two or more sources of supply, cables and other equipment on the supply side of a main intake switch, refer to the Authorised Person (LV) (see [Table 2](#)).

Except where a risk assessment indicates otherwise, equipment operating at extra low voltage is exempt from these procedures.

Steps ¹	Procedure
1 Prepare a safety programme	1. Prepare a safety programme plus an isolation and earthing diagram in duplicate, and obtain countersignatures from another Authorised Person (LV) if required. 2. Before any work can begin, permission must be obtained from the person in charge of the area to be affected by the work or test.
2 Isolate and fix signs	1. Isolate from all sources of supply. 2. Fix caution signs at points-of-isolation and where practicable prevent unauthorised connection or operation by fixing safety locks. 3. Fix danger signs on live equipment adjacent to the point-of-work or test.
3 Prove dead and earth	1. Where practicable, prove dead with a voltage test indicator at all the points-of-isolation and at the point-of-work or test. 2. If the manufacturer's earthing equipment is available earth conductors at points-of-isolation and fix safety locks. 3. Identify cables with certainty or spike underground cables at the point-of-work if the conductors are to be cut or exposed
4 Issue the permit-to-work	1. The Competent Person (LV) is to be shown the isolation and earthing diagram and the safety arrangements at all the points-of-isolation and at the point-of-work or test. 2. Issue to the Competent Person (LV): <ul style="list-style-type: none"> • the permit-to-work; • the isolation and earthing diagram; and • the Competent Person (LV)'s key to the safety key box.
5 Confirm dead	Where it was not practicable in Step 3 to prove the equipment dead, the Authorised Person (LV), using appropriate tools and protective equipment where necessary, is to confirm dead at the point-of-work as soon as conductors have been made accessible to a voltage test indicator.
6 Undertake the work	The Competent Person (LV) is to undertake or directly supervise the work and on completion, or when the work is stopped and made safe, is to return the original of the permit-to-work, the isolation and earthing diagram and the competent Person (LV)'s key to the safety key box to the Authorised Person (LV) on duty, and complete part 3 of the permit retained in the pad.

Table 2: Procedures to be carried out by an Authorised Person (LV) to enable work on main intake switches, distribution circuits, switchboards, equipment having two or more sources of supply, and cables and other equipment on the supply side of a final circuit.

Note referring to Table 2: The Authorised Person (LV) is responsible for all tasks

Step ³	Procedure for generators	Procedure for UPS systems
1 Prepare a safety programme	1. Comply with any particular safety procedures applicable to the location. 2. Prepare a safety programme and isolation and earthing diagram in duplicate and obtain countersignatures from another Authorised Person (LV) 3. Before any work starts, permission must be obtained from the person in charge of the area to be affected by the work.	
2 Isolate and fix signs	1. Inhibit engine start, isolate generator. Where practicable, prevent unauthorised connection, operation or starting by fixing safety locks. 2. Fix caution signs at all the points-of-isolation and, clearly visible, on the engine start panel. 3. Fix danger signs on live equipment adjacent to the point-of-work.	1. Isolate from all sources of supply. 2. Isolate mains supply, battery supply, output supply and any stand-by generator supply. 3. On parallel UPS systems and those having an external bypass, isolate the output supply terminals of the unit(s) to be worked on from all sources of supply. 4. If the battery installation is to be worked on, follow the rules applicable to work on live equipment, disconnect the battery from its charger and disconnect the battery earth. 5. Prevent unauthorised connection or unauthorised operation by fixing safety locks and caution signs at points-of-isolation. 6. Fix danger signs on adjacent live equipment to the point-of-work.
3 Prove dead and earth	1. Where practicable, prove dead with a voltage test indicator at all the points-of-isolation and at the point-of-work. 2. If the manufacturer's earthing equipment is available, earth conductors at points-of-isolation, and fix safety locks.	
4 Issue the permit-to-work	1. The competent Person (LV) is to be shown the isolation and earthing diagram and the safety arrangements at all the points-of-isolation and at the point-of-work. 2. Issue the permit-to-work, isolation and earthing diagram and the Competent Person (LC)'s key to the safety key box to the Competent Person (LV)	
5 Confirm dead	Where it was not practicable in Step 3 to prove the equipment dead, the Competent Person, using appropriate tools and protective equipment where necessary, is to confirm dead at the point-of-work as soon as conductors have been made accessible to a voltage test indicator. Where practicable, earth the conductors after they have been confirmed dead.	
6 Undertake the work	The Competent Person (LV) is to undertake or directly supervise the work and on completion, or when the work is stopped and made safe, is to return the original of the permit-to-work, isolation and earthing diagram and the competent Person (LV)'s key to the safety key box to the Authorised Person (LV) on duty and complete part 3 of the permit retained in the pad.	

Table 3: Procedures to be carried out by and Authorised Person (LV) to enable work on generators¹ and UPS systems²

Notes referring to Table 3: ¹. Stand-by generating sets started by manual initiation or automatically on receipt of a signal.

². Fixed uninterruptible power supply equipment (excluding portable self-contained 'plug-in' units).

³. The Authorised Person (LV) is responsible for all tasks.

8. Safety precautions and procedures for live working and testing low voltage equipment

Work on or near live equipment

8.1 Work or testing on (or near) live equipment which involves a Competent Person (LV) includes:

- all forms of testing, fault-finding or adjustment where practicalities dictate live working is essential;
- the removal and replacement of fuse carriers in final circuits;
- the removal and replacement of plug-in components;
- basic battery maintenance (cleaning/topping up only);
- work on battery systems if more than 25V and/ or 10Ah (ampère-hours).

8.2 When work of the type referred to in paragraph 8.1 is carried out:

- the extent of work should be kept to a minimum;
- approved test equipment to the standard recommended in Health & Safety Executive Guidance Note GS38 'Electrical test equipment for use by electricians' should be used, together with any additional approved safety equipment which significantly reduces the risk of injury;
- if the equipment is not to IP2X or IPXXB standard, a self-check live working form (LW1) should be completed;
- the removal of components from connections or terminals is not allowed – if disconnection of terminals or connectors is required, the work should be carried out as outlined in [Table 1](#).

8.3 Live working other than that specified in [paragraph 8.1](#) should not normally be considered. The Electricity at Work Regulations 1989 make it illegal to work on or near live equipment, without first complying with Regulation 14:

'Regulation 14'

No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless:

it is unreasonable in all the circumstances for the conductors to be dead

and

it is reasonable in all the circumstances for the person to be at work on or near the conductor while it is live

and

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

The above represents a very severe legal test on the need to work live. Dead working should always be the first choice and live working only the very last method chosen when all other possibilities of providing alternative supplies or arranging out-of-hour shut-downs of supply etc have been carefully evaluated.

Note 5: Except for work on batteries, it is unlikely that situations will occur in healthcare premises which necessitate live working under the terms of a certificate of authorisation for live working (that is, removal and/ or replacement of components with the circuit energised). (Live testing, fault-finding or making adjustments are all forms of live working (which can only be undertaken by suitably authorised Competent Persons (LV) using appropriate safe methods) but they do not require the issue of a certificate of authorisation for live working, since components are not removed or replaced.)

Work on the essential board or final circuits in a critical care area is often offered as an example of a situation which requires live working because of the need to maintain the electrical supply to critically ill patients. However, if careful planning is applied to finding a way of doing the job dead, a solution can be found.

Auxiliary supplies via extension leads from an adjacent ward – run so as not to restrict corridors to 'crash teams' (extension leads taped to skirting boards and a wooden frame constructed to bridge the corridor) – was a practical solution used in one critical care facility. Clearly, such solutions are time-consuming to organise and more expensive than live working, but the electrical risks from shock etc to those doing the work have been greatly reduced, and this is what the law requires.

Safety precautions and procedures for work on live low voltage electrical equipment and conductors

- 8.4 Other modes of live working other than those specified in paragraph 8.1 should not normally be considered except where all possible alternatives have been considered and eliminated.
- 8.5 Authorised Persons (LV) should consult their Authorising Engineers (LV) before undertaking any work (except for work on a battery) which will require them to issue a certificate of authorisation for live working. Permission should be obtained if a decision is taken to go ahead.
- 8.6 When this condition applies and live working is deemed essential, it will require specific written authorisation in the form of a certificate of authorisation for live working issued by an Authorised Person (LV) to a Competent Person (LV) in accordance with the procedures detailed.
- 8.7 In all circumstances when work is to be carried out on live low voltage electrical equipment and conductors:

- suitable precautions may be taken by the use of screening, insulated tools and other appropriate means to avoid danger from inadvertent contact with live circuit conductors or earthed metalwork;
- the persons carrying out the work should satisfy themselves by examination that the precautions taken are adequate and, before use, that the equipment to be used is suitable for the task;
- only approved instruments should be used for electrical, phase rotation or similar measurements;
- adequate means should be provided to prevent unauthorised access to the zone of work, particularly if working on distribution boards in corridors;
- a second person should be present where, in the opinion of the Authorised Person (LV), that person could contribute significantly to ensuring that injury is prevented;
- that person should have adequate knowledge and experience, be trained to recognise and avoid danger and, if necessary, render assistance in the event of an emergency.

8.8 Any person authorised for live working must be a Competent Person (LV) over 18 years of age.

8.9 [Form LW1](#) should be completed before any live working takes place unless all parts of the live equipment are shrouded to prevent finger access (IP2X). If a certificate of authorisation for live working is to be issued, a copy of the form should be attached to the certificate.

Precautions for working on battery installations

8.10 The output from the battery should be isolated when working on the equipment it supplies unless for safety reasons the battery output needs to be instantly and permanently available. The battery charger should be isolated.

8.11 Where it is necessary to use tools for working on a battery, they should be of an approved insulated type.

8.12 The requirements to implement any or all of the precautions for work on live equipment as detailed in [paragraphs 8.1–8.2](#) to control maintenance work on battery installations should be determined by an Authorised Person (LV).

8.13 If work other than simple maintenance (for example topping up electrolyte levels) is undertaken, this work should only be carried out in full accordance with the precautions detailed within this Scottish Health Technical Memorandum, including the issue of a certificate of authorisation for live working.

8.14 For work on batteries below 25V and 10Ah, Authorised Persons (LV) should undertake a risk assessment of individual installations and issue local instructions if considered appropriate. When working on any battery system, care should be taken to prevent short-circuiting terminals.

- 8.15 Work that may involve a source of ignition must never be undertaken near an enclosed cell or battery unless adequate precautions have been taken to eliminate any risk of danger or injury.
- 8.16 Where any work is to be carried out near, or directly over, a battery installation, specific precautions should be taken to prevent the potential risk of danger or injury which could result from any accidental short-circuiting of the battery terminals.
- 8.17 A supply of sterile water to allow flushing of the eyes should be available during the course of the work.
- 8.18 Personal protective equipment including face visor, acid-resistant gloves and apron should be worn during the work.
- 8.19 In all cases of burns, medical attention should be obtained.

9. Work on a low voltage system associated with a high voltage system

- 9.1 Where work on a low voltage system requires a high voltage system to be made dead to allow such work, the guidance given in Scottish Health Technical Memorandum 06-03: 'Electrical safety guidance for high voltage systems' should also be applied.
- 9.2 When work on a low voltage system requires a high voltage system to be made dead, isolated and earthed in order to allow such work, a permit-to-work should be issued for work on the low voltage system. (The permit should include the isolation and earthing that has been carried out on the HV system in order to make the equipment safe.)
- 9.3 When work on any low voltage system is to be carried out and is associated with work on a high voltage system for which a permit-to-work has been issued, and the low voltage work can only be done while the high voltage system remains dead and earthed:
- a separate permit-to-work should be issued for the low voltage work;
 - the permit-to-work issued for the low voltage work should detail the equipment made safe for the work to proceed;
 - cross-reference should be made on both permits to the existence of the other permit, quoting the relevant serial number together with the use of appropriate key safes.

10. Operating records

General

- 10.1 For each site for which Authorised Persons (LV) have been appointed, records are to be kept as listed in the following sections. These records are to be accurate and kept up-to-date.

LV logbook

- 10.2 For each site for which Authorised Persons (LV) have been appointed, a bound hard-covered book (not loose-leaf) with sequentially numbered pages and titled 'LV logbook' is to be prepared.
- 10.3 The book is to be clearly and indelibly marked with the name of the site, the location, and the system or installation to which it refers, and is to be kept in the lockable document cabinet when not in use.
- 10.4 The logbook will be retained, and all entries will be made, by the Authorised Person (LV) appointed for the particular geographical area.
- 10.5 Entries are to be made in chronological order, each entry being ruled off with a horizontal line across the page. Entries are to show:
- the acceptance and relinquishing of responsibility between Authorised Persons (LV);
 - the removal, return and transfer of the Authorised Person (LV)'s key from the Authorised Person (LV)'s key box;
 - the issue and return of any switchroom key;
 - the issue, cancellation, loss or withdrawal of a safety document;
 - the receipt, termination and remedial action associated with an operational restriction;
 - the issue of a safety guidance handbook;
 - the annual inspection of protective equipment, test equipment and the six-monthly inspection of portable earthing equipment.
- 10.6 Completely filled logbooks are to be retained in the lockable document cabinet for a period of three years after the date of the last entry.

Operational procedure manual

- 10.7 For each site for which Authorised Persons (LV) have been appointed, a ring-binder file entitled 'Operational procedure manual' is to be prepared.
- 10.8 The binder is to be clearly and indelibly marked with the name of the site, location, system or installation to which it refers, and is to be kept in the 'lockable document cabinet' when not in use.

- 10.9 The manual is to contain, in separate sections, a copy of each of the following:
- certificate of appointment issued to a Competent Person (LV), or – for the contractor’s Competent Person (LV) – a register of Competent Persons (LV) including details and dates of training, issue dates and review dates of certificates;
 - operational restriction received;
 - inspection report and details of any remedial work undertaken in connection with an operational restriction;
 - cancelled operational restriction;
 - demarcation agreement with other organisations;
 - demarcation agreement with contractors;
 - any operational agreements with a distribution network operator;
 - the original copy of completed safety programmes together with isolation and earthing diagrams, including any completed and subsequently not used;
 - details of protective equipment, test equipment and portable earthing equipment kept within the establishment, including specifications, operators or users’ instructions, maintenance instructions and, where appropriate, calibration records;
 - a copy of audits carried out in accordance with this guidance.
- 10.10 Each document added to a section of the manual is to be sequentially numbered.
- 10.11 Documents in the manual are to be retained for a period of three years after the date of their cancellation or termination.
- 10.12 The operational procedure manual is also to contain a reference copy of the current edition of this safety guidance (LV).

Operating and maintenance manuals

- 10.13 For each geographical area for which Authorised Persons (LV) have been appointed, one or more ring-binder files entitled ‘Operating and maintenance manual’ is to be prepared.
- 10.14 The binder is to be clearly and indelibly marked with the name of the site, location, system or installation to which it refers, and kept in the lockable document cabinet when not in use.
- 10.15 The ring-binder is to contain:
- manufacturers’ maintenance and operating instructions for each type of low voltage distribution switchgear installed in the system or installation, with test certificates and relevant records;

- a copy of any current operational restriction applicable to any equipment installed in the system or installation;
- a copy of the current 'as-installed' drawings of the system(s).

Maintenance records

- 10.16 Maintenance records are of value in establishing the frequency of maintenance. Therefore, careful note should be taken of relevant items each time maintenance is performed.
- 10.17 Maintenance records should be initiated when the equipment is installed and should contain at least the following information:
- 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;
 - location of the manufacturer's manual and list of recommended spares;
 - date of last maintenance operation and note of the operation counter reading at that time, or an estimate of the number of operations;
 - type of maintenance carried out;
 - 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;
 - details of fuse-link type and ratings, and relay settings;
 - details of the maximum system fault levels and any changes to them;
 - any special safety requirements.
- 10.18 Every significant fault or breakdown should be recorded and analysed with a view to taking action to prevent its recurrence.

Isolation and earthing diagram

- 10.19 Before any permit-to-work is issued, an isolation and earthing diagram should be prepared. This should illustrate the safety arrangements that have been implemented at the points-of-isolation and the place of work to make the equipment safe for the execution of the work or test.
- 10.20 An isolation and earthing diagram will be printed in black on pale green paper. It will have an original and a duplicate of each page and each page of a diagram will bear the same pre-printed serial number. Pads of numbered forms must be used in sequence.
- 10.21 An isolation and earthing diagram should show:
- the name, signature and location of the originating Authorised Person (LV);
 - the name, signature and location of the countersigning Authorised Person (LV);

- the date the countersigned programme is to commence;
- the purpose of the proposed work or test;
- the equipment that the proposed sequence of operations will make safe for the work or test to be undertaken;
- the cables and equipment to be worked on or tested;
- the points-of-isolation;
- the points-of-earthing;
- the points-of-work or test;
- any safety locks and signs fitted.

Implementing the isolation and earthing diagram

- 10.22 Before commencing the sequence of operations detailed on the countersigned isolation and earthing diagram, the duplicate is to be placed in the operational procedure manual.
- 10.23 The Authorised Person (LV) is to note on the original copy of the isolation and earthing diagram the serial numbers of the safety programme and the permit-to-work to enable them to be cross-referenced.
- 10.24 The Authorised Person (LV) is to show the isolation and earthing diagram to the Competent Person (LV) indicating the safety arrangements at the points-of-isolation and earthing at the point(s) of the work or test. The Competent Person (LV) will sign the document to indicate an understanding of the safety arrangements in place.
- 10.25 The isolation and earthing diagram is then to be attached to the permit-to-work.

Completion of the work or test

- 10.26 On completion, the original isolation and earthing diagram will replace the duplicate in the operational procedure manual.
- 10.27 All original copies of completed isolation and earthing diagrams are to be retained in the operational procedure manual for three years following the date of implementation.
- 10.28 If the Competent Person (LV) has lost the original of the isolation and earthing diagram, the loss is to be recorded in the logbook by the Authorised Person (LV) on duty. The Competent Person (LV) is to countersign the duplicate to confirm the loss of the original.

Safety programmes

General

- 10.29 Before any permit-to-work is issued, a safety programme, detailing the intended sequence of safety operations to be performed to make the equipment safe for the execution of the work or test, is to be prepared.
- 10.30 A safety programme will be printed in black on pale-green paper. It will have an original and a duplicate of each page and each page of a programme will bear the same pre-printed serial number. Pads of numbered forms must be used in sequence.

Contents of safety programmes

- 10.31 The safety programme is to be completed in duplicate by the Authorised Person (LV) who will be responsible for issuing the permit-to-work, and is to indicate:
- the name, signature and location of the originating Authorised Person (LV);
 - the name, signature and location of the countersigning Authorised Person (LV) if required;
 - the date the countersigned programme is to commence;
 - the purpose of the proposed work or test;
 - the equipment that the proposed sequence of operations will make safe for the work or test to be undertaken;
 - the sequence of operations to be undertaken up to and including the issue of a permit-to-work;
 - the location, including any name and identification code, at which each operation is to be performed;
 - the identity of each item of switchgear to be operated (this should be what is stated on the local label on the equipment or alternatively the generic type, manufacturer's name and type reference);
 - the operation to be performed and the reason for the operation;
 - any "items required" (for example keys, locks, safety signs, protective equipment, handles, document etc);
 - the requirement for an Accompanying Safety Person for a specific operation;
 - any intended special instructions or safety measures to be included on the permit-to-work;
 - confirmation, where applicable, that prior notification has been given to persons and/or departments who will be affected by the proposed operations and that contingency plans, where required for critical care areas, can be implemented in an emergency.

- 10.32 When a safety programme has been completed, if countersignature is required, it should be countersigned by another Authorised Person (LV) who has a detailed working knowledge of the particular system involved.

Implementing safety programmes

- 10.33 Before commencing the sequence of operations detailed on the countersigned safety programme, the Authorised Person (LV) is to confirm that the person(s) responsible for the day-to-day operational management of the areas to be affected by the intended work or test are fully aware of the effect this will have on the electrical supplies to the affected area.
- 10.34 Before commencing the sequence of operations detailed on the countersigned safety programme, the duplicate is to be placed in the operational procedure manual.
- 10.35 The Authorised Person (LV) is to refer to the original of the safety programme while carrying out the sequence of operations detailed on the programme.
- 10.36 The Authorised Person (LV) is to note on the original copy of the safety programme the date and time of each switching operation for subsequent entry into the logbook.
- 10.37 The serial number of the isolation and earthing diagram and permit should be entered on the safety programme as a cross-reference.

Completion of safety programmes

- 10.38 On completion of the sequence of operations detailed on the safety programme, a summary is to be entered in the logbook. This summary should include the safety programme serial number, start and finish times, and reason.
- 10.39 On completion, the duplicate safety programme should be removed and replaced by the original copy of the safety programme. This is to be retained in the operational procedure manual.
- 10.40 All original copies of completed safety programmes are to be retained in the operational procedure manual for three years following the date of implementation.

Permits-to-work

General

- 10.41 A permit-to-work will be printed in black on pale-blue paper. It will have an original and a duplicate page for part 1 and a single page for parts 2, 3 and 4. Each page of a permit will bear the same serial number. Pads of numbered forms must be used in sequence.
- 10.42 Only one pad of permit-to-work forms is to be used for each geographical area for which an Authorised Person (LV) is on duty.

10.43 When not in use, the pads of permit-to-work forms are to be kept in the lockable document cabinet.

Issue and acceptance of permits-to-work

10.44 A permit-to-work is not to be issued for any item of equipment for which an existing permit-to-work remains valid, nor for any equipment which is within an area for which a limitation-of-access exists, unless a risk assessment indicates that it is safe to do so.

10.45 Except where an Authorised Person (LV) is to undertake the work personally, permits-to-work are to be issued only to Competent Persons (LV).

10.46 Authorised Persons (LV) undertaking tasks requiring a permit-to-work are to issue a permit to themselves. The document should be countersigned by another certified Authorised Person (LV). The Authorised Person (LV) then becomes the Competent Person (LV).

10.47 Permits-to-work with the isolation and earthing diagram attached are to be issued at the location of the work to be undertaken. The issue and cancellation of every permit is to be recorded in the logbook.

10.48 Before offering a permit-to-work to a Competent Person, the Authorised Person (LV) is to:

- physically identify, by marking, to the Competent Person (LV) the equipment to be worked on;
- show the Competent Person (LV) the isolation and earthing diagram which illustrates the safety arrangements at the points-of-isolation and at the point-of-work. Then the Competent Person (LV) will sign to confirm his/her understanding;
- explain in detail to the Competent Person (LV) the exact extent of the work to be undertaken;
- draw the attention of the Competent Person (LV) to any special instructions or safety measures noted in part 1 of the permit;
- demonstrate to the satisfaction of the Competent Person (LV) that the equipment is dead and safe to work on.

10.49 Exceptionally, for low voltage equipment where it is not practical to prove the equipment dead before issuing a permit-to-work, the Authorised Person (LV), having issued the permit, is to remain with and supervise the Competent Person (LV) until conductors have been made accessible to a suitable low voltage potential indicator (or voltage test indicator for proving dead at the low voltage conductors of a low voltage transformer). The Authorised Person (LV) is then, without any delay, to confirm the equipment dead before allowing the Competent Person (LV) to assume control of the work.

10.50 Before the permit-to-work is accepted, the Competent Person – having understood the work to be undertaken and being prepared to carry it out – is to sign to accept any special instructions or safety measures noted in part 1 of the

permit and is to complete and sign part 2. The signature on part 2 renders the original of part 1 of the permit valid for the defined work, which is then issued to the Competent Person (LV).

- 10.51 The Authorised Person (LV) retains the duplicate of part 1 with parts 2, 3 and 4 in the permit pad.
- 10.52 After accepting the permit-to-work, the Competent Person (LV) becomes responsible for personally supervising or undertaking the defined work.
- 10.53 The Competent Person (LV) is not to leave the location of the work or to undertake other work or tests while the defined work is in progress.
- 10.54 During any temporary absence of the Competent Person (LV) from the location of the work, the work is to be suspended and adequate safety precautions taken until the work is resumed on the return of the Competent Person (LV).

Cancellation of the permit-to-work

- 10.55 Having completed the work, withdrawn all persons, materials, instruments and tools from the location of the work, and advised all persons associated with the work that it is no longer safe to work on the equipment, the Competent Person (LV) is to complete and sign part 3 of the permit retained in the pad, and return the original of part 1 to the Authorised Person (LV).
- 10.56 Where the work has been stopped, the same procedures apply, but in addition the Competent Person (LV) confirms that the equipment has been made safe pending the issue of another permit-to-work.
- 10.57 The Authorised Person (LV) is to check that the work has been satisfactorily completed and that the equipment is safe.
- 10.58 The Authorised Person (LV) is then to cancel the permit by destroying the original part 1 and completing and signing part 4 of the permit retained in the pad.
- 10.59 The isolation and earthing diagram should be retained for filing. The duplicate page of parts 1 and the completed page of parts 2, 3 and 4 are to be retained in the pad.
- 10.60 If the Competent Person (LV) has lost the original of part 1 of the permit, the loss is to be recorded by the Authorised Person (LV) in part 4 of the permit in the pad and in the logbook.
- 10.61 The Competent Person (LV) is to countersign part 4 to confirm the loss of the original. The loss of a permit is to be reported to the Authorising Engineer (LV).
- 10.62 Completed pads of permit forms are to be retained in the lockable document cabinet for three years after the date of cancellation of the last permit issued from the pad.

Limitation-of-access

General

- 10.63 In an area or location that is normally under the control of the Authorised Persons (LV) for electrical safety reasons, a limitation-of-access may be issued by the Authorised Person (LV) for any specified task other than one for which a permit-to-work is required.
- 10.64 A limitation-of-access will be printed in black on buff paper.
- 10.65 It will have an original and a duplicate page for part 1 and a single page for parts 2, 3 and 4. Each page of a limitation-of-access will bear the same serial number. Pads of numbered forms must be used in sequence.
- 10.66 Only one pad of limitation-of-access forms is to be in use for each geographical area for which an Authorised Person (LV) has been appointed.
- 10.67 When not in use, the pads of limitation-of-access forms are to be kept in the lockable document cabinet.

Issue and acceptance of limitations-of-access

- 10.68 A limitation-of-access may be offered to a person of any discipline or specialism who is competent to personally execute the work or to supervise the execution of the work by others.
- 10.69 On accepting the limitation-of-access, that person becomes responsible for undertaking or supervising the work for which the access is required.
- 10.70 Before issuing a limitation-of-access, the Authorised Person (LV) should positively identify the scope and limits of the work to be carried out, and the physical extent of the work at the location.
- 10.71 A limitation-of-access is to be issued at the place where the work is to be undertaken. The issue and cancellation of every limitation-of-access is to be recorded in the logbook.
- 10.72 Before offering a limitation-of-access, the Authorised Person (LV) is to:
- accompany the prospective recipient to the location where the work is to be undertaken;
 - confirm with the prospective recipient in detail the exact extent of the work activities to be undertaken, including the scope and limits;
 - show the prospective recipient the area in which the work is to be undertaken;
 - indicate to the prospective recipient all items of live electrical equipment in or adjacent to the working area that are to be identified by danger signs;

- draw to the attention of the prospective recipient any special instructions or safety measures noted in part 1 of the limitation-of-access, and indicate the safety measures that have been applied by the Authorised Person (LV).

- 10.73 Before accepting a limitation-of-access, the prospective recipient – having understood the scope, extent and limits of the work to be undertaken, and being prepared to undertake it – is to sign to accept any special instructions or safety measures noted in part 1 and is to complete and sign part 2. The signature on part 2 renders the original of part 1 of the limitation-of-access valid for the defined work and is issued to the person. The Authorised Person (LV) retains the duplicate pages of part 1 with parts 2, 3 and 4 in the limitation-of-access pad.
- 10.74 The acceptance of the limitation-of-access makes the person responsible for personally undertaking or supervising the defined work. This person is not to leave the location of the work or to undertake any other activities while the work is in progress. During any temporary absence of the person responsible from the location of the work, the work is to be suspended and adequate safety precautions taken until the work is resumed on the return of this person.
- 10.75 A limitation-of-access is to be issued at the location of the work to be undertaken. The issue and cancellation of every limitation-of-access is to be recorded in the logbook.
- 10.76 Provided that a risk assessment indicates that it is safe, a limitation-of-access may be issued for work to be undertaken in an area or location containing an item of equipment for which a permit-to-work remains valid.
- 10.77 Where practicable, all items of live equipment at the location are to be cordoned off from the working area covered by a limitation-of-access for the duration of the work. This should be achieved by temporary barriers comprising, as a minimum, no-entry warning tape or equivalent prominent markers.
- 10.78 Danger signs are to be prominently displayed on all items of live electrical equipment, at and adjacent to the location to which the limitation-of-access applies and while it remains valid.
- 10.79 During the period for which the limitation-of-access remains valid, the Authorised Person (LV) is to arrange for the area involved to be inspected at the end of each working period or day to ensure that:
- any flammable or hazardous materials introduced into the area during the work activity are removed when the activities cease at the end of each working period or day;
 - emergency escape routes, emergency exits and access to essential electrical equipment has not been obstructed.

Cancellation of a limitation-of-access

- 10.80 Having completed the work, and having withdrawn all persons, materials, instruments and tools from the working place, the recipient is to complete and

sign part 3 of the limitation-of-access in the pad, and return the original of part 1 to the Authorised Person (LV).

- 10.81 When the work has been completed, the Authorised Person (LV) is to check that the location has been left in a clean and tidy condition and is secured against unauthorised access.
- 10.82 The Authorised Person (LV) is then to cancel the limitation-of-access by destroying the original of part 1 and completing and signing part 4 retained in the pad. The duplicate pages of part 1 and the completed page of parts 2, 3 and 4 are to be retained in the pad.
- 10.83 If the Authorised Person (LV) decides to stop the work, the limitation-of-access is to be withdrawn and cancelled. The withdrawal is to be noted in part 4 of the limitation-of-access retained in the pad, and the reasons for the withdrawal and the actions taken are to be noted in the logbook.
- 10.84 If the recipient has lost the original of part 1 of the limitation-of-access, the loss is to be recorded by the Authorised Person (LV) in part 4 of the limitation-of-access retained in the pad and in the logbook.
- 10.85 The recipient is to countersign part 4 to confirm the loss of the original. The loss of a limitation-of-access is to be reported to the Authorising Engineer (LV).
- 10.86 Completed pads of limitation-of-access forms are to be retained in the lockable document cabinet for three years after the date of cancellation of the last limitation-of-access issued from the pad.

Certificate of authorisation for live working

General

- 10.87 In an area or location that is normally under the control of the Authorised Persons (LV) for electrical safety reasons, a certificate of authorisation for live working may be issued by the Authorised Person (LV) for any specified task other than one for which a permit-to-work is required.
- 10.88 A certificate of authorisation for live working will be printed in black on pink paper.
- 10.89 It will have an original and a duplicate page for part 1 and a single page for parts 2, 3 and 4. Each page of a certificate of authorisation for live working will bear the same serial number. Pads of numbered forms must be used in sequence.
- 10.90 Only one pad of certificates of authorisation is to be in use for each geographical area for which an Authorised Person (LV) has been appointed.
- 10.91 When not in use, the pads are to be kept in the lockable document cabinet.

10.92 Before issuing a certificate of authorisation for live working and starting work on a system or equipment, the Authorised Person (LV) responsible for its issue must be satisfied that:

- it is unreasonable in all the circumstances for it to be made dead;
- it is reasonable in all circumstances for work to be carried out on or near it while it is live;
- suitable precautions (including, where necessary, the provision of suitable protective equipment) are taken to prevent injury.

10.93 Before issuing a certificate of authorisation for live working, the Authorised Person (LV) should:

- determine the actions and precautions necessary to comply with the requirements of [paragraphs 8.3–8.5](#), and document them on the certificate of authorisation for live working;
- ensure that the Competent Person (LV) to whom the certificate will be issued fully understands the details of the work to be done;
- record in the logbook details of the precautions taken to comply with the requirements of [paragraphs 8.3–8.5](#).

Procedure for issue of a certificate of authorisation for live working

10.94 The following procedures apply to the issue of a certificate of authorisation for live working:

- the Authorised Person (LV) should enter on the certificate of authorisation for live working details of the work to be done and precautions necessary. The accuracy and completeness of the certificate should be agreed with the Competent Person (LV) responsible for carrying out the work;
- the top copy of the certificate should be issued to the Competent Person (LV) in charge of the work, who, after reading its contents and signifying to the Authorised Person (LV) that the instructions etc are fully understood, should acknowledge its receipt by signing the declaration on part 2;
- the recipient of the certificate should retain possession of the top copy at all times while the work detailed on the certificate is carried out;
- if, during the course of the work, it is found necessary to change the scope of the work, the existing certificate of authorisation for live working should be returned to the Authorised Person (LV) and cancelled. The need for live-working procedures should again be reviewed and, if still found essential, a new certificate of authorisation for live working should be issued clearly detailing the revised work;
- a (live working) safety document is not to be issued for work on any item of equipment which is already the subject of a (limitation-of-access) safety document;
- carbon copies must not be removed from the certificate of authorisation for live working book, even when a certificate is cancelled before issue.

Procedure for cancelling a certificate of authorisation for live working

- 10.95 When work for which a certificate has been issued is suspended or completed, the Competent Person (LV) to whom it was issued should sign the declaration on part 3 of the certificate and return the certificate to the Authorised Person (LV), who should cancel it by signing the declaration on part 4 and destroy the original of part 1 in the presence of the Competent Person (LV).

11. Display of permanent posters and safety signs

Display of posters

11.1 In each room containing low voltage electrical equipment, the following posters should be prominently displayed:

- a poster showing an approved method of treatment for electric shock;
- a single line drawing of the low voltage system up to and including final circuit distribution boards under the control of the Authorised Person (LV).

11.2 Where management has the responsibility for the danger, the Authorised Person (LV) is to carry out an assessment to determine the requirement and location for the display of information in connection with this guidance. Information is to be displayed permanently in suitable and prominent positions. The areas to be considered for the display of information in connection with this guidance are to include every workshop and each Authorised Person (LV)'s office.

11.3 Other information and posters to be displayed may include:

- the Electricity at Work Regulations 1989;
- a poster showing an approved method of treatment for electric shock;
- other relevant health and safety information.

Design specification

11.4 All signs should be to the sizes indicated.

11.5 The design and colours of the signs should be to BS5499-5: 2002. Colours should be to BS5252:1976 as follows:

- yellow 08E51;
- blue 18E53;
- red 04E53.

11.6 Signs should be manufactured from laminated plastic or other similar non-metallic weather-resistant material (thickness appropriate to the intended location and application).

11.7 Non-corrosive materials are to be used when fixing permanent safety signs. Permanent signs should not be fixed with adhesives.

11.8 All temporary signs should be provided with two 5mm diameter holes for a suspension cord. The holes should be 10mm from the top edge and 30mm from each end for 150mm wide signs, and 50mm from each end for 200mm wide signs.

- 11.9 Temporary safety signs are to be suspended from non-conducting cords and fixed and removed only by an Authorised Person (LV).
- 11.10 Permanent safety signs are to be securely and permanently fixed in accordance with the clauses in this section.

Display of permanent safety signs

- 11.11 Where a “gas flooding system” is installed in a switchroom or accommodation where low voltage is present, a safety sign with appropriate text should be installed in a prominent position (Figure 1).



Figure 1: Electrical switchroom safety sign (actual size: 200 x 100 x 1.5mm white plastic)

Display of temporary safety signs

- 11.12 Caution signs are to be prominently displayed and securely fixed at all points-of-isolation before the start of, and for the duration of, any work or testing, and before the issue of any permit-to-work.
- 11.13 Danger signs are to be prominently displayed so that they are visible from every angle of approach to a low voltage enclosure before any testing at low voltage is carried out and before the issue of, and for the duration of, any work or testing, and before the issue of any permit-to work.
- 11.14 Danger signs are to be prominently displayed on any equipment which remains live and is adjacent to equipment to be worked on or tested before the start of, and for the duration of, the work or testing, and before the issue of any permit-to work.
- 11.15 Where work or testing is to be undertaken on any part of a multi-cubicle switchboard, danger signs should be prominently displayed on the cubicles or compartments adjacent to the part being worked on or tested. If the board has rear access, danger signs are to be similarly displayed at both the front and rear of the board. Reliance is not to be placed on the switchboard labelling when

identifying parts at the rear of the board. Any discrepancies found are to be reported.

- 11.16 Danger signs are to be prominently displayed on any equipment which is accessible, both in or adjacent to the area which is the subject of the limitation-of-access, before the issue of and for the duration of any limitation-of-access.

12. First-aid

Treatment for electric shock – free from contact

- 12.1 Switch off supply immediately or send someone to do so. Do not attempt to remove a person from contact with high voltage unless suitable articles insulated for the system voltage are used for this purpose. When attempting to free a person from contact with low voltage use rubber gloves, boots, or mat, or insulated stick, but if these are not available use a loop of rope, cap or coat to drag the person free. Whatever is used should be dry and non-conducting. (An adult is considered to be anyone aged eight or over for the purposes of these instructions.)



- 12.2 After release:
- do not waste time. If possible, lay casualty on a firm, dry surface and if there is no sign of breathing, immediately commence artificial respiration. If possible, send for an ambulance and doctor;
 - ensure the airway is open;
 - pinch nose firmly closed;
 - take a deep breath and seal your lips around the casualty's mouth;
 - blow into the mouth until the chest rises;
 - remove your mouth and allow the chest to fall;
 - repeat once more, and then check for circulation;
 - if circulation is absent, commence chest compressions;
 - check for circulation after every ten breaths;

- if breathing starts, place in recovery position;
- if the chest fails to rise during inflation, the airways are blocked; external cardiac compression must not be carried out until the airways are unblocked. Check that the jaw is lifted, the head tilted back and that the mouth and throat are clear. If there are still no obvious signs of recovery, check the pulse, and if it is felt, continue with artificial respiration. If the neck pulse is not felt, commence cardiac resuscitation.

Cardiac resuscitation

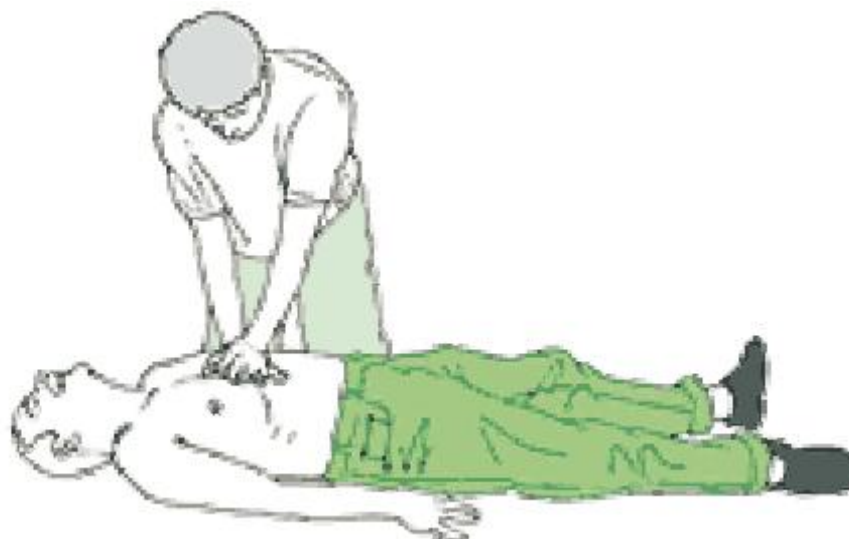
- 12.3 With the hand cup-shaped, strike the chest over the heart position once without follow-through weight. If the heart restarts, indicated by signs of recovery and a pulse that can be felt, continue with lung inflations.
- 12.4 If still no pulse, start external cardiac compression.



Chest compressions

Note 6: Chest compressions must always be combined with rescue breaths.

- place heel of your hand two fingers' width above the junction of the casualty's rib margin and breastbone.



- place other hand on top and interlock fingers. Keeping your arms straight and your fingers off the chest, press down by 4–5cm; then release the pressure, keeping your hands in place;
- repeat the compressions 15 times, aiming at a rate of 100 per minute;
- give two rescue breaths;
- continue resuscitation, 15 compressions to two rescue breaths;
- only check for circulation if the casualty's colour improves;
- if circulation is present, stop the chest compressions but continue rescue breaths if necessary.

Control of bleeding

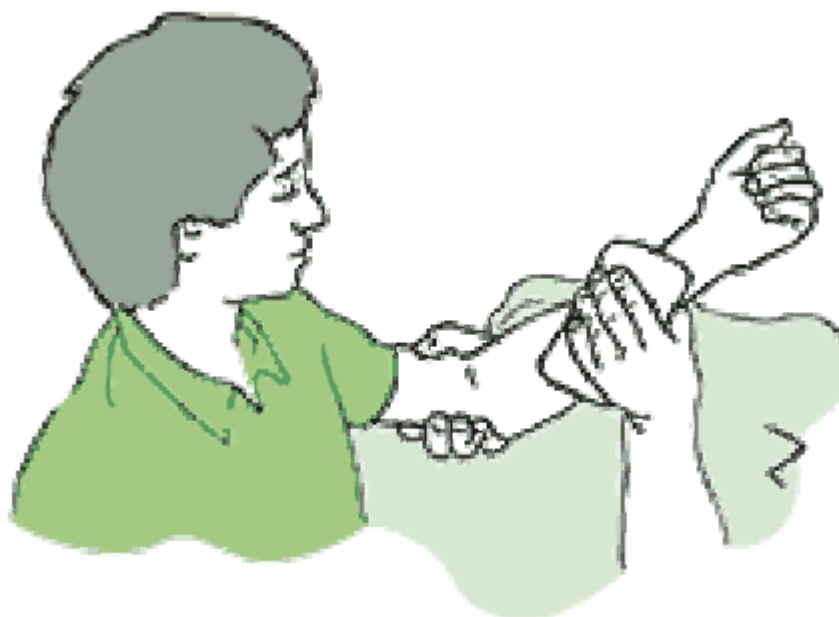
Minor cuts, scratches and grazes

Treatment

- wash and dry your own hands;
- cover any cuts on your own hands and put on disposable gloves;
- clean the cut, if dirty, under running water. Pat dry with a sterile dressing or clean, lint-free material. If possible, raise affected area above the heart;
- cover the cut temporarily while you clean the surrounding skin with soap and water, and pat the surrounding skin dry. Cover the cut completely with a sterile dressing or plaster.



Severe bleeding



Treatment

- put on disposable gloves;
- apply direct pressure to the wound with a pad (for example a clean cloth) or fingers until a sterile dressing is available;
- raise and support the injured limb. Take particular care if you suspect a bone has been broken;
- lay the casualty down to treat for shock;
- bandage the pad or dressing firmly to control bleeding, but not so tightly that it stops the circulation to fingers or toes. If bleeding seeps through first bandage, cover with a second bandage. If bleeding continues to seep through the second bandage, remove it and re-apply;
- treat for shock;
- dial 999 for an ambulance.

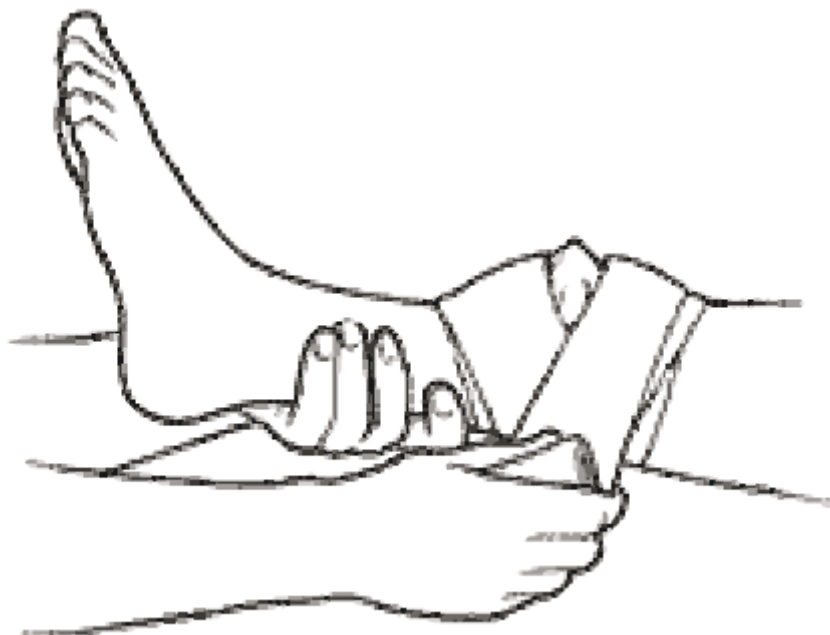
Remember: Protect yourself from infection by wearing disposable gloves and covering any wounds on your hands.

If blood comes through the dressing, do not remove it – bandage another over the original.

If blood seeps through both dressings, remove them both and replace with a fresh dressing, applying pressure over the site of bleeding.

Objects in wounds

- 12.5 Where possible, swab or wash small objects out of the wound with clean water. If there is a large object embedded, do the following:



- leave it in place;
- apply firm pressure on either side of the object;
- raise and support the wounded limb or part;
- lay the casualty down to treat for shock;
- gently cover the wound and object with a sterile dressing;
- build up padding around the object until the padding is higher than the object, then bandage over the object without pressing on it;
- depending on the severity of the bleeding, dial 999 for an ambulance or take the casualty to hospital;
- apply firm pressure directly to the wound;
- cover with a clean dressing and bandage firmly in place. If bleeding continues, add further dressings on top of the first and increase the pressure by bandaging firmly into place.

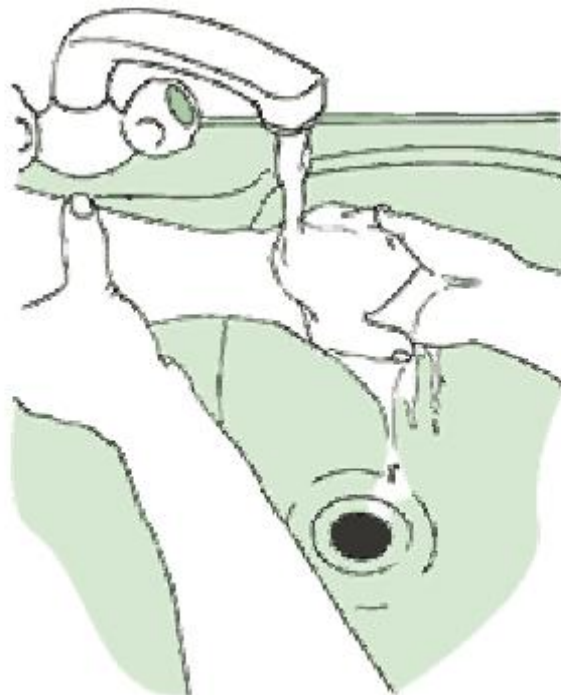
Burns and scalds

Severe burns

Treatment

- start cooling the burn immediately under running water for at least ten minutes;
- dial 999 for an ambulance;

- make the casualty as comfortable as possible; lie them down;



- continue to pour copious amounts of cold water over the burn for at least ten minutes or until the pain is relieved;
- while wearing disposable gloves, remove jewellery, watches or clothing from the affected area – unless it is sticking to the skin;
- cover the burn with clean, non-fluffy material to protect from infection. (Cloth, a clean plastic bag or kitchen film all make good dressings);
- treat for shock.

Minor burns

Treatment

- 12.6 For minor burns hold the affected area under cold water for at least ten minutes or until the pain subsides. Remove jewellery etc and cover the burn as detailed above.
- 12.7 If a minor burn is larger than a postage stamp, it requires medical attention. All deep burns of any size require urgent hospital treatment.

Clothing on fire

Treatment

- stop the casualty panicking or running – any movement or breeze will fan the flames;
- drop the casualty to the ground;

- if possible, wrap the casualty tightly in a coat, curtain or blanket (not the nylon or cellular type), rug or other heavy-duty fabric. The best fabric is wool;
- roll the casualty along the ground until the flames have been smothered.

12.8 On **all** burns, **do not**:

- use lotions, ointments and creams;
- use adhesive dressings;
- break blisters.

12.9 Burns should be cooled with cold water, if available. Then cover with a clean, preferably sterile, dressing, and bandage lightly in position. If transfer to hospital is desirable, dial 999 and request the local ambulance service.

First-aid appliances

12.10 The first-aid equipment provided should be used only for the purpose intended.

12.11 The Health and Safety (First-aid) Regulations 1981 place a general duty on employers to make adequate first-aid provision for their employees if they are injured or become ill at work. Employers must inform their employees of the provision made for them.

12.12 Reference should be made to the Health and Safety Executive's 'First-aid at work. The Health and Safety (First-Aid) Regulations 1981. Approved Code of Practice and Guidance L74'.

Appendix 1: Associated regulations and documents

See the [References](#) section for full details of these publications and for details of other publications referenced in this document.

Statutory

- Approved Code of Practice for Management of Health and Safety at Work Regulations 1999;
- Confined Spaces Regulations 1997;
- Construction (Design and Management) Regulations 2007;
- Electricity at Work Regulations 1989;
- Electricity Safety, Quality and Continuity Regulations 2002;
- Health and Safety (Safety Signs and Signals) Regulations 1996;
- Health and Safety at Work etc Act 1974;
- Management of Health and Safety at Work Regulations 1999;
- Manual Handling Operations Regulations 1992;
- Personal Protective Equipment Regulations 2002;
- Provision and Use of Work Equipment Regulations 1998;
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995;
- Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

Department of Health

- Electrical services: Health Technical Memorandum 06-02 Electrical safety handbook;
- Health Facilities Scotland:
 - Scottish Health Technical Memorandum 00: ‘Policies and principles’;
 - Scottish Health Technical Memorandum 06-01: ‘Electrical services supply and distribution’;
 - Scottish Health Technical Memorandum 06-03: ‘Electrical safety code for high voltage systems’;
- The Institution of Engineering & Technology:
 - ‘Code of practice for in-service inspection and testing of electrical equipment’;
 - ‘Guidance Note 3: Inspection and testing’;

- The Health & Safety Executive's:
 - 'Avoidance of danger from overhead electric lines GS6';
 - 'Avoiding danger from underground services HSG47';
 - 'Electrical safety on construction sites HSG141';
 - 'Electrical test equipment for use by electricians GS38';
 - 'Electricity at work: safe working practices HSG85';
 - 'Health and Safety (First-Aid) Regulations 1981, Approved Code of Practice and Guidance';
 - 'Keeping electrical switchgear safe HSG230';
 - 'Maintaining portable and transportable electrical equipment HSG107';
 - 'Memorandum of guidance on the Electricity at Work Regulations 1989 HSR25';
 - 'Safety in electrical testing at work INDG354'.

Standards

- BS921: 1976 'Specification. Rubber mats for electrical purposes';
- BS7430: 1998 'Code of practice for earthing';
- BS7671: 2008 'Requirements for electrical installations';
- BS EN 60529: 1992 'Specification for degrees of protection provided by enclosures (IP code)';
- BS EN 60900: 2004 'Live working. Hand tools for use up to 1,000V ac and 1,500V dc';
- BS EN 60903: 2003 'Live working. Gloves of insulating material';
- Any engineering instructions issued by the management.

Appendix 2: Protective and test equipment

General

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 should 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 healthcare 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. Where possible, items of equipment should comply with an approved standard, for example British Standards or European equivalent or electricity supply industry standards.
5. This guidance requires that protective equipment be readily available at all times and be worn or used whenever necessary to avoid danger.
6. Reliance should not be placed on any single item of protective equipment.
7. The range of protective equipment that may be required for compliance with this guidance, at each site for which Authorised Persons have been appointed, could include the following items:
 - insulated hand tools;
 - insulated rubber boots;
 - insulated rubber gloves;
 - insulating rubber mats;
 - face shields (visors);
 - insulating materials for temporary screening;
 - safety-belts and harnesses;
 - cable-spiking equipment;

- cable-tracing equipment;
 - null-balance earth meter;
 - insulation tester (500V dc);
 - insulation tester (1,000V dc);
 - heavy current low reading Ohmmeter;
 - low voltage indicator with proving unit;
 - line earth loop tester;
 - RCD tester;
 - continuity tester;
 - phase rotation meter;
 - heavy duty hand torch;
 - pair of 650V safety rubber gloves to BS697: 1986; BS EN 60903: 2003;
 - key for switchrooms;
 - key for key locker, if provided;
 - portable appliance tester (optional);
 - locking devices, keys and safety notices as required;
 - copies of the Health & Safety Executive's (1989) 'Memorandum of guidance on the Electricity at Work Regulations 1989', management's electrical safety rules for low voltage systems, and Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems'.
8. Where live working is to be sanctioned by the issue of a certificate of authorisation for live working, the Authorised Person should 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 the relevant standard in [paragraph 14](#) of this Appendix.
9. 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.
10. The user of any item of protective equipment is to be responsible for carrying out a visual inspection before and after use. If an item is found to be defective or unsafe it is to be reported to the Authorised Person as soon as possible.
11. All protective, test and earthing equipment should be stored, inspected, tested and, where appropriate, recalibrated in accordance with manufacturers' recommendations.
12. All protective, test and earthing equipment is to be inspected by an Authorised Person at intervals recommended by the manufacturer but not exceeding 12 months, and the results entered into the Logbook. Any item of protective equipment found to be defective is to be destroyed and replaced.

Protective equipment

13. These rules and procedures require Competent Persons and Authorised Persons to use appropriate protective equipment when the circumstances require it. Items of protective equipment held or used within a site should comply with any relevant British Standards and should be so kitemarked.

British Standards are not available for some of the items of protective equipment recommended.

Protective equipment covered by a British Standard

14. The following items of equipment are covered by the British Standards indicated:
- insulated screwdrivers – BS2559-3: 1973;
 - insulated pliers – BS3087-1: 1991;
 - rubber gloves for electrical purposes – BS697: 1986 and BS EN 60903: 2003;
 - rubber mats for electrical purposes – BS921: 1976;
 - face shields and visors – BS EN 166: 2002, BS EN 167: 2002 and BS EN 168: 2002;
 - safety-belts and harnesses – BS EN 354: 2002; BS EN 355: 2002; BS EN 361: 2002; BS EN 362: 2004; BS EN 363: 2002; BS EN 364: 1993 and BS EN 365: 2004.
15. Face shields and visors should provide protection against electrical flash, impact and molten metal particles.
16. They should be available to persons who may be exposed to the effects of electric arcs, for example when withdrawing fuses in older types of distribution cubicle.
17. Many different types of safety-belt and harness are available, each intended for a particular purpose. Safety-belts and harnesses manufactured to the relevant British Standard, and of the correct type, should be available to persons working in insecure locations, for example on overhead lines.

Protective equipment not covered by a British Standard

18. Cable spiking equipment in the form of an explosive cartridge-type must be operated in accordance with manufacturers' instructions by a suitably trained person. When using cartridge-operated equipment on small cables, care must be taken where there is a danger of severing the cable.
19. Insulating material for temporary screening may be required when working on or near live equipment or to separate isolated equipment from adjacent live equipment. Flexible insulating material may be used to prevent breakdown between conductors during low voltage tests. The material used should be

suitable for the purpose. The material is to be cut and fixed, as necessary, to suit the particular task.

20. When using insulating rubber boots as part of a safety system, reliance is not to be placed upon insulating rubber boots alone. There is a danger of metallic objects becoming embedded in the soles without this becoming apparent during inspection.

Voltage test indicators

21. This guidance requires Authorised Persons and Competent Persons to prove equipment dead by using a voltage test indicator.
22. As there is no British Standard for a voltage test indicator in non-hazardous areas, it should comply with the recommendations of the Health and Safety Executive's 'GS38: electrical test equipment for use by electricians'. Test indicators for use on 230/400V systems should be suitable for use up to 500V and should indicate a live supply down to 50V. It should also be able to differentiate between ac and dc.
23. Test indicators should be proved before and after use from a known supply.

Cable locating devices

24. When selecting a cable-locating device for a particular task or location, refer to the guidance given by the manufacturer or supplier of the cable-locating equipment.
25. Cable-locating devices should, as a minimum, be rugged and weatherproof to National Electrical Manufacturers Association standard NEMA 3S (see 'Definitions' in Chapter 2), comply with the Electromagnetic Compatibility Regulations 2005, and be produced by BS EN ISO 9001: 2000 accredited manufacturers.
26. A cable-locating device that combines all three principles of operation – hum detector (power), radio frequency detector (radio) and transmitter/ receiver locator (signal generator) – into one instrument should be selected.
27. No person should use cable-location and tracing devices unless they are competent to do so, have been specifically trained in their use, and hold a certificate issued by the instructor indicating that the training has been successfully completed. Normally, the manufacturers of the equipment should give training, but alternatively a person who has been trained and certified by the manufacturers may give it.

Earthing equipment

28. Low voltage cables and equipment may be earthed by using integral or portable proprietary earthing devices operating within the equipment enclosure on which the earth is to be applied. An earthing device must be suitable for the use for which it is provided, be maintained in a condition suitable for that use, and be properly used.

29. Where no proprietary earthing device is available, equipment may be purpose-made. The design must ensure that conductors are capable of carrying the prospective fault current for the time required for back-up protective devices to operate (normally three seconds) without creating danger or injury or damage to equipment.

Switchroom earthing

30. All switchroom earthing conductors and connections should be inspected at 12-monthly intervals, special attention being given to the more vulnerable parts such as the final connection to earth electrodes and other external parts of the earthing system.
31. The earthing systems should be tested annually in accordance with Scottish Health Technical Memorandum 06-01: 'Electrical services supply and distribution'.

Recommendations for the inspection, test and recalibration of protective, test equipment

32. Insulated hand tools should be supplied with a certificate stating that the tools have been electrically tested.
33. Rubber gloves should be kept in a dark place where they will not be subjected to mechanical or chemical damage. A container that is clean and free from grease and oil should be provided solely for storing the gloves.
34. Before use, each glove should be examined inside and out by the user. Each finger of each glove is to be stretched by hand to ascertain that its mechanical strength is adequate. If either of the gloves is damaged or defective, the pair is to be destroyed and replaced.
35. After each use, the gloves are to be inspected by the Authorised Person for surface defects or materials embedded in the surface. If any glove appears defective, the pair is to be destroyed and replaced.
36. Gloves that are used frequently are to be tested at intervals not exceeding six months. Gloves that are used infrequently are to be retested after each use, or at intervals not exceeding 12 months, whichever is the more frequent.
37. Gloves are to be retested by the manufacturer or locally on equipment described in, and in accordance with, the procedures set out in BS697: 1986.
38. Face shields are to be examined by the user before and after use.
39. Belts and harnesses are to be stored in a cool, dry place, not subjected to direct sunlight and not subjected to unnecessary strain, pressure, excessive heat or humidity. The equipment is also to be kept free from contact with sharp implements, corrosive substances and other possible causes of damage.
40. Where necessary, test equipment is to be inspected and recalibrated at the intervals recommended by the manufacturer.

41. The schedule should incorporate:
- routine maintenance proposals, based on periodic inspections supplemented at more extended intervals with operational checks and examination as required;
 - post-fault maintenance, which should be determined by consulting the manufacturer's handbook and by past experience.

Fire extinguisher installation and equipment

42. Inspections and checks should be made in accordance with Firecode document Scottish Health Technical Memorandum 83.

Appendix 3: Safety documentation (model forms)

Model form numbers

1. Isolation and earthing diagram;
2. Safety programme;
3. Permit-to-work;
4. Limitation-of-access;
5. Certificate of authorisation for live working;
6. Permission for disconnection/interruption of electrical services;
7. Logbook.

Serial No

Isolation and earthing diagram
(Complete precisely and legibly in BLOCK CAPITALS)

Safety programme no Date
Permit-to-work/Sanction-for-test noDate

Purpose of proposed work/test

Equipment which the proposed sequence of operations will make safe to work on/test

Sketch of isolation and earthing arrangements

Competent person's initials

Authorised Person
SignedName Date

Countersigning Authorised Person
Signed Name Date

Sheet	of	Serial No
-------	----	-----------

Safety Programme

Purpose of proposed work/test* (*Delete as appropriate)			Equipment which the proposed sequence of operations will make safe to work on or test		
Item No	Location	Equipment	Operation and reason	Items required	Time & Date
Date countersigned programme is required to commence					
Signed Authorised person				Date	
Countersigning Authorised Person:- I hereby declare that I have checked the above safety programme, and I am satisfied that, to the best of my knowledge, it will enable the proposed work or test to be carried out safely and in accordance with the 'Electrical Safety Code'. I have knowledge of, and have access to the current diagram of, the system and equipment concerned					
Signed:				Date:	

Serial No

Location

Permit-to-work
(Complete precisely and legibly in BLOCK CAPITALS)

Front - original

Part 1: Issue

Issued to

I hereby declare that it is safe to work on the following electrical equipment which has been made **dead, isolated** from all **live** conductors and, in the case of high voltage equipment, is connected to **earth**:

All other electrical equipment is dangerous to work on

The system is **isolated** and safety locks and **caution** signs fitted at

The equipment is **earthed** and safety locks fitted at

Danger signs are posted

Other precautions taken are

The following work shall be carried out

Authorised Person
Signed Date

Serial No.

Location

Permit-to-work
(Complete precisely and legibly in BLOCK CAPITALS)

Front copy

Part 1: Issue

Issued to

I hereby declare that it is safe to work on the following electrical equipment which has been made **dead, isolated** from all **live** conductors and, in the case of high voltage equipment, is connected to earth:

All other electrical equipment is dangerous to work on

The system is **isolated** and safety locks and **caution** signs fitted at

The equipment is **earthed** and safety locks fitted at

Danger signs are posted

Other precautions taken are

The following work shall be carried out

Authorised Person
Signed Date

Back - copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out work on the electrical equipment as detailed on this permit-to-work and that no attempt will be made by me or by persons under my control to work on any other electrical equipment I have been shown and have initialled arrangements on the isolation and earthing diagram.

Signed Print name.....

Time Date

Part 3: Clearance

I hereby declare that the work for which this permit-to-work 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 permit-to-work and that all gear, tools etc have been removed.

Signed Print name

Time Date

* *Delete as appropriate*

Part 4: Cancellation

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

Signed Print name

Time Date

Serial No

Location

Limitation-of-access
(Complete precisely and legibly in BLOCK CAPITALS)

Front - original

- 1. This form must not be used for work on electrical equipment for which an electrical permit-to-work or sanction-for-test is required.**
- 2. On completion of the work, the holder must surrender this limitation-of-access as directed for cancellation, after which no work shall be done.**

Part 1: Issue

Issued to.....in the employ of..... being a Competent Person, is hereby given permission to carry out the work described below:

Location:

Work:

No other work shall be carried out

Remarks:

Authorised Person
Signed Time Date

Serial No

Location

Limitation-of-access
(Complete precisely and legibly in BLOCK CAPITALS)

Front – copy

1. This form must not be used for work on electrical equipment for which an electrical permit-to-work or sanction-for-test is required.
2. On completion of the work, the holder must surrender this limitation-of-access as directed for cancellation, after which no work shall be done.

Part 1: Issue

Issued to.....in the employ of being a Competent Person, is hereby given permission to carry out the work described below:

Location:

Work:

No other work shall be carried out

Remarks:

Authorised Person
Signed Time Date

Back - copy

Part 2: Receipt

I hereby declare that I accept responsibility for carrying out work in accordance with this limitation-of-access 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 Print name.....
(being the person to whom this form is issued)

Time Date

Part 3: Clearance

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

Signed Print name

Time Date

* *Delete as appropriate*

Part 4: Cancellation

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

Signed Print name

Time Date

Serial No

Location

**Certificate of authorisation for live working
(Complete precisely and legibly in BLOCK CAPITALS)**

Front – original

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. Form LW1 has been completed and is attached:

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

Serial No

Location

**Certificate of authorisation for live working
(Complete precisely and legibly in BLOCK CAPITALS)**

Front – copy

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. Form LW1 has been completed and is attached:

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

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. On completion of the work, I will surrender this certificate of authorisation for live working as directed for cancellation, after which no work shall be done.

Signed Print name

(being the person to whom this form is issued)

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 by charge have been withdrawn, all gear, tools etc have been removed and the electrical equipment has been left in a safe condition.

Signed Print name

Time Date

**Delete as appropriate*

Reason for suspending work and action taken (if applicable)

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 Print name

Time Name

Serial No

Permission for disconnection/interruption of electrical services
(Complete precisely and legibly in BLOCK CAPITALS)

Description of work
Authorised/Competent Person requesting disconnection Position/Title Name Signed Date
Circuit to be disconnected
Area service or equipment affected by disconnection
Point of disconnection positively identified <input type="checkbox"/> Yes <input type="checkbox"/> No

Duration of disconnection

from __:__ hrs on the __/__/__ to __:__ hrs on the __/__/__

Special instruction or safety measures (to be completed by person affected by work)

I confirm that permission for the intended work activity has been given, I have explained to the Authorised/Competent Person any special instructions or safety measures indicated above and understand that isolation of the system is now required and will ensure that all areas, services or equipment likely to be affected by the isolation have alternative provision/will not be put at risk.*

Position/Title Name

Signed Date

**Delete as applicable*

LW1 - Live functional testing – self check safety precautions

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

Task	Location	Tick	(Delete as appropriate)
1.	Is live functional testing necessary? Reason (please tick): Disruption of services Fault diagnosis not practical dead Contradiction of other statutory regulations Other (please state)		YES/NO <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.	Have unnecessary personnel been removed from work area?		YES/NO/NA
3.	Are you a competent person who is authorised for live LV functional testing?		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 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9.	Area 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: 1. 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** and **isolated**.

2. If completed by a Competent Person, this document should be returned to your supervisor.

3. If completed by an Authorised Person, a copy of this document should be attached to the certificate of authorisation for live working.

Logbook

Date	Time	Location	Circuit or switch concerned	Event or operation and reason	Safety programme and isolation and earthing diagram numbers	Safety document type and serial no	To whom issued	Signature of Authorised Person

Appendix 4: Model procedures and letters

Appointment procedure for an Authorising Engineer (LV)

1. It is the responsibility of the Designated Person to ensure that any person appointed as Authorising Engineer is suitably qualified and adequately experienced to satisfy the requirements of this Scottish Health Technical Memorandum, which has been compiled to enable the management to meet its statutory obligation – to comply with the requirements of the Electricity at Work Regulations 1989 for work on electrical equipment.
2. Before an Authorising Engineer is appointed, the Designated Person should be satisfied that the prospective Authorising Engineer meets all the criteria set out in [paragraphs 4.7–4.12](#) of this guidance.
3. The appointment of an Authorising Engineer is to be by an exchange of letters.

Dear _____ (Name of prospective Authorising Engineer)

OFFER OF APPOINTMENT AS AUTHORISING ENGINEER (LV)

Being satisfied that you are suitably qualified and meet the requirements of paragraphs 4.7–4.12 of Scottish Health Technical Memorandum 06-02: ‘Electrical safety guidance for low voltage systems’, I hereby offer you the appointment of Authorising Engineer for _____ to undertake the duties set out in paragraphs 4.7– 4.12 of Scottish Health Technical Memorandum 06-02: ‘Electrical safety guidance for low voltage systems’ until further notice. However this appointment will be reviewed and reconfirmed at three-yearly intervals.

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

Yours sincerely

(Designated Person)

Model letter for appointing an Authorised Engineer (LV)

Dear _____ (Name of Designated Person)

ACCEPTANCE OF APPOINTMENT AS AUTHORISING ENGINEER (LV)

I acknowledge receipt of your letter dated _____ offering me appointment as an Authorising Engineer for _____

I confirm that, to the best of my knowledge, I satisfy the requirements for appointment as an Authorising Engineer indicated in paragraphs 4.7– 4.12 of Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems'.

I accept the responsibilities of the Authorising Engineer and will, to the best of my ability, carry out the Authorising Engineer's duties set out in Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems'.

I note that I am required to attend an Authorising Engineer training course at intervals not exceeding three years, an Authorised Person refresher course at intervals not exceeding three years, and a fire-training course at intervals not exceeding 12 months.

Yours sincerely,

(Authorising Engineer)

Copies to: Operational procedure manual

Model letter for accepting an appointment as an Authorising Engineer (LV)

Appointment procedure for an Authorised Person (LV)

Part 1: Nomination procedure

Details of proposed appointment						
Type: New appointment/renewal/revised coverage* * <i>delete as appropriate</i> Dear _____ (<i>name of prospective Authorised person</i>) Date _____ You have been nominated for appointment as an Authorised Person in respect of the system(s), installation(s) and location(s) indicated below: 1. _____ 2. _____						
Voltage	Type of system or installation	Location (hospitals)				
		1	2	3	4	5
LV	Ring distribution system					
	Radial distribution system					
	Single generating set installation					
	Multiple generating installation					
	Other (give details of any other LV systems or installations)					
If you agree to be considered for appointment for 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 and return it to me as soon as possible. Yours sincerely _____ (<i>Authorising Engineer (LV)</i>)						

Part 2: Personal details

Name _____		
Current grade and job title _____		
Technical qualifications		
Details of apprenticeship		
Details of previous experience as an Authorised Person		
Courses	Location	Dates

Details of training received		
Courses	Location	Dates
Details of first-aid training for electric shock		
Course	Date	
<p>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.</p> <p>Signed _____ Date _____</p> <p>Address _____</p> <p>_____</p> <p>_____</p>		

Part 3: Certification of satisfactory training and familiarisation

Dear _____ (Name of Authorising Engineer)

I wish to nominate _____ for appointment as an Authorised Person for the system(s), installation(s) and location(s) as attached.**

Authorised Person training 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.

Name _____

Signed _____ Date _____

Address _____

** Details should be provided of the site(s) and LV equipment which shall be under the control of the nominee.

Model letter for appointing an Authorised Person (LV) by management

Dear _____ (Name of prospective Authorised Person)

OFFER OF APPOINTMENT AS AN AUTHORISED PERSON (LV)

You are hereby offered appointment as an Authorised Person (LV) for the duties identified in Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems' for the low voltage systems and installations at (hospital/location/healthcare organisation) for a period of three years, commencing on (Date).

Please confirm your acceptance of the appointment and the receipt of the enclosed "Certificate of appointment" by completing and returning the attached letter to me.

You should also sign the certificate of appointment.

Yours sincerely

Assessed by _____ Appointed by _____

(Authorising Engineer LV) (Management)

Dear _____ (Name of Authorising Engineer)

ACCEPTANCE OF APPOINTMENT AS AN AUTHORISED PERSON (LV)

I accept the appointment as an Authorised Person (LV) for the system(s), installation(s) indicated in your "offer of appointment" letter dated _____

I acknowledge receipt of the certificate of appointment number _____ as my authority to act, while on duty, as an Authorised Person for the system(s), installation(s) and location(s) indicated on the certificate.

I note that, while on duty as an Authorised Person, I will be competent for the practical implementation and operation of Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems' for the systems and installations for which _____ have control of the safety, and for which I have been appointed.

I will to the best of my ability follow the procedures as set out in the above Scottish Health Technical Memorandum and any written local variations notified to me by or agreed with the Authorising Engineer.

Yours sincerely,

Model letter for accepting an appointment as an Authorised Person (LV)

Certificate of appointment: Authorised Person (LV)

Certificate No. _____ Healthcare organisation _____

This is to certify that _____ (name of appointed Authorised Person) is appointed an Authorised Person for the purposes of the duties identified in Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems'

The appointment applies only to the locations and to the electrical systems and installations set out below.

The appointment is valid for three years only until _____

Authorising Engineer

Name _____

Date _____

Authorised Person

Name _____

Date _____

Location(s)

Exact extent of systems & installations to which this appointment relates

Certificate of appointment – Authorised Person (LV)

Part 1: Appointment record

Certificate no _____

Name _____

The certificate is valid only for three years until the last expiry date indicated below. After a review a new certificate will be issued and the details recorded below.

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

Notes

<p>Part 2: LV training record</p> <p>Certificate no _____</p> <p>Name _____</p>	
Course title	Date completed
<p>Part 3: First-aid training record</p>	
First-aid training	Date completed

Appointment procedure for a Competent Person (LV)

1. It is the responsibility of the Authorised Person to ensure that any person appointed as a Competent Person has suitable training and experience and is competent to satisfy the requirements of [paragraphs 4.23–4.29](#) of this guidance.
2. The appointment of a Competent Person is to be by the issue of a certificate of appointment model certificate.
3. A prospective Competent Person is to be nominated by the local manager by completing and signing part 1 of an application for appointment of a Competent Person as the model form.
4. The prospective Competent Person is to complete and sign part 2 of the application to confirm that they are familiar with the system(s), installation(s) and equipment listed in part 1 of the application.
5. Following a successful interview, the Authorised Person will offer an appropriate certificate of appointment to the prospective Competent Person, which is to be formally accepted in writing.

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 _____	(name of prospective Competent person) Date _____
You have been nominated for appointment as an Competent Person in respect of the system(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)	_____
<i>(Add specific duties if required)</i>	
If you agree to be considered for appointment for Competent 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 and return it to me as soon as possible.	
Name of proposer	_____
Authorised Person	_____
(On completion of Part 1, forward to the prospective Competent Person for completion of Part 2)	

Note: All testing duties require that the person carrying out the inspection and testing of any electrical installation must have, as appropriate to his or her function, a sound knowledge and experience relevant to the nature of the installation being inspected and tested. The person should also be fully versed in the inspection and testing procedures and employ suitable testing equipment during the inspection and testing process as required by the latest edition / amendment to the IEE regulations.

Where testing of portable appliances is concerned, the person carrying out inspection and testing must be competent to undertake the inspection and, where appropriate, testing of electrical equipment and appliances, having due regard to their own safety and that of others.

To meet the requirements of the above, it is recommended that if – the Competent Person is required install or alter electrical circuits – they should have attained C&G 2381. If that person then is responsible for testing the circuit, they should have attained C&G 2391.

Part 2: Personal details

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

Name _____	
Current grade and job title _____	
Technical qualifications*	
Degree <input type="checkbox"/> HND <input type="checkbox"/> HNC <input type="checkbox"/> OND <input type="checkbox"/> ONC <input type="checkbox"/> C&G 2381 <input type="checkbox"/> C&G 2391 <input type="checkbox"/> C&G 2377 <input type="checkbox"/> NVQ Level 3 <input type="checkbox"/> NVQ Level 4 <input type="checkbox"/> <i>Tick all applicable *</i>	
Any other relevant qualifications	
Details of apprenticeship	
Details of training received	
Courses	Dates
First-aid training for treatment of electric shock <input type="checkbox"/> <i>Tick if applicable*</i>	
I confirm that I would be willing to accept the appointment as a Competent Person 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 nominating Authorised Person)	
Return address	

Part 3: Approval and scope of appointment

(To be completed by the Authorised Person)

<i>Name of Authorised Person</i>			
<p>I hereby confirm that _____</p> <p>(i) is responsible to undertake work on the types of systems and equipment for which the appointment is sought;</p> <p>(ii) is familiar with the types of systems and equipment on which work is to be undertaken</p> <p>(iii) possesses technical knowledge or sufficient experience to avoid danger that may be presented by the work to be undertaken;</p> <p>(iv) has an adequate knowledge of those parts of Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems';</p> <p>(v) has adequate knowledge of, and within the last three years has received training in, first-aid treatment for electric shock;</p> <p>(vi) is suitable for appointment as a Competent Person to work in the vicinity of the following systems and equipment within the limitations identified below.</p>			
Systems and equipment	Locations as part 1 (Enter √)		
	1	2	3
<p>Signed _____ Date _____</p> <p>Address _____</p> <p>_____</p> <p>_____</p> <p>(On completion of part 3, send this form to the Authorising Engineer)</p>			

OFFER OF APPOINTMENT AS A COMPETENT PERSON

Dear _____ (Name of prospective Competent Person)

As previously discussed, you are hereby offered an appointment as a Competent Person for the purposes of Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems' for a period of one year, commencing on _____ (date).

Please note that the appointment offered covers only the locations and types of installation and equipment indicated on the certificate.

If you wish to accept the appointment, please acknowledge receipt of the enhanced certificate by signing and returning a copy of the attached letter.

Print name _____

Signature _____

(Authorised Person)

Copies to: Operational procedure manual

Model letter for appointing or re-appointing a Competent Person

ACCEPTANCE OF APPOINTMENT AS A COMPETENT PERSON

Dear _____ (name of appointed Authorised Person)

I accept appointment as a Competent Person for the purposes of Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems' for a period of one year commencing on _____ (date).

I note that the appointment covers only the locations and types of installations and equipment indicated on the certificate.

I will, so far as is reasonably practicable, ensure that I, and any others working with me or supervised by me, avoid danger to ourselves and others, and will not cause damage to electrical equipment.

I will not carry out any work beyond the limits indicated on the certificate unless I am under the direct supervision of an Authorised Person so appointed.

Yours sincerely,

_____ (Competent Person)

Copies to: Operational procedures manual

Model letter for accepting an appointment or re-appointment as Competent Person

Certificate of appointment as a Competent Person
Certificate No. _____
This is to certify that _____ <i>(name of Competent Person)</i> Is appointed as a Competent Person for the following locations until the expiry date shown. 1. _____ 2. _____ 3. _____
Duties: To accompany any non-Competent Person when entering a low voltage sub-station or enclosure for any purpose, except where that person is a Competent Person in possession of a valid limitation-of-access safety document and to remain within the building until the work is complete. To carry out maintenance tasks within the building as directed but not on high voltage equipment unless issued with a Permit-to-work by an Authorised Person. To trip the low voltage switchgear in case of emergency. Add specific duties if required:
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.

Certificate of appointment as a Competent Person

Appointment Record

(To be completed by the Authorised Person)

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

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

Appendix 5: Audit of safe system of work and safety procedures

General

1. This section details the audit and monitoring procedures to be carried out by the Designated Person, Authorising Engineers and Authorised Persons.

Validation audits by the Designated Person

2. The Designated Person is to arrange for a validation audit to be carried out one year after introduction of these procedures and then at intervals not exceeding five years.

Compliance audits by Authorising Engineers

3. Authorising Engineers are to carry out a compliance audit at each establishment for which they are appointed at a maximum of 12-monthly intervals.

Compliance audits by Authorised Persons

4. Authorised Persons are to carry out a compliance audit on each Competent Person for which they are responsible including contactors at a maximum of 12-monthly intervals.

Audit programme and progress reports

5. Authorising Engineers are to prepare a programme of audits covering a period of 12 months. The programme is to be prepared so that all significant installations for which they are appointed are seen over a maximum interval of three years. The programme is to be distributed to the Designated Person, the 'focal point' Authorised Person and all other Authorised Persons at the establishment.

Compliance audits

6. The Authorising Engineer is to review the action plan and progress of any outstanding recommendations from the previous audit.
7. The Authorising Engineer is to examine the current and known future workload and is to assess whether sufficient Authorised Persons are appointed. The Authorising Engineer is also to examine the register of appointed Competent Persons to ensure that sufficient persons are appointed.

Authorised person and documentation audit

8. The Authorising Engineer is to interview each Authorised Person to ascertain the quantity and quality of any safety documentation raised since the last audit. The Authorising Engineer is to carry out a full audit trail of at least one job

carried out by each Authorised Person. This audit is to cover the job from start to completion. In the case of low activity, the Authorising Engineer is to look at all documents produced and to assess the Authorised Person against a hypothetical scenario.

9. The Authorising Engineer is to examine the job list to ensure that safety documentation has been used for all jobs requiring it.
10. The Authorising Engineer is to examine a representative sample of the documentation raised by each Authorised Person.
11. The Authorising Engineer is also to examine a representative sample of the support documentation (from the lockable document cabinet) for suitability.
12. The Authorising Engineer is to examine the training records and ensure that each person has maintained their qualification for the application of this Scottish Health Technical Memorandum, including emergency first-aid.

Safety equipment

13. The Authorising Engineer is to inspect a sample of the safety equipment to ensure that:
 - adequate equipment is available at the establishment;
 - it is suitable for the intended purpose;
 - it has been properly maintained; and
 - the Authorised Persons, and other users, have been trained to use it safely.

Switchrooms and other installations

14. The Authorising Engineer is to examine a sample of electrical installations and switchrooms and is to ensure that all installations are inspected at a maximum interval of three years.

Non-compliances

15. Where non-compliance is found, the Authorising Engineer is to take the following action:
 - for non-compliances on completed jobs not adversely affecting the safety, investigate the reason and raise a non-compliance comment in the audit report;
 - for non-compliances on completed work that could have adversely affected the safety, investigate the reason and raise an auditor's practice improvement notice;
 - for non-compliances on work-in-progress that may adversely affect safety, suspend the work, investigate the reason and raise an auditor's suspension notice.

Audit report

16. The Authorising Engineer is to agree the factual findings with the focal point Authorised Person and other Authorised Persons before preparing the report. The report is to include compliant items, any non-compliant findings and a table of recommendations. The report is to be issued within 28 days of completion of the site visit.
17. Copies of the report are to be distributed to the Designated Person and the focal point Authorised Person, who is to arrange distribution to all other Authorised Persons.

Action plan

18. The focal point Authorised Person in consultation with the Authorising Engineer is to prepare an action plan to implement any recommendations from the report. The action plan is to be prepared within 28 days of receipt of the audit report and is to include the action to be taken, the name of the Authorised Person who will carry out the action, and the target date for completion. The Authorising Engineer is to copy the action plan to the Designated Person.

Short notice compliance audits by Authorising Engineers

19. In addition to the above procedures, the Authorising Engineer is to carry out one short-notice compliance audit of each Authorised Person every 12 months. This audit should be timed to coincide with work-in-progress if at all possible. The report of the findings is to be distributed to the individual Authorised Person and the Designated Person.

Compliance monitoring by Authorised Persons

20. Authorised Persons are to monitor work-in-progress regularly and are to keep a record of the findings and any remedial action initiated or required. Copies of the Authorised Persons' reports are to be made available to the Authorising Engineer.

Auditing aids

21. The following generic checklists can be used as a guide for auditing the safe system of work for electrical distribution systems. Authorising Engineers can tailor these to suit the particular installation(s) for which they are appointed. Photographs may be included in the report where appropriate.

Authorising Engineer's audit checklist

Complete column 3 'Yes/No' to show state as found.

Tick column 4 only if action is required.

Authorised Persons

Authorised Person		Y/N	Action
1.	Is the Authorised Person currently certified?		
2.	Is the Authorised Person due for refresher training in SHTM 06-02?		
3.	Is the Authorised Person due for training in emergency first-aid?		
4.	Is the Authorised Person due for training in use of cable tracing equipment?		
5.	Is the Authorised Person carrying out AP duties on a regular basis?		
6.	Is the Authorised Person carrying out monitoring of work-in-progress?		
7.	Are sufficient Authorised Persons appointed?		

Audit trail

Job number _____ Originating Authorised Person _____			
8.	Does the safety programme follow the procedures in Table 1 or 2?		
9.	Is the safety programme clear, legible and unambiguous?		
10.	Was the safety programme countersigned by an appropriate person?		
11.	Does the Authorised Person have sufficient items of safety equipment to carry out the actions on the Safety programme?		
12.	Is the isolation and earthing diagram clear, legible and unambiguous?		
13.	Is the permit-to-work clear, legible and unambiguous?		
14.	Was the permit-to-work issued to a Competent Person?		
15.	Was the permit-to-work cancelled correctly?		
16.	Were the site records up-dated on completion of the work?		

Documentation

17.	Are the documents kept in the lockable documents cabinet?		
18.	Does the Authorised Person have access to a controlled copy of SHTM 06-02?		
19.	Are the single line network diagrams of the electrical distribution correct and up-to-date?		
20.	Are copies of operation and maintenance manuals held for all equipment?		
21.	Are all events recorded in the logbook?		
22.	Are operational restrictions recorded in the logbook?		
23.	Is all of the distribution system included in the planned maintenance programme?		
24.	Is the register of Competent Persons up-to-date?		

Safety equipment

25.	Does the Authorised Person have sufficient safety locks, safety key boxes and multi-hasps for the likely number of concurrent jobs?		
26.	Does the Authorised Person have sufficient caution and danger signs for the likely number of concurrent jobs?		
27.	Are the potential indicator and proving unit satisfactory?		
28.	Is the other protective equipment inspected at annual intervals?		

Switchrooms

Switchroom externals			
29.	Is there a safety sign (P1) displayed at the entrance?		
30.	Is the sign legible?		
31.	Is the name of the switchroom exactly the same as the switchgear schedule?		
32.	Is the sign securely fixed?		
33.	Is the correct contact telephone number shown?		

Switchroom security

34.	Is the door secure/sound?		
35.	Is there an emergency escape door?		
36.	If so, is it accessible and can it be opened from the inside?		
37.	Is there a clear escape route outside the switchroom?		
38.	Is there a 24-hour telephone point inside?		
39.	Are any non-AP items stored in the switchroom?		
40.	If so, are the access arrangements correctly controlled?		

Switchroom structure

41.	Is the switchroom dry and clean?		
42.	Are duct covers fully in place?		
43.	Are there any signs of rain ingress?		
44.	Are there any visible defects in the structure?		
45.	Are there any signs of rodents in the switchroom?		
46.	Is the working space and lighting adequate?		
47.	Is emergency lighting installed?		
48.	If so, is it included in the planned maintenance programme?		

Switchroom posters and labels

49.	Are posters displayed as required?		
50.	Is each item of switchgear clearly labeled?		
51.	Do the labels agree exactly with the switchgear schedule?		
52.	Are labels displayed at the rear of the switchgear?		
53.	Does the switchgear condition agree with the maintenance record?		
54.	Does the switchgear condition agree with the maintenance record?		
55.	Is there excessive noise or heat from the switchgear?		
56.	Are there any signs of leakage from visible compound-filled cable terminations?		
57.	Are there any operational restrictions in place?		
58.	If so, are warning notices displayed?		

Fire precautions

59.	Are any rubbish or fire hazardous materials stored outside the switchroom?		
60.	Is a suitable fire extinguisher provided in the switchroom?		
61.	Has it been inspected?		
62.	Is there a 'gas flooding' system installed?		
63.	If so, are there clear instructions displayed on how to inhibit the system when entering the substation?		
I confirm that, where actions are required, a report has been submitted to the Designated Person			
_____ Signature of A E			

Authorised person annual on-site operational audit form

Complete column 3 "Yes/No" to show state as found.

Tick column 4 only if action is required.

Competent person

Competent Person _____	Y/N	Action
Is the Competent Person currently certificated?		
Is the Competent Person trained to SHTM 06-02?		
Is the Competent Person due for training in emergency first-aid?		
Does the Competent Person have a copy of the SHTM 06-02 rule book?		

Audit trail dead working

Job number _____ Originating Authorised Person _____		
	Description of work-in-progress	
	Identification of the point of isolation	
1.	Were circuit drawings used?	
2.	Were the circuits labeled?	
3.	Other methods used to determine isolation, please give details below:	

4.	In view, are circuit drawings and/or labels up-to-date, accurate and sufficient? If no, give details		
	Isolation		
5.	Was the equipment energised prior to isolation?		
6.	Was permission to disconnect supplies obtained?		
7.	Is the disconnection of supply correctly established?		
8.	Are caution signs posted?		
9.	Have safety locks being applied at the point of isolation?		
10.	If applicable, have fuses being removed and retained by the Competent Person?		
11.	Does the isolation method used comply with SHTM 06-02?		
	Proving dead		
12.	Are approved test lamps available at the place of work?		
13.	Is a functioning test lamp available at the point of work?		
14.	Was the test lamp proved to work prior to use?		
15.	Was the circuit proved dead at the point of work?		
16.	Was the test lamp proved to work after use?		
	Tests on completion of work		
17.	Was the equipment tested before re-energisation? If yes, please list below:		
	Certification on completion of work		
18.	Was a BS7671 test certificate required for the work? If yes, give details of certificate completed:		

Audit trail live working (not requiring a safety document)

Competent Person _____		Y/N	Action
Description of work			
19.	Testing		
20.	Fault-finding		
21.	Adjustments		
Other. Please give details:			
22.	Do you agree that the work must be undertaken live? If no, give reasons:		
Safety precautions			
23.	Is the Competent Person trained and authorised?		
24.	Is authorization less than three years old?		
25.	Was the form LW1 completed?		
Which of the following safety precautions were adopted?			
26.	Accompanied		
27.	Rubber gloves worn		
28.	Rubber mats		
29.	Insulated tools used		
30.	Temporary insulation		
31.	Suitable clothing to the wrist worn		
32.	GS38 test leads used		
33.	Barriers erected to control work area		
34.	Do you consider the precautions taken as adequate? If no, please give reasons:		
35.	Does this work fully meet the SHTM 06-02 live working policy? If no, please give reasons:		

Audit trail general

		Y/N	Action
	Work instructions		
36.	Were written job instructions used for the work?		
37.	If written instructions were given, were they correct and sufficient? If no, please give details:		
38.	Were verbal instructions used for the work?		
39.	If verbal instructions were given, were they correct and sufficient If no, please give details:		
	Tools and instruments		
40.	Are all tools and instruments on-site safe to use? If no, please give details:		
41.	Is the individual's tool-kit complete and fit for purpose? If no, please give details:		
	Note This section may need to be completed when the job is finished and access to the stored tools/instruments in the workshop is available		

I have been shown the completed entries on this form

Signature of Competent Person

I confirm where there are actions required a report has been submitted to the Designated Person.

Signature of Authorised Person

Appendix 6: Standard symbols for isolation and earthing diagram

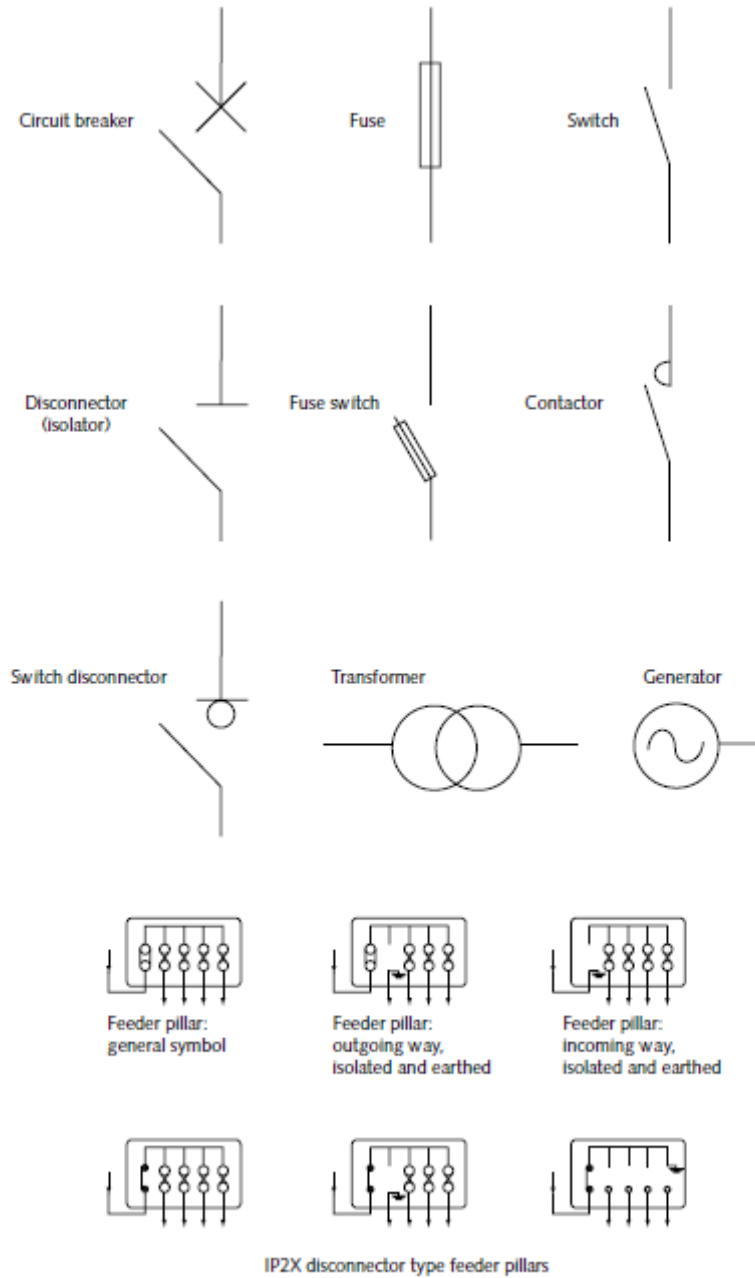


Figure A1: Standard symbols for isolation and earthing diagram

Switchgear

The terminology used to describe a piece of switchgear on a system should state:

- where the switchgear is located;
- what type of switchgear is going to be operated;
- to where does the switchgear connect.(see Figure A2 below)

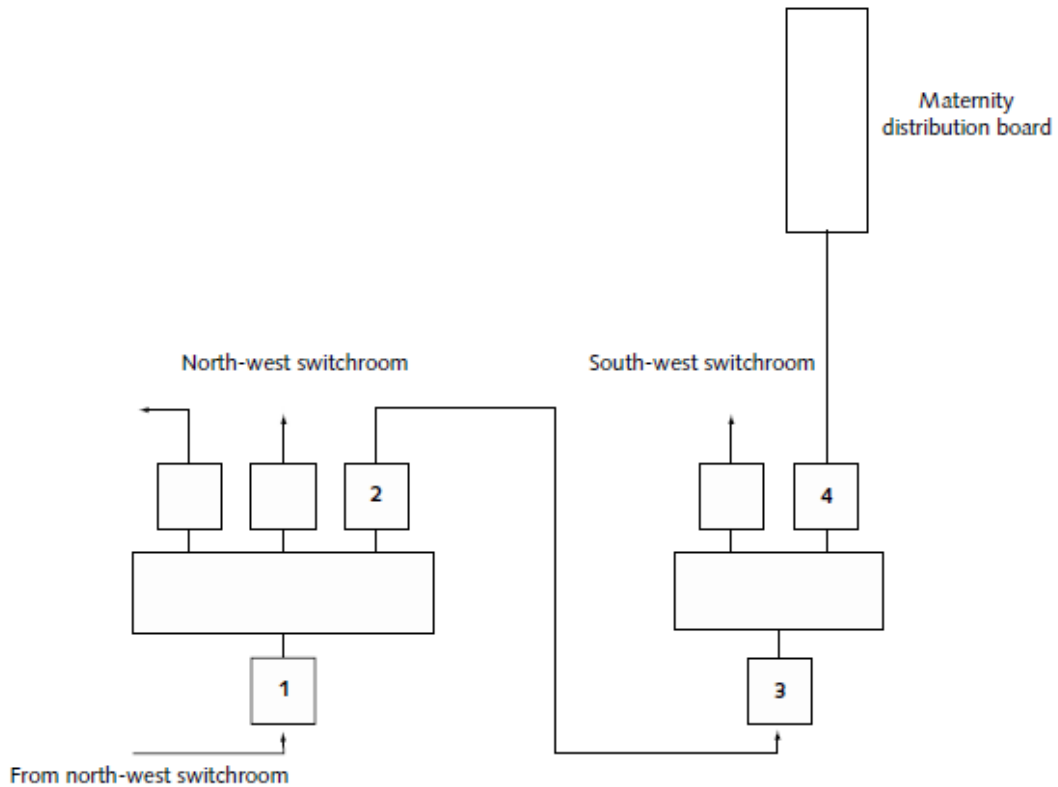


Figure A2: Switchgear network diagram

	Where	What	To Where
1	North-west switchroom	Switch disconnector	North-west switchroom
2	North-west switchroom	Circuit breaker	South-west switchroom
3	South-west switchroom	Switch disconnector	South-west switchroom
4	South-west switchroom	Fused switch	Maternity distribution board

Operation

The operation of the switchgear should be recorded as follows:

- switch/circuit breaker switch to on;
- switch/circuit breaker switch to off.

Appendix 7: Qualifications and training requirements

Qualifications of an Authorising Engineer

1. To be eligible for appointment, a prospective Authorising Engineer should:
 - be a Chartered or an Incorporated Engineer with practical and relevant technical engineering experience of the types of system and equipment relative to their appointment;
 - have satisfactorily completed an approved Authorised Person initial training course in the last three years or within six months of a first-time nomination;
 - have satisfactorily completed an approved Authorising Engineer training course in the last three years or within six months of a first-time nomination;
 - be familiar with the different types of equipment, installation and system in use within the area for which appointment is sought;
 - have a basic knowledge of the systems and installations in use in the area for which they will become responsible, and become familiar with the more complex systems;
 - be independent from the organisation – this is important to exercise the duties of the post;
 - be able to demonstrate their competency and suitability for the role by demonstrating a good understanding of the management tasks involved and knowledge of Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems' prior to appointment;
 - have adequate knowledge of, and within the last three years have successfully completed a training course on, emergency first-aid.

Authorising Engineer (LV) initial training

2. This guidance suggests that, in order to become eligible for appointment as an Authorising Engineer, candidates should have successfully completed an appropriate training course for Authorised Persons. The course profile is described in this Appendix.

Qualifications of Authorised Persons (LV)

3. Prospective Authorised Persons should be nominated by the management and assessed and appointed by the Authorising Engineer. The appointment is to be for defined systems and installations and will be registered on a certificate of appointment signed by the Authorised Person and the Authorising Engineer.
4. To be eligible for appointment as an Authorised Person, the prospective Authorised Person should:
 - be over 23 years of age;
 - be electrically qualified within the following range:

- degree;
- HND/HNC;
- OND/ONC;
- BTEch 4 or 3;
- C&G;
- NVQ at level III or above;
- have an adequate knowledge of this guidance and of those regulations listed in [Appendix 1](#) that are applicable to the systems and installations for which the appointment is sought;
- be technically competent and qualified to safely operate, and make safe to work on or test, the equipment, systems or installations for which appointment is sought;
- be familiar with the equipment, systems or installations for which appointment is sought;
- have successfully completed an Authorised Persons (LV) training course approved by the Authorising Engineer;
- before being appointed, be able to demonstrate competency and suitability for the role through a formal interview carried out by the Authorising Engineer;
- have adequate knowledge of, and within the last three years have successfully completed, an emergency first-aid training course.

Authorised Person (LV) training

5. This guidance suggests that, in order to become eligible for appointment as Authorised Persons, candidates should have successfully completed an approved training course for Authorised Persons. The course profile is described in this Appendix. There are also periods of on-site training and familiarisation that are described in paragraph 10 of this Appendix.

Refresher training

6. This guidance suggests that an Authorising Engineer should attend an appropriate Authorised Persons' training course at intervals not exceeding five years.
7. This guidance suggests that an Authorising Engineer should attend an appropriate Authorising Engineer refresher training course at intervals not exceeding five years.
8. This guidance suggests that an Authorised Person should attend an appropriate training course for Authorised Persons at intervals not exceeding three years.
9. The Authorising Engineer is responsible for deciding when training is necessary for individual Authorised Persons, and normally every Authorised Person should attend training every three years. However, the Authorising Engineer may

consider extending this period up to a maximum of five years. In support of this decision, copies of the reasons and the approval given are to be held on file by the Authorising Engineer. Under no circumstances can the training period be extended beyond five years.

Familiarisation training

10. At the end of the familiarisation period for the systems, installations and equipment for which the appointment is sought, the prospective Authorised Person should be able to demonstrate:
- a good working knowledge of the procedures associated with the operation of this guidance, the role and duties of an Authorised Person and any agreed local variation;
 - a good working knowledge of the layout of the electrical distribution, the location of the safety key boxes, working key cabinet and how to gain access to them;
 - a good working knowledge of the operation – under normal, failure and fault conditions – of all the principal components of the systems and installations for which authorisation is being sought, such as switchgear, distribution equipment and standby generating sets;
 - practical experience, under the direct supervision of an experienced Authorised Person, of the operation of the electrical equipment forming part of the system or installation;
 - knowledge of the location of, how to obtain access to, and the use of, all appropriate protective equipment, test indicators (including appropriate test supplies (proving units)), where applicable low voltage potential indicators (including appropriate test supplies (proving units)), and safety signs;
 - a good understanding of all the necessary safety measures to be taken to prevent danger or, where appropriate, injury, and to prevent damage to equipment;
 - knowledge of any necessary liaison with the local facilities managers, Authorised Persons of other disciplines, electricity supply authorities, and contractors having operation, repair or maintenance contracts.

On-site training

11. On-site training is to consist of putting into practice, under the supervision of an experienced Authorised Person, the knowledge gained during the familiarisation period.

Qualifications of Competent Persons (LV)

12. Prospective Competent Persons should be nominated by the management and assessed and appointed by the Authorised Persons. The appointment is to be for defined systems and installations and will be registered on a certificate of appointment signed by the Competent Person and the Authorised Person.

13. To be eligible for appointment as a Competent Person, the prospective Competent Person should:
- be qualified within the following range: BTEch 3, C&G, NVQ level III, IEE Regulations (BS7671). It is recommended that if the Competent Person is required to install or alter electrical circuits, they should have attained C&G 2381. If that person is responsible for testing the circuit, they should have attained C&G 2391;
 - be competent to undertake work on, and testing of, the types of system and equipment for which the appointment is sought;
 - be familiar with the types of installation and equipment that they will be required to work on or test;
 - possess the necessary technical knowledge, skill and experience relevant to the nature of the work or tests to be undertaken to prevent danger and injury;
 - have an adequate knowledge of the relevant parts of this guidance, any agreed local variations, and regulations which are applicable to the installations and equipment on which work or tests are to be undertaken;
 - have an adequate knowledge of, and within the last three years have successfully completed, an emergency first-aid training course.
14. Appointment for up to three years will follow completion of necessary training, the passing of the authorisation examination (comprising practical exercises), and an interview with the Authorised Person.

Training

15. Management have a general duty to ensure that their employees receive training necessary to allow them to safely perform their duties.
16. Appropriate training courses are formal courses of instruction appropriate to the duties expected to be performed by a prospective or practising Authorising Engineer, Authorised Persons or Competent Persons, which have been approved for the purpose by the management. The Authorising Engineer should also approve the content and location of safety training for all individuals who are to be appointed or re-appointed as Authorised or Competent Persons.
17. Training may take place at a training establishment and/or locally on site. On-site training is an important element; it ensures a better understanding of how the safety policy will be applied locally to the low voltage system.
18. Such courses are to be designed to impart an adequate level of knowledge of this guidance and of other matters necessary for the application of safe systems of work. In addition, they are to include practical experience of applying safe working procedures on a range of typical low voltage equipment arranged to provide simulated circuits.
19. Students should be continually assessed in both written and practical exercises so that, on completion of the course, the training organisation can make an

independent assessment of their suitability and technical competence for consideration by the Authorising Engineer or Authorised Person as appropriate. The students should also be informed directly of the results of the assessments.

20. Suitable course profiles for this purpose are included in this Appendix. These are for general guidance only, and courses that are a composite of existing commercially-run courses may be acceptable provided the Authorising Engineer has given approval.

Initial training course for an Authorising Engineer (LV)

21. Approved training courses for an Authorising Engineer are to provide the necessary training and background information to prepare candidates to safely discharge the duties of an Authorising Engineer in accordance with this guidance.

22. The basic training is to ensure that:

- the management policy towards electrical safety is applied universally across the areas of management responsibility;
- Authorised Persons are correctly selected and appointed, and their application of Scottish Health Technical Memorandum 06-02 – ‘Electrical safety guidance for low voltage systems’ is properly audited;
- the roles and duties of an Authorising Engineer with regard to the selection of Authorised Persons are looked at in detail;
- the procedures to be adopted when work is undertaken are carried out in a controlled environment.

23. The course is to have a duration of about three days, and the scope is to include:

- an introduction to the safe systems of work;
- the roles and responsibilities of persons for this system;
- practical and procedural aspects of safe working practices;
- nomination, evaluation, appointment and auditing of Authorised Persons;
- candidate interview techniques;
- training requirements for new and in-service Authorised Persons;
- termination procedures for Authorised Persons;
- focal point duties, including accident investigation.

Training course profile for Authorised Person (LV)

24. Approved training courses for low voltage electrical distribution systems are to provide the necessary basic training and background information to prepare students to safely discharge the duties, in accordance with Scottish Health Technical Memorandum 06-02: ‘Electrical safety guidance for low voltage

systems', as an Authorised Person in respect of the defined distribution systems.

25. The basic training is to provide:

- an adequate knowledge of the reasoning and content of Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems';
- a thorough knowledge of, and practical experience in, the duties and responsibilities of an Authorised Person (Electrical);
- an introduction to the theory, application, operation and maintenance of components of typical low voltage distribution systems.

26. The background information is to provide an understanding of the principles involved in the design, operation and maintenance of typical low voltage distribution systems and their associated protective devices.

27. The course should last about five days, and the scope is to include:

- statutory requirements relating to electrical safety;
- Scottish Health Technical Memorandum 06-02: 'Electrical safety guidance for low voltage systems';
- role and duties of personnel;
- types and functions of common low voltage distribution switchgear;
- testing of electrical installation to BS7671: 2008;
- protective devices, miniature circuit breakers (MCBs), fuses and interlocks;
- operation and maintenance procedures for standby power supplies and equipment;
- practical exercises on the isolation of standby, UPS and battery systems including the issue of permits-to-work and certificates of authorisation for live working;
- practical exercises on the isolation of low voltage distribution systems including preparation, checking and use of safety programmes, and procedures pertaining to permits-to-work;
- items listed below for competent persons;
- completion of logbook and filing of documentation;
- monitoring of electrical safety work by staff/ contractors;
- cable detection, location and identification.

Training course profile for Competent Persons (LV)

28. Approved training courses are to provide the necessary basic training and background information to prepare Competent Persons to safely discharge their duties in accordance with Scottish Health Technical Memorandum 06-02 : 'Electrical safety guidance for low voltage systems'.

29. The course is to last about one day, and the scope is to include:
- statutory requirements relating to electrical safety;
 - the guidance given in Scottish Health Technical Memorandum 06-02 : ‘Electrical safety guidance for low voltage systems’;
 - role and duties of personnel;
 - procedures for working on equipment made dead;
 - procedures for working on live equipment;
 - use of approved tools and equipment and personal protective equipment. Means/method of proving dead at the point of work;
 - completion of live working self-check safety precautions (Form LW1) before testing, faultfinding or making adjustments on live LV circuits;
 - type of live working which requires the issue of a LV certificate of authorisation for live working by an Authorised Person;
 - testing of circuits prior to energisation.

Emergency first-aid training and equipment

30. All Authorised Persons, Competent Persons and Accompanying Safety Persons are to successfully complete emergency first-aid training course in accordance with this guidance at intervals not exceeding three years.
31. Training in emergency first-aid is to be provided by organisations whose training and qualifications for first-aiders are approved by the Health and Safety Executive for the purposes of the Health and Safety (First-Aid) Regulations 1981.
32. Training courses are to be of at least four hours’ contact time, and should include the following subjects:
- resuscitation (as appropriate for the treatment of electric shock);
 - treatment of burns;
 - control of bleeding;
 - treatment of the unconscious casualty;
 - contents of first-aid box;
 - communication.
33. This training is to be repeated, as a minimum, every three years.
34. Copies of certificates issued to Authorised Persons are to be held by the Authorising Engineer.
35. Copies of the certificates issued by first-aid trainers for Competent Persons and Accompanying Safety Persons are to be held in the operational procedure manual.

36. A current list of first-aiders for the appropriate locations, including, where appropriate, their telephone numbers, is to be held in the operational procedure manual.

Contractors' staff

37. All contractors' staff working on or testing electrical installations, systems and equipment for which the management has control of the electrical danger are to receive, as a minimum, the emergency first-aid training indicated above.
38. Copies of the certificates issued by first-aid trainers for contractors' Competent Persons and Accompanying Safety Persons are to be held in the operational procedure manual.

Examination

39. Examination of Authorised and Competent Persons to determine suitability for appointment should take the form of practical exercises and an interview.
40. Exercises and interview questions will cover those topics to a level appropriate to the proposed duties and responsibilities of the appointment.
41. Practical exercises for an Authorised Person appointment should include:
- preparation and issue (to Authorising Engineer acting as a Competent Person) a permit-to-work, limitation-of-access and a certificate of authorisation for live working;
 - preparation and use of a safety programme for work on a complex circuit which requires the issue of a permit-to-work, insulation-testing repair and phasing-out across an open switch before making a parallel;
 - proving dead at the point of work.

Note: The latter two items will be carried out using the local on-site LV network. If it is not practical to arrange isolation of the complex circuit (chosen for the safety programme), the candidate and Authorising Engineer will physically visit each switching location etc, and the candidate will describe to the satisfaction of the Authorising Engineer any actions they would take to ensure safety.

42. The Authorising Engineer should 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 the note above is used.
43. Practical exercises for a Competent Person appointment should include:
- issue (by the Authorised Person conducting the examination) to the candidate of a permit-to-work, including questioning to confirm the candidate's knowledge. The candidate should then explain how he/she will brief and supervise members of the working party working under his/her control. This exercise should be carried out in a switchroom with danger

signs posted to simulate conditions described in the permit-to-work, but without the need to actually isolate the circuit;

- isolation of a non-complex circuit and proving dead at the point of work;
- receipt of a certificate of authorisation for live working.

44. Interview questions and candidate (summary) replies should be recorded by the examining officer.
45. The examination procedure should be repeated prior to re-appointment of individuals.

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