



SOP 13 - Estates Department Procedure: Electrical Safety & Operation (LV)

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Introduction

Objectives of these procedures

This guidance is intended to be complementary to and read in conjunction with Scottish Technical Memorandum (SHTM) 06-02 and attempts to gather together all relevant information required to operate and maintain in a unified manner the various Electrical systems throughout NHS Boards' premises within NHS Scotland.

The documentation sets out to define roles, responsibilities and limitations of all staff that may be tasked with the operation of switchgear or working on low voltage & high voltage electrical systems. For these purpose electrical services relates to low voltage & high voltage, SHTM-06-02 & SHTM 06-03

Documents particularly relating to these procedures are:

- Health and Safety at Work etc. Act 1974;
- Electricity at Work Regulations 1989;
- Scottish Health Technical Memoranda 06-01 and 06-02;
- Scottish Health Technical Memoranda 08-02;
- Scottish Health Technical Memoranda 08-03;
- Provision and use of Work Equipment Regulations 1998;
- BS 7671 (Current revision) and its various guides published by the IET and BSI..

Issue of the safety guidance handbook

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.

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1. Authors & Reviewers to the Procedure

Reviewed and Signed off

- Initial Author-** Health Facilities Scotland, first draft D0:05
- Editor** - Estates Compliance Manager
- Reviewer** - Director of E&F
- Reviewer** - Sector Estates Manager (Central Acute)
- Reviewer** - Sector Estates Manager (Central/NEF)
- Reviewer** - Sector Estates Manager (QMH/DWF)

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2. Management roles and responsibilities -overview

Designated staff functions

The following are the key personnel who have specific responsibility for electrical installations.

Management - General

Management is defined as the owner, occupier, employer, general manager, chief executive officer or other person within or on behalf of the NHS Board ultimately accountable for the safe operation of premises.

Nominated staff

The Head of Estates (or equivalent) is responsible, as duty holders, for the safety of electrical systems within the NHS Board's premises.

Note: The Electricity at Work Regulations 1989 imposes duties on employers to comply with these insofar as they relate to matters which are within their control. These duties are in addition to those imposed by the Health and Safety at Work etc. Act 1974.

The Chief Executive (or Director of department) must formally nominate in writing a Designated Person with responsibility for the Electrical Safety Policy.

Designated Person

The Designated Person will have overall authority and responsibility for the electrical installations within the NHS Board's premises and will have a duty to implement the organisational and arrangement duties for carrying out that policy. This person could be the Head of Estates but will not be the Authorising Engineer [AE].

Authorising Engineer [AE]

The AE will be a Chartered Engineer with appropriate experience who possesses the necessary degree of independence from the NHS Board. The AE is appointed in writing by management (Designated Person) to implement, administer and monitor the safety arrangements for the electrical supply and distribution systems, to ensure compliance with the Electricity at Work Regulations 1989 and to assess the suitability and appointment of candidates in writing as "Authorised Persons".

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Authorised Person [AP]

The AP will be a person possessing adequate technical knowledge and having received appropriate training, and have received a letter of recommendation by the AE to be responsible for the practical implementation and operation of the NHS Board's safety policy and procedures on defined electrical systems. It is the duty of the DP to appoint the AP as appropriate.

Competent Person [CP]

A Competent Person is approved and appointed in writing by an Authorised Person 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.

Accompanying Safety Person [ASP]

An Accompanying Safety Person is an individual 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 will be familiar with the system or installation being worked on or tested and will have been instructed on the action to be taken to rescue a person safely in the event of an accident. The accompanying person should be trained to recognise danger, to switch off and, if necessary, to give assistance in the event of an emergency.

All Users

NHS Fife regards electrical safety at work as also being a responsibility of every employee in order to safeguard themselves, their colleagues and other persons within the sphere of NHS Fife's interests.

The effectiveness of the electrical safety policy and procedures depends to a large extent on the full co-operation and active participation of all employees to implement safe work practices and to report on any perceived risk of danger arising from the use of the electrical system and equipment.

This electrical safety policy will apply wherever any NHS Fife employees are working and to all electrical equipment belonging to NHS Fife, wherever it is located.

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3. The Authorised Person

Note: The Authorised Person shall be formally recommended by the Authorising Engineer for defined systems and installations. Appointment will be by the issue and acceptance of a certificate from the Designated Person.

Requirements for Authorisation

The following qualifications will be required prior to appointment: (These should be copied and recorded in the AP file)

- demonstration of adequate knowledge of each system for which authorisation is sought;
- meeting the training and familiarisation requirements;
- satisfying the AE as to competency and ability;
- having received training for first aid treatment for electric shock.

Responsibilities

Authorised Persons will have the following responsibilities within the limits imposed by their certificates of appointment:

- Correctly implementing approved procedures to ensure that all precautions to achieve safety have been completed, including:
 - task and site specific risk assessment and method statements;
 - confirming that safety precautions at all locations are complete.
- Prior to the issue of a safety document taking into account risk assessments and method statements, deciding, where appropriate:
 - whether live working is essential and unavoidable;
 - whether circuit earths are required, and, if so, the number and points of application;
 - whether any action is required to contain or dissipate stored energy;
 - whether any precautions are necessary, for example, mechanical isolation; signage, PPE;
 - what personal supervision is required;
 - whether safety has been achieved and will be maintained where the requirements of the safety document are completely implemented;
 - whether the contents of the safety document to be issued are correct and unambiguous.

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- When issuing a safety document:
 - ensure that the contents of the safety document are fully explained to the recipient and that the recipient understands the nature and extent of the work or testing to be done and the safety precautions to be taken; (Note the operative(s) must sign that they understand the safety document prior to any works commencing);
 - provide as appropriate any keys, padlocks, isolation equipment and signage and also note any circuit earths considered necessary.
- When cancelling a safety document:
 - ensure that the declaration within the clearance section has been signed and the requirements satisfied;
 - the CP copies are to be destroyed in the presence of the AP.

Duties

These are summarised as follows:

- preparing Inspection & Maintenance Schedule and Records;
- assisting in Safety Programme Preparation;
- ensuring that all records concerning the system for which the AP is appointed are current and regularly updated;
- ensuring that the test equipment is calibrated and maintained in good condition;
- co-operating with the AE in matters of policy concerning the installation to ensure compliance with the Electricity at Work Regulations 1989;
- reporting any dangerous and/or unusual occurrences to the AE;
- appointing Competent Persons [CP];
- establishing procedures for switching operations;
- establishing and controlling safe isolation procedures;
- issuing and cancelling safety documents;
- having adequate knowledge, and having received training in, first aid treatment for electric shock.

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4. The Competent Person

Note: The Competent Person [CP] will be responsible for undertaking duties on systems. The limitation of these duties will be clearly be defined in accordance with the AP instructions. While carrying out these duties the CP must ensure that all safety measures are taken to prevent danger, avoid injury and prevent damage to equipment.

Responsibilities

Competent Persons shall comply with the NHS Board's 'Safety Rules' when carrying out work. Instructions are issued in writing. They shall use safe methods of work, safe means of access and the personal protective equipment (PPE) and clothing provided for their safety.

CPs, when in receipt of safety documentation, shall:

- be fully conversant with the nature and extent of work to be done;
- read the contents and confirm to the person issuing the safety document that they fully understand its contents;
- 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;
- retain the safety document and (where appropriate) keys, padlocks, isolation devices etc, 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 shall be reported immediately by the CP to an Authorised Person.

Competent Persons clearing a safety document shall do so only after all persons working under the safety document have been withdrawn from, and have been warned not to work on, the equipment concerned. Where appropriate they shall ensure that all tools, gear and loose material have been removed, guards and access doors replaced and the workplace left tidy in a safe condition.

Qualifications for appointment of Competent Persons

To be eligible for appointment, competent persons shall:

- be qualified as a minimum of approved electrician;
- have current qualifications supporting knowledge of BS7671;

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- be competent to undertake work on the types of systems and equipment for which the appointment is sought;
- be familiar with the type of systems and equipment on which work requires to be undertaken;
- possess technical knowledge and sufficient experience to avoid danger that may be presented by the work to be undertaken;
- have an adequate knowledge of:
 - the relevant parts of this ‘Electrical Safety Code’ for systems;
 - any local house rules which are applicable to the systems and equipment on which work or tests require to be undertaken;
 - SHTM 06 (all parts).
- have an adequate knowledge of, and undertaken refresher training on an annual basis in, first aid treatment for electric shock.

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5. The Users

All users of electrical equipment within NHS Fife have responsibility for implementing the following rules.

Installation

All new fixed electrical systems and equipment must be checked and tested for electrical safety by a competent person before being taken into use. This may be carried out by an approved electrical contractor (those who are registered with the National Inspection Council for Electrical Installation Contracting or a member of the Electrical Contractors Association) or an electrician from the Estates Department (who has gained the City & Guild 2391 or 2394/2395 qualification).

Inspection and Testing

All fixed electrical plant and installation (s) must be routinely inspected and tested, in accordance with current legislation and good electrical practice. Testing of electrical installations will be the responsibility of the local Estates Department and only up to the point of isolation, e.g. specialist fixed and/or medical equipment, e.g. MRI scanners etc will not be tested, and the responsibility for the maintenance of this equipment will be with the user and managed under a service & maintenance contract with the manufacturer or suitably competent contractor.

Portable Appliance Testing

All 'portable' equipment i.e. that is connected to the electricity supply with a plug, must be inspected and/or tested at installation and thereafter at appropriate intervals (frequency determined by a process of risk assessment based on its type of use and its environment). Records of the inspection and/or tests must be made and kept. See HSG 107 with frequencies for testing portable equipment. Each local Estates department will manage this service for NHS Fife owned equipment.

In between recorded checks, **users** must regularly carry out a visual inspection and report any perceived defect. See HSG107 for guidance on user checking

After the recorded check, and repair if necessary, the checker must attach to the equipment a label saying **Tested for Electrical Safety** and insert the date that it was tested and next test date.

The appropriate manager from each area of NHS Fife must ensure that a comprehensive list of portable electrical equipment is kept, updated and available at time of inspection and that staff which they are responsible for, do not bring in personal items of electrical equipment.

No person shall use an item of electrical equipment unless it bears a label indicating a current pass status of safety inspection as issued by the Estates Department, its

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nominated contractor, or in the case of specialist medical electrical equipment, Medical Physics Staff.

Equipment found with no label or is over its test date, should not under normal circumstances be used. Should the need arise to use such an item of equipment in an emergency situation; the user of the equipment will determine if the risk is acceptable. This will include a visual check of the equipment by the user. The Department Manager must then contact the Estates Help Desk and arrange to have the equipment tested at the earliest opportunity.

Use (General)

Those in charge of work involving the use of electricity must ensure that the equipment is safe to use and adequately maintained.

They must ensure that those under their supervision are fully informed, instructed and, if necessary, trained in the safe operation of the equipment.

They must ensure that measures are in place to prevent the use of defective equipment.

Training

Training is an essential element of safe work practices and all staff must be appropriately trained, prior to being appointed or instructed to undertake duties under the safety procedures.

The training of an individual, which can be by formal education and by on-the-job tuition, as appropriate, is to be assessed for suitability by the person responsible for the appointment of the individual to a particular duty.

Examination of each person's training record is to be included in the procedures review process and where necessary, periodic retraining is to be arranged to cover the technical aspects, electrical safety and first aid matters, as appropriate for each individual's duties.

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6. Safety instructions

NHS Board Safety Rules for Electricity

Competent Person

The letter of appointment for a CP, along with the attached NHS Board Safety Rules, will specify any limitations that have been imposed on the CP with regard to his level and area of responsibility for the system.

All Other Staff

The Safety Rules have been produced for all staff grades. If complied with, a safe system of work will be achieved. The individual Estates Managers will be required to ensure that their staff are familiar with the appropriate section of the Safety Rules. It is recommended that this is reviewed with staff regularly as toolbox talks or at regular meetings and formally signed as a record.

General Guidance

Safety documentation will be used by the Authorised Person where he deems fit with the following guidance

Note: Live working, which includes not only working on live uninsulated conductors, but also working so near live uninsulated conductors that there is a risk of injury, should only be carried out in circumstances where it would be unreasonable to work dead.

This would include all types of fault finding and testing, but only where it has been risk assessed, a method statement is in place and suitable precautions are to be taken against injury (including adequate training and the provision of adequate PPE).

- Permits-to-Work, Limitation of Access Permits and a Certificate of Authorisation for Live Working (if appropriate) will be required for working on, or isolating up to and including the final distribution board;
- Permits-to-work will be required for switching sub-circuits on final distribution boards. Permission must be obtained in writing and in advance from a Ward or Department Manager before switching or isolating;
- Permits-to-work will be required for maintenance work on equipment or control panels. The correct form of safe electrical isolation with isolation devices, padlocks and keys with the appropriate safety or caution notices must be used;
- Consideration must be given when planning work to the possibility of separate or alternative electrical supplies in the working area. This may be any of the following:
 - Generator supply; UPS/IPS; PFC Equipment

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Incident Reporting

Any incident which involves the electrical system and which compromises safety must be reported, in the first instance to the Estates Services Department, who will inform the Authorised Person for the system and who in turn will determine what action is to be taken to prevent any risk or danger arising from the reported equipment.

All reported incidents are to be investigated by the Designated Person and a written record of the incident and action taken is to be filed in the system log book and the operational procedures manual. A Datix Entry will also be required.

The reporting of injuries or dangerous occurrences under the Reporting of Injuries, Diseases and Dangerous Occurrence Regulations 2013 (RIDDOR), will be acted upon, as required, by the Designated Person

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Appendix1: Safe isolation procedures for LV systems

- A1/1 Directors, NHS Board members, duty holders, Authorising Engineers, Authorised Persons, of NHS Boards employing electrical operatives or sub-contractors, should ensure that their requirements for safe working practices are clearly explained in NHS Board-specific electrical safety policy documents including site specific risk assessments and method statements.
- A1/2 The AP will carry out periodic inspection of operatives tools to make sure that they have the correct tools to carry out the tasks and that they are suitable, in good repair and calibrated (where appropriate). Records of inspections to be kept.
- A1/3 The AP shall ensure that the specific risk assessments and method statements are regularly reviewed and amended as site conditions change. The operative must be informed of any changes to these documents.
- A1/4 In existing environments it should be assumed that all equipment and circuits are live. For new works and refurbishment works the contractor should advise all staff and other contractors in the area when circuits are intended to be made live and when testing is taking place. Notification signs should be placed at the access and egress points to advise that circuits in the area are now live.
- A1/5 For all work on LV electrical equipment or circuits, it is important to ensure that the correct point of isolation is identified, that an appropriate means of isolation is used, and that the supply cannot inadvertently be reinstated while the work is in progress.
- A1/6 The conductors must be proved to be dead at the point of work **before** they are touched / worked on and where necessary caution notices should also be applied at the point(s) of isolation. **It should never be assumed** that conductors or equipment is dead because a particular isolation device has been placed in the **OFF** position. All line, neutral and protective conductors of the circuit should be tested and proved to be dead prior to works commencing.
- A1/7 The procedure for proving dead should be by use of a proprietary test lamp or two-pole voltage detector as recommended in HSE Guidance Note GS38, *“Electrical test equipment for use by electricians”* **Multi-meters and non-contact voltage sticks should not be used for proving or confirming dead.**

The test lamp or voltage detector should be proved to be working on a known live source, proprietary proving unit or in-built test feature before **and** after use. The NHS Board should ensure that test equipment and any lock off devices, padlocks, signage PPE etc are provided, calibrated and tested.

The point of isolation should be under the control of the person who is carrying out the work on the isolated conductors by the use of hasps, lock off devices, padlock,

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signage etc...Care should be taken to isolate all sources of supply (micro generation, renewable technology, batteries, standby generators, UPS, etc).

- A1/8 For new installations, it is preferable that circuits are not made live until all circuits are installed, completed and inspected and tested. Partial energisation of a distribution board should be avoided.
- A1/9 For single circuits from a distribution board, motor control panel or controls cabinet, suitable means of isolation must be used. This should be in the form of a lock off device (for mcb, mcb or fuse), padlock (with unique key or combination; both retained by the person carrying out the isolation) together with a warning and caution notice fixed at the point of isolation. Hasps with multiple padlocks should be used if a number of electricians could be working on a circuit or piece of equipment and in this instance they would each have their own unique padlock with key or combination plus warning signs.
- A1/10 No circuit should be made available until it has been fully installed by a competent person and tested to the requirements of BS7671. The circuit or equipment shall remain isolated until the circuit/equipment is complete and has been fully tested. Circuits or equipment should not be energised until it is safe to do so.

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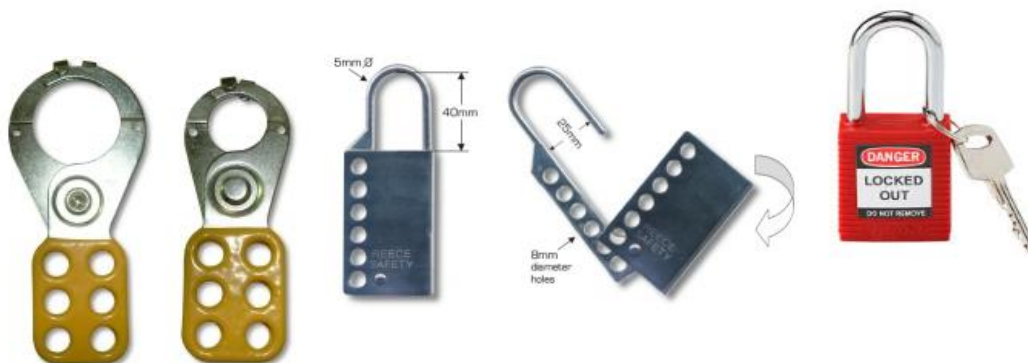
Appendix 2: Examples of safety labels and protective devices

Examples of safety labels



(All safety padlocks should be red, with one key only.)

Examples of hasps and padlocks

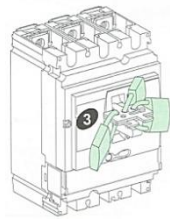


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Examples of MCB, MCCB and fuse lock off devices

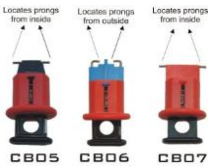


MCB



MCCB

(All safety padlocks shall be red, with one key only.)



MCB



MCB



MCCB



Fuse



Plug

Note: There are many different types of protective device and the correct type of lockout (with padlock and signage) must be chosen. The use of tape to indicate isolation is not acceptable under any circumstances.

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Appendix 3: Safety precautions and procedures for live working and testing LV systems

Note: Over-arching guidance is set out in Scottish Health Technical Memorandum (SHTM) 06-02, to which reference should be made. Note 5 states: “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 (i.e. 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 a suitably authorised Competent Person 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”. However, for work involving Contractors, a Certificate of Authorisation for Live Working will *always* be required.

A3/1 Where possible, avoid live working .There must be adequate space, access and lighting to work safely. The HSE advise that there are three conditions must be met for live working to be permitted where danger may arise. If just one of these conditions cannot be met, live working must **not** be permitted and dead working is essential. The assessment procedure illustrates this.

A3/2 The conditions are:

- it is unreasonable in all the circumstances for the conductor to be dead; **and**
- it is reasonable in all the circumstances for the person to be at work on or near that conductor while it is live; **and**
- suitable precautions (including, where necessary, the provision of personal protective equipment) have been taken to prevent injury.

A3/3 Adequate precautions must be taken when carrying out such live working to ensure that as far as reasonably practical the risk of electric shock is reduced to the lowest level. The includes the use of form LW1

A3/4 From a Risk Assessment prepared for this specific activity together with a flow chart to guide staff undertaking the task it will be noted that there are two definite paths to follow. These are dependent on whether the testing is being carried out by the NHS Board in-house Competent Person(s) or by Competent Contractors.

A3/5 In addition to the requirements set out in paragraph 3.4 (Section 3) the in-house Competent Person will:

- be qualified within the range BTech, C&G, NVQ level 3, IET Wiring Regulations (BS7671). It is recommended that if Competent Persons are required to install

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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;

- have been interviewed by the AP as to awareness of Regulation 14 of the Electricity at Work Regulations 1989;
- have knowledge of and be familiar with the equipment that they will be required to work on or test;
- have a copy of the Risk Assessment for Live Working;
- have undertaken an awareness session relating to SHTM 06-02 within the last 3 years;
- have an adequate knowledge of and, within the last 3 years, have successfully completed an emergency first-aid training course.

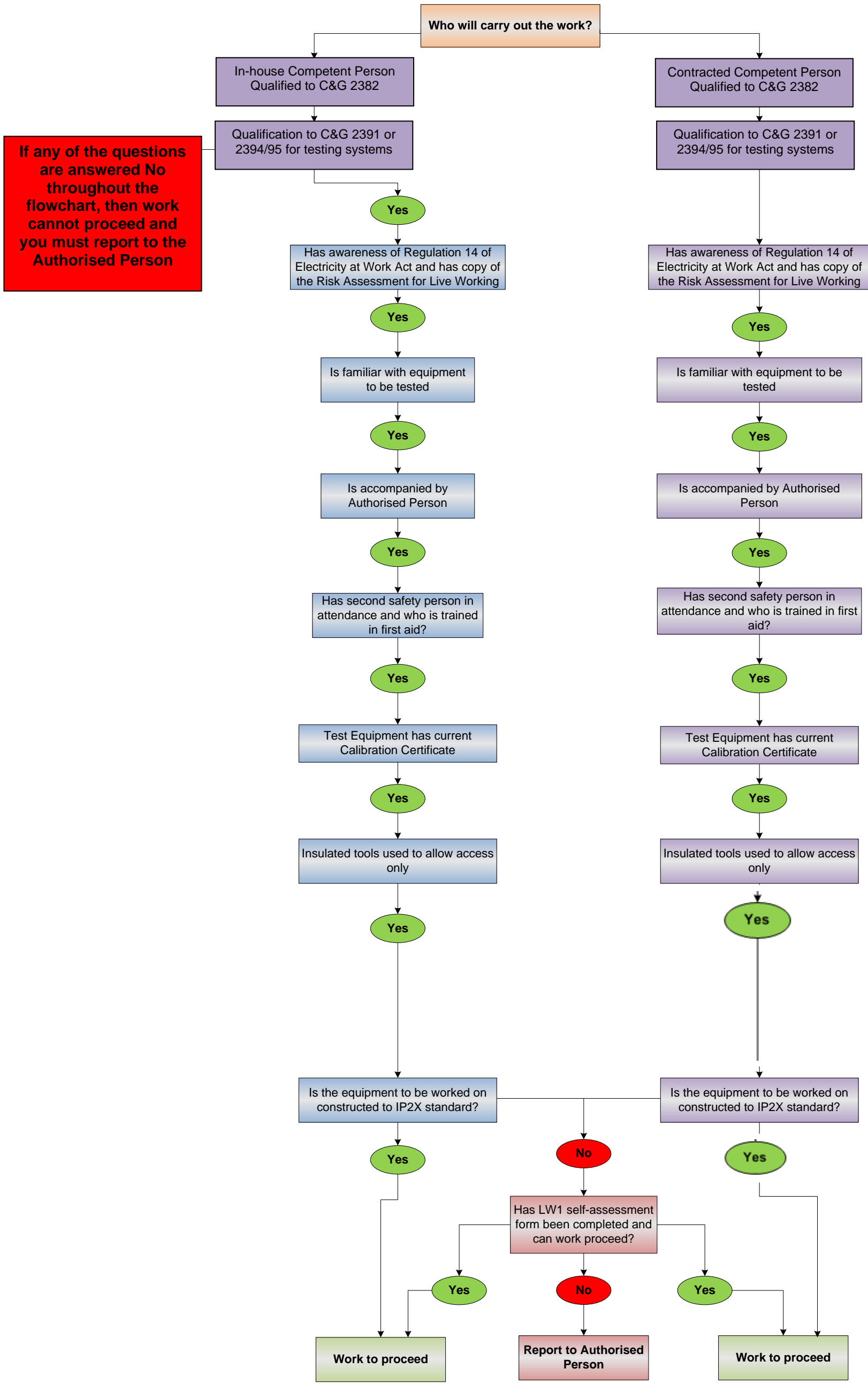
The Contractor's Competent Person will:

- be qualified within the range BTEch, C&G, NVQ level 3, IET Wiring Regulations (BS7671). It is recommended that if Competent Persons are 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 able to demonstrate awareness of Regulation 14 of the Electricity at Work Regulations 1989;
- be in possession of City & Guilds 2391 Installation Testing Certificate;
- demonstrate suitable knowledge of the type of equipment to be tested;
- be in possession of a Certificate of Authorisation for working on live equipment – issued by the NHS Board's Authorised Person ;
- have a copy of the Risk Assessment for Live Working.

Note: The competency of the Contractor's staff will be checked and recorded at a regular frequency and when a new Competent Person is presented for work on the NHS Board's sites. This will be carried out before any work commences.

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Testing & Inspections



Work on or near Live Equipment

Note: Irrespective of who is carrying out the work the Authorised Person will monitor the compliance with the Risk Assessment and Certificate of Authorisation

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Appendix 4: HSG 107 – Portable Appliance Testing

<http://www.hse.gov.uk/pubns/priced/hsg107.pdf>

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References

Health and Safety at Work Act 1974

Electricity at Work Regulations 1989

SHTM 06-02 & 03 - Electrical safety guidance for low voltage systems

HSG107 - Maintaining portable electrical equipment (PAT)

SHTM 08-02 - Lifts

SHTM 08-02 – Bedhead Services

BSI/IET	BS7671	Requirements for Electrical Installations. (IET Wiring Regulations. Seventeenth edition)
HSE	EIS37	Safety testing of electrical switchgear
HSE	INDG223	Managing Asbestos in Buildings
HSE	HSG230	Keeping Electrical Switchgear Safe
HSE	INDG372	Electrical Switchgear Safety
HSE	INDG354	Safety in Electrical Testing at Work
HSE	HSG85	Electrical Safety at work
HSE	GS38	Electrical test equipment for use by electricians
HSE	INDG231	Electrical Safety and you

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