Electrical Safety Guidance Note 1 - General Guidance

Competent Person

The definition of a competent person given in the Electricity at Work Regulations 1989 (EWR) is as follows:

“A person in the possession of sufficient technical knowledge or experience to be capable of ensuring that danger is prevented”.

The scope of technical knowledge or experience should include,

- Adequate knowledge of electricity;
- Adequate experience of electrical work;
- Adequate understanding of the system to be worked on and practical experience of that class of system;
- Understanding the hazards which may arise during the work and the precautions which need to be taken;
- Ability to recognise at all times whether it is safe for work to continue.

The competent person will normally be formally qualified.

Fixed and live electrical systems referred to in this document are those defined by the EWR.

Procedures

A risk assessment must be done before work of any nature is carried out on electrical equipment. Generic risk assessments may be used when work of a similar nature is being done. A competent person will make this decision.

Standard operating procedures must be in place for work on any fixed electrical installation. A permit to work procedure must be in place for work on any fixed and/or live electrical systems. Warning notices and appropriate barriers must be in place when work is being carried out on fixed and/or live electrical systems.

First aid and Electricity

It is the policy of the MRC that:

- Individuals working on any electrical appliance or system must have received training in first aid techniques sufficient in content for the task in hand to allow the individual to deal competently with an emergency situation.
- Individuals working on "live" electrical systems must know how to deal with an emergency situation and be formally trained in resuscitation techniques.

It is recommended that individuals working on "live" electrical systems be accompanied by a person equally competent in both of the above. The risk assessment will determine whether lone working can be permitted.
Electrical Safety Guidance Note 2 - Portable Electrical Equipment

The British Standard (BS) and International Electro-technical Commission (IEC) define appliances into two categories Class 1 and Class 2

Class I

Appliances that have a functional insulation throughout and an earth-connected case (earthed appliances)

Class II

Appliances that have a functional and additional insulation

In these appliances metal parts cannot become "live" under any fault conditions (i.e. the appliances are double insulated with no earth connection). Such appliances are marked with a “double-square” symbol (Figure 1)

Figure 1: Class II Double Square Symbol

Types of test

New equipment (purchased)

New portable electrical equipment should be inspected and tested for electrical safety before use. This must be done by a competent person.

New equipment (constructed or modified in house)

A competent person must be satisfied that any such equipment is compliant with the regulations. This must be recorded. This record must accompany equipment transferred to another establishment.

Other electrical appliances

Safety testing of electrical appliances also extends to items bought and taken into the work environment for personal use. Examples include kettles, coffee makers and radios.

User checks

It is common sense that staff should check that equipment is free from an obvious defect before use. Staff do not have to be electrically qualified for doing a visual check. If there is any doubt the equipment should not be used until it has been checked and declared safe by a competent person. Examples of defects to
look for would be the charring of or discoloured leads and plugs, frayed leads, broken plugs and missing equipment covers.

Faults **MUST** be reported to a competent person.

**Portable Appliance Testing**

Staff testing portable electrical equipment must have been trained to do this on a recognised “Portable Appliance Testing (PAT) Course”. Those with a PAT certificate need not necessarily be a qualified electrician.

The HSE guidance specifies that only three types of test need be carried out.

- Visual
- Earth bond
- Insulation resistance

**Visual Checks**

- Check the length of leads to ensure it is correct for the appliance
- Check leads for damage
- Check for plug damage
- Check that plugs are fitted correctly
- Check that the appliance has the correct fuse rating
- Check that wires are correctly connected
- Check all extension leads (note that leads are treated as a portable appliance in their own right) and therefore should be checked for the above points where relevant.

**Earth bond checks**

- Test that the bond is fitted correctly (i.e. from plug to appliance chassis)

**Insulation resistance**

- Visually check for deterioration of the insulation
- On testing, any leakage of the current to earth fails the appliance

**Records**

All tests must be recorded. Re-test frequency depends upon equipment use, type and how often it is moved.

**Frequency of testing**

Equipment moved often or used in harsh environments such as cold rooms should be tested at least annually. Equipment moved infrequently and used in normal situations may require to be tested every 3 to 5 years. It is appreciated that Units and ESS teams embedded in a host institution maybe required to follow the timetable of the host.

It should be noted that certain equipment containing sensitive electronic components (e.g. computers) can be damaged by appliance testing. Expert advice should be sought.

The table at the end of this document (Annex 1) may assist you in the testing of equipment or act as an aid memoir in designing your own schedule.
Electrical Safety Guidance Note 3 - Non-Portable Electrical Equipment

Work on Electrical Distribution Systems

Modification or renewal of existing fixed wiring installations should be carried out only by competent electrical contractors or competent staff. The work must be specified in advance, if necessary with the involvement of the Head Office Estates Management Section, and conform to the prevailing UK standard (currently the 17th edition of the Institute of Electrical Engineers Regulations (IEE Regs) for electrical installations).

Work must be tested and certified to be safe by a competent person before acceptance. Particular attention should be paid to clear and unambiguous labelling of the system to allow for ready identification and access to isolating switches for particular work areas. Up-to-date wiring diagrams should be kept for future reference. Multi-socket or line distribution boards are not an acceptable permanent substitute for fixed wiring.

Work on Fixed Electrical Plant and Equipment

All pieces of single or multiphase equipment permanently wired into the electrical distribution system should, as far as it is reasonably practicable, be maintained to prevent danger.

Such maintenance and any necessary repairs should be done by a competent contractor or competent member of staff. The frequency of maintenance should be determined in the light of the manufacturer’s recommendations and the type of use. Equipment of this type should be installed in such a way that the means of access, working space and lighting are adequate to prevent danger to persons working on or near the equipment. Isolators must be readily accessible and steps taken to prevent the equipment from inadvertently being made live whilst it is worked on.

Fixed Electrical Plant forming part of an experimental apparatus or Machine

The scientific group leader or another senior member of staff involved in a project must be a competent person where fixed electrical plant forms part of an experimental rig or machine. This is particularly the case when the equipment is subject to regular modification or continuing development, particularly if live work is anticipated. Considerable expertise will be necessary and a formal electrical or electrical engineering qualification may be necessary.

Live working can only be allowed if:
- It is unreasonable for the relevant conductors to be dead.
- Suitable precautions have been taken to prevent danger.
- A permit to work procedure is in place.

The permit to work system must ensure that no unauthorised access can occur to areas where live work is taking place.

Under normal circumstances lone working on live conductors is not permitted, a second person trained to recognise danger and render first aid in the event of injury must be present.
## Annexe 1 – Suggested initial* test intervals for low-risk environments

<table>
<thead>
<tr>
<th>Equipment/environment</th>
<th>User checks</th>
<th>Formal visual inspection</th>
<th>Combined inspection and testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery-operated: (less than 20 volts)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Extra low voltage: (less than 50 volts AC) eg telephone equipment, low voltage desk lights</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Information technology: eg desktop computers, VDU screens</td>
<td>No</td>
<td>Yes, 2 - 4 years</td>
<td>No if double insulated - otherwise up to 5 years</td>
</tr>
<tr>
<td>Photocopiers, fax machines: NOT hand-held. Rarely moved</td>
<td>No</td>
<td>Yes, 2 - 4 years</td>
<td>No if double insulated - otherwise up to 5 years</td>
</tr>
<tr>
<td>Double insulated equipment: NOT hand-held. Moved occasionally, eg fans, table lamps, slide projectors</td>
<td>No</td>
<td>Yes, 2 - 4 years</td>
<td>No</td>
</tr>
<tr>
<td>Double insulated equipment: HAND-HELD eg some floor cleaners</td>
<td>Yes</td>
<td>Yes, 6 months -1 year</td>
<td>No</td>
</tr>
<tr>
<td>Earthed equipment (Class 1): eg electric kettles, some floor cleaners</td>
<td>Yes</td>
<td>Yes, 6 months -1 year</td>
<td>Yes, 1 - 2 years</td>
</tr>
<tr>
<td>Cables (leads) and plugs connected to the above. Extension leads (mains voltage)</td>
<td>Yes</td>
<td>Yes, 6 months -4 years depending on the type of equipment it is connected to</td>
<td>Yes, 1 - 5 years depending on the type of equipment it is connected to</td>
</tr>
</tbody>
</table>

*NB: Experience of operating the maintenance system over a period of time, together with information on faults found, should be used to review the frequency of inspection. It should also be used to review whether and how often equipment and associated leads and plugs should receive a combined inspection and test.