Health and Safety

Electricity

Minimum Standard

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1 Aims and Principles

The aim of this Government of Jersey (GoJ) Minimum Standard is to provide guidance on the steps which should be taken to ensure that the risks posed by electricity in the workplace are adequately controlled to prevent harm.

For ease of reference, the document is split into four parts:

Part 1 – Fixed Electrical Installations
Part 2 – Electrical Equipment
Part 3 – Work on or near Electrical Equipment
Part 4 – Working Near Underground or Overhead Electrical Services

Departments with responsibility for managing electrical equipment, including fixed installations or works which could expose persons to electrical risks should develop their own procedures for managing these risks. These must include the standards set out in this document or be of an equivalent or higher standard.

2 Legislation and Guidance

a) Applicable Legislation

Health and Safety at Work (Jersey) Law, 1989

Electricity at Work (Jersey) Regulations, 1983

b) Guidance

Guidance on the Electricity at Work (Jersey) Regulations, 1983

Electrical Safety at Work Index (UK HSE)

Electricity at Work – Safe Working Practices (UK HSE)

Guidance on Maintaining Portable Electrical Equipment *(to be updated)*

Maintaining Portable Electrical Equipment (UK HSE) *(to be updated)*

Maintaining Portable Electrical Equipment in Low-Risk Environments (UK HSE) *(to be updated)*

Working safely and avoiding danger from underground services and other utility apparatus

3 Definitions

Fixed electrical installation

All parts of an electrical system including all of the electrical equipment connected together and the various electrical energy sources in that system.

A system can be fixed e.g. the fixed electrical installation in a building, or transportable, e.g. a generator used on a construction site. This also includes self-contained systems, such as transportable generating sets.

Any item which has been disconnected but is capable of being energised and made live by the system is also considered to be part of the system.

Items which are plugged into or wired directly into the fixed parts of the electrical system are defined as electrical equipment.

Electrical Equipment

Electrical equipment which can be energised when it is connected to the fixed electrical installation by means of a plug or is directly wired e.g. using a spur box.

This includes a wide range of items including washing machines, air-conditioning units, kettles, photocopiers, computer equipment, hand held tools etc.

Extension leads, plugs and sockets, and cord sets that supply this type of equipment are classified as electrical equipment and need to be treated as such, as they operate in the same environment and are subject to the same use as the equipment they serve.

Protective Device

A device used to protect equipment, machinery, components and devices in an electrical circuit against short circuit, over current and earth fault. Examples include fuses, residual current device (RCD), circuit breaker etc.

Disconnection

Where electrical equipment has been disconnected from the electrical supply in a manner which prevents electrical energy from reaching the equipment.

Secure Isolation

Where electrical equipment has been disconnected from the electrical supply and the means of disconnection is secure to prevent unintentional re-energisation. The method used could include removal of a fuse and signage, a physical means of locking off the disconnection switch etc.

4 Who this Minimum Standard Applies to

- Government of Jersey (GoJ) and States' employees
- Voluntary staff or those on honorary contracts where there is no implied contract of employment

5 Links to other GoJ Policies, Minimum Standards and Guidance

a) Policies

Government of Jersey - Health and Safety Policy

b) GoJ Minimum Standards

Risk Assessment
Permit to Work
Personal Protective Equipment
Control of Contractors
Lone Working

c) Other Internal Guidance

Further guidance may be available from other departments carrying out this type of work.

For assistance with preparing internal procedures, contact should be made with your departmental Health and Safety Manager/Adviser "Professional".

6 Roles and Responsibilities

The procedures prepared by the department which is responsible for managing the use of fixed electrical installations and electrical equipment in the workplace must clearly set out the roles and responsibilities of all those individuals involved.

Reference should be made to the Government of Jersey Health and Safety Policy for general responsibilities.

7 Overview

General

The legal requirements for managing the risks associated with electricity in the workplace are covered by the Electricity at Work (Jersey) Regulations, 1983 (Electricity Regulations).

This Minimum Standard provides a summary of some of the requirements with further information available in the guidance to the regulations which should be consulted in conjunction with this document.

Risk Assessment

The risks associated with electrical installations, electrical equipment and any activities which present electrical risks in the workplace should be assessed and suitable controls put in place.

This Minimum Standard summarises the typical controls which can be implemented to manage the risks but reference should also be made to other relevant guidance, such as that issued by the Institution of Engineering and Technology (see below) for further information.

BS7671 IET Wiring Regulations – Requirements for Electrical Installations

This is an industry-recognised code of practice which has been developed by the Institution of Engineering and Technology (IET) and the British Standards Institution (BSI). Compliance with this standard is likely to achieve compliance with the relevant requirements set out in the Electricity Regulations.

However, there are types of electrical systems, equipment and hazards to which BS 7671 is not applicable, for example systems for public electricity supply, equipment on vehicles and installations operating at voltages greater than 1000 volts or 1500 volts ac.

To assist with systems etc. not covered by the British Standard, there are many codes of practice written by standard-making authorities, trade associations and other bodies. These set out standards and procedures covering particular industries, processes or hazards as may be applicable.

IET Code of Practice for In-Service Inspection and Testing of Electrical Equipment

This Code of Practice (CoP) provides advice on in-service inspection and testing to determine whether electrical equipment is fit for continued service. It reinforces the need of the duty-holder to conduct inspection and testing of equipment by considering the risks the equipment is exposed to, the environment it is used in, along with the skill level of the user. This CoP reinforces the need to establish and conduct appropriate safety checks, taking into account current working practices and legal requirements.

The document also provides information to owners of electrical equipment on how to carry out a risk assessment for ensuring electrical safety, the maintenance requirements for continued safe use of electrical equipment, including the importance of user checks, and the hierarchy of tests available. It also provides information to those who carry out inspection and testing of electrical equipment.

Part 1 – Fixed Electrical Installations

8 Responsibilities

The responsibility for ensuring the continued safe construction and use of a fixed electrical installation will usually rest with the party responsible for its maintenance and repair. This could be the building owner, occupier or landlord.

Departments should therefore establish who has responsibility for ensuring the safety of any fixed electrical installations in premises they occupy to ensure that appropriate arrangements are in place for managing the risks.

9 Construction

Any fixed electrical installation must be constructed, installed and where necessary protected, commissioned and tested to prevent danger, so far as is reasonably practicable.

Any system must be designed to ensure that it is fit for use in the type of premises it is being installed in and the conditions to which it is likely to be exposed.

To assist in complying with these requirements, any work undertaken on fixed electrical installations should be undertaken by competent GoJ employees or an approved contractor from the Government of Jersey Approved Contractors List.

10 Protective Devices

In order to protect the fixed electrical installation and/or the equipment connected to it, it may be necessary to install protective devices. These may form part of the fixed electrical installation or be added to it when using particular equipment connected to it.

Advice on any protective devices required should be available from the installer of the fixed electrical installation, supplier of electrical equipment or other competent person.

Safe work procedures should be in place to ensure that any prescribed protective devices are provided, tested by the user and used where required.

Further information is available at Work using electrically powered equipment - Electrical safety at work (UK HSE).

11 Periodic Inspections and Testing

Fixed installations should be subject to periodic inspections and where necessary, testing to ensure that they do not give rise to any danger.

The frequency of inspection and testing will depend on the type of installation, how it is used and the environment in which it is located.

The typical frequency, as set out in the IET Wiring Regulations is between 3 and 5 years, depending on the type of premises and the frequency and type of testing will usually be determined by the competent person.

Electrical installation in buildings which are open to members of the public will usually require more frequent inspections/testing than those which are not.

The competent person carrying out the required inspection and tests will determine the required frequency using industry standards and will usually affix a sticker to the distribution board detailing the date of the last test and when it is next due.

Any testing certification issued by the competent person should be retained for the lifetime of the building.

Part 2 – Electrical Equipment

12 Responsibility

The responsibility for ensuring the safety of electrical equipment will usually be the department which uses the equipment. However, there may be circumstances where the landlord has responsibilities e.g. equipment which is spurred directly into the system such as air-conditioning units, and this should be clarified and documented in the department's procedures.

13 Selecting Electrical Equipment

Any persons selecting electrical equipment must be competent and authorised to do so i.e. they must be familiar with the task and the environment in which the electrical equipment is to be used.

When selecting and purchasing electrical equipment, several factors need to be considered.

Any electrical equipment used to carry out GoJ work activities must be suitable:

- For the intended task

- For use in the environment in which it is intended to be used
- For use in the conditions to which it will be exposed.

Whilst not an exhaustive list, consideration should also be given to the following:

- Can battery operated equipment be used?
- Can 110V tools with a transformer be used?
- Is a domestic standard appliance suitable or is an industrial appliance required?
- Is a waterproof plug required?
- Is there a safer appliance to the one being considered?
- Is specific training required?

14 Maintenance – Inspections and Tests

The equipment connected to the fixed electrical installation is more vulnerable than the installation itself as damage can occur more easily.

The likelihood of damage occurring will depend on the type of equipment, how it is used and handled, and the environment in which it is being used. For example, a hand-held tool being used to carry out work on various sites, including outdoors, will be at much greater risk of damage than an air-conditioning unit attached at ceiling level.

To ensure the continued safety of electrical equipment, an effective maintenance program should be developed. This is likely to be a combination of the following:

- User checks
- Formal visual inspections
- Testing

The aim of implementing these checks is to determine whether the equipment remains fully serviceable or whether remedial action is necessary to make sure it is safe to continue using.

User Checks

Arrangements should be in place to ensure that the person using the equipment visually inspects it before use to look for signs of damage. Typical indicators of damage include:

- Damage (apart from light scuffing) to the supply cable, including fraying or cuts
- Damage to the plug or connector, e.g. the casing is cracking or the pins are bent
- Inadequate joints, including taped joints in the cable
- The outer sheath of the cable not effectively secured where it enters the plug or the equipment. Evidence would be if the coloured insulation of the internal cable cores were visible
- The equipment has been subjected to conditions for which it is not suitable, e.g.

it is wet or excessively contaminated
- Damage to the external casing of the equipment
- Lose parts or screws
- Evidence of overheating e.g. burn marks or discolouration.

In addition to the electrical equipment, these checks should also be made on extension leads, plugs and sockets.

If the equipment is found to be defective, then it should be taken out of use immediately and either be tagged to show it is not fit for use or be quarantined. This should then be reported to the relevant manager.

Formal Visual Inspections

These inspections should be carried out by a competent person, usually an employee, who has sufficient information and knowledge to know what to look for and what is acceptable.

The person carrying out the inspection will be looking for similar damage/defects to those list under ‘user checks’ but the inspection will be carried out in a more structured and systematic manner.

These checks should be formally recorded and are also a useful tool for identifying whether effective user checks are being carried out.

In addition to carrying out the visual inspection, the competent person should also consider the following:

- Is the electrical equipment being used in accordance with the manufacturer’s instructions?
- Is the equipment suitable for the job?
- Has there been any change of circumstances?
- Have the user(s) reported any issues?

Additional checks could also include removing the plug cover (unless moulded) to ensure:

- There are no signs of internal damage, overheating or water damage to the plug
- The correct fuse is in use and it is a proper fuse, not a piece of wire, nail etc.
- The wires including the earth, where fitted, are attached to the correct terminals
- The terminal screws are tight
- The cord grip is holding the outer part (sheath) of the cable tightly
- No bare wire is visible other than at the terminals.

The formal visual inspections should be carried out at regular intervals but the period between inspections will vary considerably, depending on the type of equipment, the conditions of use and the environment in which it is being used. This frequency of inspections should be determined as part of the risk assessment process.

Depending on the findings of the inspections, it may be necessary to review the period between them. If a pattern of faults is identified, this could indicate:

- The wrong equipment is being selected for the job
- Further protection may be necessary e.g. in a harsh environment
- The equipment is being misused
- User checks are not being undertaken
- More frequent formal visual inspections are required.

Testing

User checks and formal visual inspections should identify the majority of dangerous faults. However, some faults, such as loss of earth integrity (e.g. broken earth wire within a flexible cable), deterioration of insulation integrity, or contamination of internal and external surfaces, cannot be detected by visual examination alone. Such faults can only be reliably detected by a combined visual inspection and test.

This should be carried out periodically to back up the checks and inspections and is likely to be justified:

- Whenever there is reason to suppose the equipment may be defective and this cannot be confirmed by visual examination
- After any repair, modification or similar work
- At periods appropriate to the equipment, the manner and frequency of use and the environment.

Types of tests which could be required include:

- Earth testing
- Resistance testing
- Leakage testing

The competent person will be able to decide what type of testing is required based on the type of equipment and the environment in which it is being used.

Testing electrical equipment generally requires a greater degree of competence (in terms of knowledge, training and experience) than for formal visual inspection, as appropriate electrical knowledge is needed to undertake the tests and interpret the test results.

There are two levels of competency and any person testing electrical equipment should be appropriately trained and be competent.

Level 1 A person not skilled in electrical work routinely uses a simple ‘pass/fail’ type of tester where no interpretation of readings is necessary.

The person would need to know how to use the test equipment correctly.

Providing the appropriate test procedures are rigorously followed and acceptance criteria are clearly defined, this routine can be straightforward.

Level 2 A person with appropriate electrical skills uses a more sophisticated testing instrument that gives readings requiring interpretation.

Such a person would need to be competent through technical knowledge or experience related to this type of work.

Frequency of Examinations

There are no legally prescribed frequency of examinations set for particular items of electrical equipment but suggested initial intervals are included in Appendix A. This information is taken from UK HSE current guidance which provides a useful reference point.

These intervals are a starting point when introducing a maintenance program but will need to be reviewed depending on the findings of the inspections/testing, the conditions in which the equipment is being used, the age of the equipment etc.

A competent person, with sufficient experience and knowledge should be able to assist with making the necessary judgement.

Personal Devices and Chargers

Personal devices and chargers being used in work premises must follow the same processes as that of GoJ supplied equipment, including meeting the expected standards.

Further guidance is available in the UK HSE guidance, Maintaining Portable Electrical Equipment.

15 Labelling Electrical Equipment

It can be useful to label equipment with a unique means of identification, particularly where a large number of electrical items are present in the workplace. This unique identifier can then be used to log the results of any in-house or external inspections and testing carried out on the items and will assist in identifying trends or issues associated with any particular item of equipment.

16 Repair and Replacement

Any repairs of electrical equipment should only be carried out by a competent person with relevant specialist knowledge and expertise. Depending on the extent of damage/fault identified, it may be preferable to replace the item.

Where cables are damaged, these should be replaced or damaged sections removed and the cable re-joined using proprietary means only.

17 Records

Records of formal visual inspections and any testing should be retained either in paper or electronic format. Records should be kept for 3 test cycles or for 5 years, whichever is sooner.

Records should also be kept of any repairs carried out on electrical equipment.

Part 3 – Working on or near Electrical Equipment

Many electrical incidents occur because people work on or near to electrical equipment that is:

- Believed to be dead but is live
- Known to be live but those working on it have inadequate training or equipment to prevent injury or have not taken the required precautions

Electrical equipment will contain live parts, known as conductors and arrangements will need to be in place to prevent persons from being able to come into contact with them. This can be by design e.g. using insulation or by implementing safe working procedures e.g. disconnection and secure isolation from the electrical supply.

18 Risk Assessment

Any work on electrical equipment will require a risk assessment to be carried out and a safe system of work to be prepared (Ref: Minimum Standard – Risk Assessment).

When carrying out the risk assessment, the following should be considered:

- The work to be carried out
- The hazards of the system or equipment to be worked on and the risks associated with the work
- The persons doing the work, their competence and the level of supervision necessary
- The precautions to be taken and the system of work to be employed
- The possibility that the nature of the work may change e.g. a testing job may

turn into fault finding.

19 Safe Systems of Work

The preferred method of work, which is by far the safest method of working, is for the equipment to be disconnected from the electrical supply and securely isolated before work commences.

As this is a critical element of ensuring safety when working on electrical equipment, a Permit to Work (PTW) may also be required as part of the safe system of work (Ref: Permit to Work – Minimum Standard). The disconnection and secure isolation procedure would be clearly set out as a requirement under the PTW before work can commence.

For disconnection and secure isolation to be successful a robust physical means of achieving this should ideally form part of the equipment design.

Examples include:

- Switch disconnectors with a locking-off facility or other means of securing them in the OFF position
- Circuits and equipment installed so that all sections of the system can be isolated as necessary
- Switch disconnectors suitably located and arranged so that circuits and equipment can be isolated without disconnecting other circuits that are required to continue in service
- Clear marking of any devices used for isolating circuits to show their relationship to the equipment they control, unless there could be no doubt that this would be obvious to anyone who may need to operate them.

Disconnection and secure isolation will only be effective if a safe working procedure is prepared and implemented. The use of this method is known as dead working and should always be considered first.

Live Working

Whilst dead working should be the preferred condition, live working is permitted in some circumstances but it must be justifiable if it is to be permitted to take place.

The factors which must be considered in deciding whether it is justifiable for work to proceed with the conductors live would include the following:

- When it is not practicable to carry out the work with the conductors dead e.g. where for the purposes of testing it is necessary for the conductors to be live
- Making the conductors dead will create other hazards, such as to other users of the system, or for continuously operating process plants etc.

- The need to comply with other statutory requirements
- The level of risk involved in working live and the effectiveness of the precautions available set against economic need to perform that work

Where it is determined that the work needs to be carried out live, a separate risk assessment and method statement must be prepared for the work which must include all control measures, including permit to work, use of insulated tools etc.

Flow charts and information to assist with determining whether to work dead or live and the development of safe working procedures are available in the document, Guidance on the Electricity at Work (Jersey) Regulations, 1983.

High Voltage Work

Any system which carries a voltage of more than 1000V is defined as a high voltage system. Work on this type of equipment poses a greater risk and appropriate control must be in place.

Further information on the extra precautions which should be in place for HV work are detailed in Electricity at Work – Safe Working Practices (UK HSE)

20 Provision and use of Protective Equipment

Any protective equipment e.g. voltage tester, which is identified as being required during the risk assessment should be: -

- Suitable for the use for which it is provided
- Maintained in a condition suitable for that use
- Be used properly.

Where persons are required to use protective equipment, they must be familiar with its operation and be trained in its use.

21 Provision of Information, Instruction and Training

Any persons required to work on electrical equipment must have received adequate training specific to the work being carried out.

Any training provided should cover the following:

- The risks they could be exposed to, including potential non-electrical hazards
- The measures in place to control the risks including:
    - Any PTW requirements
    - Disconnection and/or secure isolation procedures
    - Safe working methods

    - Protective equipment to be used
- The emergency procedures.

22 Competence

Any persons carrying out work on electrical equipment must:-

- Have received adequate training to do so
- Have the necessary level of knowledge and experience of the electrical system to be worked
- Be fully aware of the procedures in place for ensuring the works are carried out safely and have access to any relevant documentation
- Be authorised to carry out the specified work on the particular equipment

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23 Supervision and Checks

Regular and systematic checks of work on electrical equipment should be carried out to ensure that the correct procedures are being followed.

Further information on working on or near electrical equipment is available in the UK HSE document, Electricity at Work – Safe Working Practices

Part 4 – Working Near Underground or Overhead Electrical Services

24 General

Guidance on the arrangements which should be in place to ensure work in the vicinity of underground cables and overhead lines is carried out safely is contained in the document, Working safely and avoiding danger from underground services and other utility apparatus.

Underground Cables

The general principles for avoiding contact with underground cables are:

- Obtain records from the utility company
- Use a cable avoidance tool (CAT) to locate any possible underground cables not shown on the plans
- Contact the utility company to isolate the service (if possible) prior to any excavation

- Use hand-digging techniques to uncover the cables where electrical cables are known or suspected
- Mark the line of any cables identified
- Use competent persons to carry out the work

Overhead Power Lines

Overhead power lines are often mistaken for other services such as telecommunications, which should never be assumed.

The main cause of incidents involving overhead power lines is contact with plant or handheld long lengths of materials or equipment.

Where work is being to be carried out in close proximity to known or suspected overhead electrical services and there is a risk of contact, Jersey Electricity should be contacted to discuss shrouding of the cables and any other requirements they may have to prevent damage.

25 Risk Assessment and Safe System of Work

Any work near to underground or overhead electrical services must be properly planned.

A risk assessment should be undertaken (Ref: Minimum Standard - Risk Assessment) and a safe system of work prepared.

Further guidance on safe methods of working is available in Working safely and avoiding danger from underground services and other utility apparatus.

Appendix A

Suggested Initial Maintenance Intervals

Type of business		User checks	Formal visual inspection	Combined inspection and test
Equipment hire		N/A	Before issue/after return	Before issue
Battery operated equipment (less than 40 V)		No	No	No
Extra low voltage (less than 50 V ac), telephone equipment, low-voltage desk lights		No	No	No
Construction	110V equipment	Yes, weekly	Yes, monthly	Yes, before first use on site then 3-monthly
	230V equipment	Yes, daily/every shift	Yes, weekly	Yes, before first use on site then monthly
	Fixed RCDs	Yes, daily/every shift	Yes, weekly	Yes, before first use on site, then 3-monthly (portable RCDs – monthly)
	Equipment site offices	Yes, monthly	Yes, 6-monthly	Yes, before first use on site then yearly
Heavy industrial/high risk of equipment damage (not construction)		Yes, daily	Yes, weekly	Yes, 6–12 months
Light industrial		Yes	Yes, before initial use then 6-monthly	Yes, 6–12 months
Office information technology rarely moved, eg desktop computers, photocopiers, fax machines		No	Yes, 2–4 years	No if double insulated, otherwise up to 5 years
Double insulated ⧈ (Class II) equipment moved occasionally (**not** hand-held), eg fans, table lamps		No	2–4 years	No
Hand-held, double insulated ⧈ (Class II) equipment, eg some floor cleaners, some kitchen equipment		Yes	Yes, 6 months – 1 year	No
Earthed (Class I) equipment, eg electric kettles, some floor cleaners		Yes	Yes, 6 months – 1 year	Yes, 1–2 years
Cables, leads and plugs connected to Class I equipment, extension leads and battery charging equipment		Yes	Yes, 6 months – 4 years depending on type of equipment it is connected to	Yes, 1–5 years depending on the equipment it is connected to

Source: Maintaining Portable Electrical Equipment (UK HSE)

Appendix A

Notes

Cables, leads and plugs connected to Class II equipment should be maintained as part of that equipment. Cables leads and plugs not dedicated to an item of equipment should be maintained as individual items as appropriate.

Over time, the results of user checks, formal visual inspections and portable appliance tests may reveal trends which should be reviewed to determine whether electrical equipment needs to be visually inspected or tested more or less often, depending on the number of issues identified.

If electrical equipment is grouped together for testing at the same time, the shortest testing interval in the group should be used, rather than the longest. Alternatively, it may be appropriate to group electrical equipment by testing interval.

The IET Code of Practice has a similar table but with the information presented in a slightly different manner. In some instances with more detail and specifics but the two sets of information are considered to be consistent with each other.

Source: Maintaining Portable Electrical Equipment (UK HSE)