Introduction

This document contains corporate standards and guidance on the testing and inspection of portable electrical equipment. It is the responsibility of managers to ensure that portable electrical equipment is tested and inspected in line with this document in any area under their control.

This document must be read in conjunction with any additional guidance specific to divisional issues or activities.

Managers’ Checklist – Portable Electrical Equipment

The checklist below identifies key actions involved in the testing and inspection of portable electrical equipment. Further information about each of these points is contained in this document.

1. Is any portable electrical equipment used within the team or section and has the ‘class’ of that equipment been identified?

2. Has a suitable and sufficient risk assessment been completed to ensure that the risk is adequately controlled?

3. Are all items of portable electrical equipment subject to a suitable system of maintenance, including visual inspections and combined inspection and testing (PAT testing)?

4. Are all items of portable electrical equipment inspected and tested in accordance with the minimum standards and frequencies detailed in this document?

5. Has a risk assessment been carried out to identify if PAT testing should be carried out any more or less frequently that the standards detailed in this document?

6. Are the actions to take when portable electrical equipment fails a visual inspection or PAT test known and understood?

7. Are the arrangements regarding new and/or second hand (used) equipment, including employees’ personal items known and understood?

8. Are the arrangements for the lease, hire and loan of portable electrical equipment known and understood?
9. Are suitable records kept of all inspections and tests and of any faults found during those inspections and tests?

**Portable electrical equipment**

Portable electrical equipment is electrical equipment that is moveable or transportable and which when in use is connected to an electricity supply by means of a flexible cable fitted with a plug. Portable electrical equipment includes:

- Power tools, e.g. drills, grinders, saws;
- Domestic appliances, e.g. irons, hair dryers;
- Catering appliances, e.g. kettles, mixers, blenders, toasters;
- Ventilation and heating equipment, e.g. fans, heaters and dehumidifiers;
- Office equipment, e.g. photocopiers, personal computers, desk lamps and shredders;
- Extension cables and leads, transformers and battery chargers.

It can also mean an appliance, such as a hair dryer or iron where the flex is hard wired into a fused spur outlet. The reason these appliances are classed as portable electrical equipment is that they are meant to be moved when in use. The idea that a hard wired appliance is classed as a portable appliance is often missed. These appliances are not PAT tested but they should be subject to visual inspections.

**Classes of electrical equipment**

Class I (one): Equipment with exposed metal parts that will conduct electricity should a fault occur and may result in someone getting an electric shock. Class I equipment therefore requires the exposed metal parts to be effectively earthed.

Class II (two): Equipment that is double insulated is constructed of high integrity insulation and does not need an earth connection to maintain safety. Class II equipment is marked with the symbol below.

Battery Operated: Tools and equipment powered by a removable and rechargeable battery of less than 40 volts.

**Risk Assessment to control the risk**

Failure to maintain portable electrical equipment increases the potential for accidents involving the equipment and is a major concern in the workplace. The likelihood of accidents occurring and their severity will vary, depending on the type of electrical equipment and the environment in which it is used.
A risk assessment must be completed that considers all of these factors to ensure the risks arising from the use of portable electrical equipment are adequately controlled. This should be an integral part of your general health and safety risk assessments.

Risk also increases if:
- The equipment isn’t used correctly;
- The equipment isn’t suitable for the job;
- The equipment is used in harsh environments;
- The equipment isn’t double insulated and relies on being connected to “earth” by an earth wire in the flex.

The risk assessment should also consider if the environment where the equipment is used is high or low risk as this could affect the frequency of any inspection and testing. In general terms the following applies:

High Risk: Construction sites, heavy and light industrial facilities, workshops, etc.

Low Risk: Offices, shops, some parts of hostels, schools and residential care homes.

**Maintenance**

Maintenance can include visual inspection, testing, repair and replacement. Cost-effective maintenance of portable electric equipment can be achieved by a combination of:

- Checks by the user;
- Formal visual inspections;
- Combined inspection and tests by an electrically competent person*;
- Repairs by qualified persons.

* An electrically competent person does not necessarily have to be a qualified electrician but can be someone who has been trained to inspect and test portable electrical equipment. Where equipment faults are identified repairs must be completed by a competent person before the equipment is put back into service. In this situation the competent person may well need to be a qualified electrician depending upon the fault.

**User checks (visual)**

The person using the equipment should visually check the equipment before use. This is important since problems or faults may occur during use. As the equipment may not be formally inspected for some time, the visual check by the user plays an important role in the safe use of portable appliances and equipment. The visual check should look for:

- Damage to the cable sheath such as cuts exposing the live, neutral or earth conductor;
- Damage to the plug, cracked casing or bent pins;
- Cable pulled out of the clamp at the equipment or plug ends resulting in the cable cores showing;
- Damage to the outer casing of the equipment or loose parts and screws;
- Evidence of overheating such as burn marks and discolouration;
- The equipment has been subject to conditions for which it isn’t suitable, e.g. wet conditions.
The visual check also extends to any extension lead that is in use. Any faults found should be reported to management and the equipment taken out of use until appropriate repairs have been made.

**Formal visual inspections**

Formal visual inspection forms an important part of the maintenance system. The formal visual inspection must be carried out by a trained person and may be completed in isolation to reduce the need for regular PAT testing. It also forms an integral part of the combined inspection and test (PAT test).

Formal visual inspection includes:
- Removing the plug cover and ensuring that a fuse is being used;
- Checking that the cord grip is being effective;
- Checking that the cable terminations are secure and correct, including an earth where appropriate, and that there is no sign of internal damage, overheating or ingress of liquid or foreign matter.

**Combined inspection and tests**

The checks outlined in the sections on “User checks (visual)” and “Formal visual inspections” will, if carried out correctly, reveal most potentially dangerous faults. However some faults such as loss of earth continuity, and deterioration of insulation integrity cannot be identified by visual inspection alone. Periodic combined inspection and testing is the only reliable way of detecting such faults. Testing is likely to be required:

- Whenever there is reason to suppose the equipment may be defective (but this cannot be confirmed by visual inspection);
- After any repair, modification or similar work;
- At periods appropriate to the equipment, the manner and frequency of use and the work environment (as defined in the risk assessment).

The inspection carried out in conjunction with testing should usually include checking:

- The correct polarity of supply cables;
- Correct fusing;
- Effective termination of cable and cores;
- That the equipment is suitable for the environment.

People carrying out testing of portable electrical equipment and appliances should be appropriately trained to do the work. There are two levels of competency:

- The first level is where a person not skilled in electrical work routinely uses a simple ‘pass/fail’ type of portable appliance tester (PAT), where no interpretation of readings is necessary. The person would need to know how to use the PAT tester correctly. If the appropriate test procedures are rigorously followed and acceptance criteria are clearly defined, this arrangement can be straightforward.
- The second level is where a person with appropriate electrical skills uses a more sophisticated instrument that gives actual readings that require interpretation. Such a person would need to have an appropriate level of technical knowledge and/or experience related to the type of work.
Frequency of inspection and combined inspection and testing

The tables below are based on the recommendations of the Health and Safety Executive in their guidance notes HSG107 “Maintaining portable and transportable electrical equipment” and INDG236 “Maintaining portable electrical equipment in low-risk environments”. Following the intervals set out below should ensure that the maintenance system is effective and compliant with the legal requirements.

**Low Risk Environment:** offices, shops, schools and residential care homes, etc.

<table>
<thead>
<tr>
<th>Type of Business Equipment/Environment</th>
<th>User Checks</th>
<th>Formal Visual Inspection</th>
<th>Combined Inspection &amp; Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Operated (&lt;40V)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Office IT: desktop computer, screen, photocopier, fax machine (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 (Class II): (not hand held/moved occasionally e.g. fans, table lamps)</td>
<td>No</td>
<td>Yes 2-4 years</td>
<td>No</td>
</tr>
<tr>
<td>Double Insulated (Class II): (hand held e.g. drill, some floor cleaners or kitchen equipment)</td>
<td>No</td>
<td>Yes 6 months-1 year</td>
<td>No</td>
</tr>
<tr>
<td>Earthe (Class I) Equipment Hand held &amp; regularly moved, e.g. kettles, toasters, floor cleaners, portable heaters, fans &amp; lamps</td>
<td>Yes</td>
<td>Yes 6 months-1 year</td>
<td>1-2 years</td>
</tr>
<tr>
<td>Earthe (Class I) Equipment Other moveable equipment, e.g. fridges, microwaves, dishwashers</td>
<td>Yes</td>
<td>Yes 2 years</td>
<td>4 years</td>
</tr>
<tr>
<td>LCC Equipment used by the public e.g. in libraries, schools, residential accommodation.</td>
<td>Yes By LCC Employee</td>
<td>Yes 3 months</td>
<td>1 year</td>
</tr>
<tr>
<td>Cables &amp; plugs, extension leads, battery chargers</td>
<td>Yes</td>
<td>Yes 1 year</td>
<td>2 years</td>
</tr>
</tbody>
</table>

**High Risk Environment:** Construction sites, heavy and light industrial, workshops, etc.

<table>
<thead>
<tr>
<th>Type of Business Equipment/Environment</th>
<th>User Checks</th>
<th>Formal Visual Inspection</th>
<th>Combined Inspection &amp; Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment Hire</td>
<td>N/A</td>
<td>Before issue/after return</td>
<td>Before issue</td>
</tr>
<tr>
<td>Construction Site – 110V</td>
<td>Weekly</td>
<td>Monthly</td>
<td>Before first use on site, then 3-monthly</td>
</tr>
<tr>
<td>Construction Site – 230V</td>
<td>Daily/Shift</td>
<td>Weekly</td>
<td>Before first use on site, then monthly</td>
</tr>
<tr>
<td>Light Industrial</td>
<td>Yes</td>
<td>Before initial use, then 6-monthly</td>
<td>6-12 months</td>
</tr>
<tr>
<td>Heavy Industrial / high risk of equipment damage</td>
<td>Daily</td>
<td>Weekly</td>
<td>6-12 months</td>
</tr>
</tbody>
</table>
Changing PAT Testing Frequencies

The intervals set out in this document should be regarded as a starting point for PAT testing frequencies, as inspection and testing may be carried out more or less frequently in the light of knowledge and experience. Those frequencies should be listed as part of the control measures in the risk assessment.

Reducing testing frequencies

PAT testing may only be carried out less frequently than the intervals set out in this document if a written risk assessment has been carried out and that assessment has considered:

- The type of equipment involved and whether or not it is hand-held;
- Any manufacturer’s testing recommendations;
- The last two sets (as a minimum) of inspections and test results;
- The working environment in which the equipment is used (e.g. wet or dusty), or the likelihood of damage;
- The frequency and nature of use of the equipment (e.g. a PC sat on a desk compared to an electric drill);
- Any foreseeable abuse of the equipment;
- The effects of any modifications or repairs to the equipment;
- The integrity, soundness and age of the equipment.

Increasing testing frequencies

Just as it may be reasonable to reduce PAT testing frequencies, it may also be necessary to carry out testing more frequently than the standard intervals set out in this document. The same factors that must be considered when reducing PAT testing frequencies must also be considered when assessing the need for increased testing frequencies.

Reviewing testing frequencies

The results of PAT testing (supplied by the contractor carrying out the testing) should always be reviewed, to determine whether testing frequencies need to be changed. Testing frequencies should also be reviewed sooner if there is any reason to doubt their adequacy, e.g. if a faulty item injures a person.

Responsibility for carrying out risk assessments

Managers can either carry out risk assessments themselves or delegate this task to individuals within their area. If a manager delegates the task of carrying out a risk assessment, they must ensure that the person(s) is competent to carry out the assessment and takes all reasonable care when doing so.

If managers require advice on the suitability of inspection and testing frequencies for their work area in order to complete risk assessments they should contact Health and Safety Services or Engineering Services.
Equipment failing inspections and tests

Any faults found during visual inspections or combined inspection and tests must be reported to management and the equipment taken out of use until appropriate repairs have been made. The equipment must be quarantined and labelled “Do not use” until those repairs have been completed and it has passed a combined inspection and test by a competent person.

New and second-hand (used) equipment

New equipment carries a manufacturer’s guarantee and this is acceptable as evidence of pre-purchase tests. A manufacturers’ guarantee is normally for a 12 month period, so, the equipment must be portable appliance tested before the guarantee period expires and the future testing of that equipment should be aligned with other portable electrical equipment as soon as practicable.

Any second-hand electrical equipment must not be used before it is established that it has been tested, certificated, and passed to be safe to use by a competent person.

Personal Items

Employees are only permitted to bring their own electrical appliances into work, if their line manager has given permission. If the manager has permitted an employee to bring an electrical appliance into work, the manager is then responsible for ensuring the safety and suitability of that appliance.

Managers must ensure that any electrical appliance brought onto site by an employee is PAT tested and visually inspected at the same frequency as other portable electrical appliances of the same type. Second-hand electrical items must be PAT tested and any faults rectified before they are allowed into use. Employees must not be charged for the testing or repair of equipment that they have been permitted to bring onto site.

Lease, Hire and Loan

Any electrical equipment leased, hired or loaned by LCC to outside agencies must be PAT tested and any faults rectified prior to it being leased, hired or loaned. The equipment must also be tested periodically in accordance with the frequencies set out in this document or in accordance with a written risk assessment.

Any electrical equipment hired in from outside agencies must be supplied with a test certificate and must be visually inspected by employees at the same frequency as other LCC equipment.
Records of inspections and tests

Keeping records of formal visual inspections and combined inspection and testing (PAT testing) is important for many reasons:

- It enables management to review and monitor the effectiveness of the maintenance system;
- It demonstrates that a maintenance system exists;
- It provides management with an inventory of equipment;
- It provides management with evidence that equipment is being maintained;
- It enables management to monitor the use of unauthorised equipment;
- It enables management to determine if inspection and testing intervals need to be changed;
- It ensures all items are tested.

The following records must be kept as a minimum:

- A record of when individual items have received a formal visual inspection;
- A record of when individual items have received a combined inspection and test (PAT test). This should also be evidenced by the application of a label on the equipment;
- A record of any faults found during a combined inspection and test (PAT test). This should be provided by, or can be obtained from, the organisation that has carried out that PAT test;
- A log or inventory of all portable electrical equipment including its current status, e.g. Passed or Failed. This is extremely important where there are large amounts of equipment or equipment is used away from its base location to ensure that items are not missed.