

PORTABLE ELECTRICAL APPLIANCE INSPECTION AND TESTING

POLICY AND GUIDANCE

Name of Policy:	Portable Electrical Appliance Inspection and Testing Policy and Guidance
Purpose of the Policy:	Sets out procedures for portable electrical appliance inspection and testing.
Policy Applies to:	All portable electrical appliances on Staffordshire University premises
Approved by:	Health & Safety Committee
Responsible for its Updating:	Head of Health & Safety
Final Approval by:	Executive
Policy First Issued:	2015
Date of Approval:	April 2015
Proposed Date of Review:	April 2018

Staffordshire University's commitment to equality and diversity means that this policy has been screened in relation to the use of gender neutral language, jargon free plain English, recognition of the needs of disabled people, promotion of the positive duty in relation to race and disability and avoidance of stereotypes. This policy is available in alternative formats on request.

CONTENTS

1.0	GENERAL HEALTH AND SAFETY POLICY	1
2.0	POLICY ON PORTABLE ELECTRICAL APPLIANCE INSPECTION AND TESTING	1
3.0	DUTIES UNDER THE LAW	1
3.1.	Summary	2
4.0	RESPONSIBLE PARTIES	2
4.1.	Policy	2
4.2.	Advisory	2
4.3.	Senior Management	3
5.0	ARRANGEMENTS	4
5.1.	Introduction	4
5.2.	Personal Equipment	5
5.3.	Testing after repairs	5
5.4.	Testing Equipment in Residual Current Device (RCD) and Earth Leakage Current Breaker (ELCB) Protected Areas	6
5.5.	Suppression Capacitors and Neon Lamps	6
5.6.	Extension Cables	6
5.7.	Definitions	6
5.8.	Schedule of Inspection and Testing	8
5.9.	Frequency of Inspection and Testing	12
5.10.	Recording of Inspection and Testing Results	15
5.11.	Remedial Action	15
5.12.	Training	15
6.0	GUIDANCE NOTES	16
6.1.	General	16
6.2.	Electrical Hazards	16
6.3.	Assessment of Risk	18
6.4.	Frequently Asked Questions (FAQs)	19
7.0	RELEVANT STATUTORY PROVISIONS	20
7.1.	Definitions	20

7.2.	The Health and Safety at Work, etc. Act (1974)	20
7.3.	Electricity at Work Regulations (1989)	21
7.4.	Provision and Use of Work Equipment Regulations (1998)	22
7.5.	Management of Health and Safety at Work Regulations (1999)	22
8.0	REFERENCES	22
	Appendix A – Equipment Inspection and Test Record	24

1.0 General Health and Safety Policy

- 1.1. Staffordshire University (the University) undertakes to comply with all statutory health and safety requirements.
- 1.2. The University wishes to adopt all other reasonably practicable means to eliminate hazards and reduce the risk of injury to its employees, students, visitors and contractors, and the risk of damage to its property.
- 1.3. The University will ensure that resources are made available to provide:
 - plant, equipment and systems of work that are safe and without risks to health;
 - safe arrangements for the use, handling, storage and transport of articles and substances;
 - a safe place to work with safe access to it and safe egress from it;
 - a healthy working environment;
 - adequate welfare facilities and arrangements;
 - sufficient information, instruction, training and supervision to ensure all employees are aware of the hazards at their workplace together with the necessary measures to be taken to protect against these hazards, if they are at risk;
 - a monitoring, inspection and auditing procedure to ensure the effective management of health and safety throughout the University.

2.0 Policy on Portable Electrical Appliance Inspection and Testing

- 2.1. The University undertakes to comply with the Electricity at Work Regulations (1989) made under the Health and Safety at Work (1974) and all future statutory requirements concerned with the inspection and testing of portable electrical appliances.
- 2.2. The University wishes to adopt all other reasonably practicable means to eliminate hazards and reduce the risk of injury or damage arising from portable electrical appliances.

3.0 Duties Under the Law

Relevant Statutory Provisions are given in depth in Section 7.

3.1. Summary

There are legal duties on manufacturers and suppliers covering the initial integrity (safety) of new electrical appliances. There are general duties, covering the use and maintenance of appliances, designed to ensure that they remain in a safe condition.

The particular legal duties relating to the use and maintenance of electrical appliances are contained in the Electricity at Work Regulations (1989).

These apply to all work activities and place requirements on employers, self-employed and employees (duty holders), designed to control risks which can arise from the use of electricity.

The Regulations require certain safety objectives to be achieved and do not prescribe the measures to be taken. This allows the duty holder to select precautions appropriate to the risk rather than have precautions imposed by law which may not be relevant to a particular work activity.

4.0 Responsible Parties

4.1. Policy

University Health and Safety Committee

The University Health and Safety Committee is responsible for determining the University policy on Portable Electrical Appliance Inspection and Testing, with final approval given by Executive.

4.2. Advisory

Health and Safety Unit

The Head of Health and Safety is responsible for advising the University Health and Safety Committee and members of the University on the statutory requirements.

Faculty/Service Health and Safety Advisers

Faculty/Service Health and Safety Advisers are delegated by the Dean/Director to advise upon the Faculty/Service arrangements for Portable Electrical Appliance Inspection and Testing.

4.3. Senior Management

Vice-Chancellor

The Vice-Chancellor has the ultimate responsibility to ensure that Staffordshire University complies with all statutory health and safety requirements. He/she delegates the responsibility for safety management to Deans/Directors.

Deans/Directors

Deans/Directors are responsible for statutory compliance in their areas of responsibility, e.g. their Faculty/Service.

They may delegate the implementation of the Faculty/Service arrangements for Portable Electrical Appliance Inspection and Testing to the Faculty/Service Health and Safety Adviser although they retain the responsibility for ensuring that Inspection and Testing is carried out and remedial action is taken where necessary. They may delegate this responsibility to Supervisors and Staff members.

Director of Estates

The Director of Estates is responsible for providing a centralised Portable Appliance Testing service to University Departments.

Supervisors

Supervisors are responsible for ensuring statutory compliance in their areas of responsibility, e.g. of technical staff, students.

Staff Members

All Staff have a duty to take reasonable care for the health and safety of themselves and others who may be affected by their work. They also have a duty to comply with the University's arrangements for health and safety.

Students

Students, although not employees of the University, are offered the same health and safety protection as employees with respect to Portable Electrical Appliance Inspection and Testing and are similarly required to comply with its arrangements.

Portable Appliance Testers

Persons carrying out Portable Electrical Appliance Inspection and Testing do so on behalf of the University and do not carry any personal liability for the results obtained, as long as they carry out the testing in accordance with the training they have received. It is the Dean/Director's responsibility to ensure the tests are satisfactorily carried out and any remedial action promptly taken.

5.0 Arrangements

5.1. Introduction

Portable Electrical Appliances must be inspected and tested regularly by Competent Persons to ensure that they can continue to be used safely.

The planned inspection and testing will include:

- User check
- Visual Inspection for signs of damage or deterioration
- Electrical Tests, i.e.
 - o an Earth Continuity test and
 - o relevant Insulation tests

Apart from the user check, the test results will be recorded to allow for future comparison, for written identification of defects to be remedied and to provide information for an assessment of risk.

Each University Faculty/Service will be responsible for making its own inspection and testing arrangements.

User Checks – These can be carried out by the user, without any formal training. For equipment issued to students, the supervisor or member of staff is expected to perform the user check.

Formal Visual Inspection – This can be performed by a suitably trained person.

Electrical Tests – These can be performed by a suitably trained person, with suitable equipment.

Some Faculties/Services will have the technical resources to do the tests. Those who do not are advised to utilise the Portable Appliance Testing Contract arranged by Estates.

Health and Safety Unit has details of suitable training courses.

5.2. Personal Equipment

Personal equipment owned by staff, students, visitors and contractors must not be connected to the University Electrical Supply system, unless it is in good condition.

If it is suspected that the equipment is not in good condition, then it should not be allowed to be plugged in.

Personal equipment owned by students residing in halls of residence or staff in departmental buildings, such as kettles, calculators, CD players, etc., **must not** be tested by University staff in the course of their regular inspection regime, without permission of the owner, in case damage is caused to personal property.

If a member of hall or departmental staff notices students or staff indulging in dangerous electrical practices, such as poor wiring, using exposed mains connections, etc., the danger must be pointed out to the student or member of staff and the Hall Warden or Head of Department informed, who must then take the appropriate action to curtail the danger.

Any equipment that does not comply with the relevant safety requirements detailed in 'Code of Practice: Electrical Equipment' must not be used on University premises or during University activities.

5.3. Testing after repairs

Equipment which is repaired at the University between annual tests must be satisfactorily re-tested (Electrical Tests) following repair before it is put back into service.

Equipment which is repaired outside the University, or by Service Engineers (who are not University employees) on University premises, should be tested by the engineer carrying out the work. It should be made clear in any associated correspondence that this is necessary and expected.

5.4. Testing Equipment in Residual Current Device (RCD) and Earth Leakage Current Breaker (ELCB) Protected Areas

The ring-main supply circuits of some University workshops and laboratories are fitted with RCDs and using the Portable Appliance Safety Test Unit in these areas may cause the RCD to cut-off the mains supply. Therefore testing should be carried out in areas that are not protected by RCDs.

5.5. Suppression Capacitors and Neon Lamps

Some items of equipment are fitted with large suppression capacitors, or high brightness neon lamps, between the supply and earth conductors, which can cause an apparent Insulation (Flash) Test failure. In such instances the help of an electrically qualified person should be sought.

5.6. Extension Cables

The use of extension leads should be avoided where possible.

If extension leads must be used, then they must have 3-core leads (including a protective earthing conductor). If the lead exceeds 12m in length, it must be protected by a 30 mA RCD manufactured to BS7071.

Extension cables can be tested by plugging an item of equipment that has been satisfactorily tested into the extension cable socket and re-testing the cable and equipment as one item. However, this method of testing may be unsatisfactory for long extension cables due to the additional resistance offered by the cable. The tests should be repeated for each socket of a multi-socket extension cable.

5.7. Definitions

A Portable Electrical Appliance is, literally, any electrical equipment capable of being carried and, in general, connected to the mains supply by a flexible lead and a plug. The definition includes appliances with their own power sources, e.g. “intrinsically safe” equipment used in potentially explosive environments and equipment designed to operate at 110 volts. The definition does not include equipment which is “hard” wired, e.g. heavy equipment supplied by a fixed, armoured power cable, which is tested using other regimes.

Examples of Portable Appliances. (For use with the Initial Testing Frequency Table):

(S) Stationary – Mass exceeds 18kg. No carrying handle			
Fridge	Washing Machine	Freezer	Laboratory Oven
(IT) Information Technology & Business – Computers and certain equipment used in offices			
Computer	Answering machines/faxes	Trimmers	Telephones
Photo-copier	Mail processing machines	Data terminals	Printers
VDU	Electric plotters		Power packs
(M) Movable – 18kg or less in mass. Not fixed in place. OR has handles, wheels, castors to facilitate movement			
Air conditioning unit	Water baths		
(P) Portable –Less than 18kg in mass. Intended to be moved in operation OR can be easily moved.			
Toasters	Food mixers	Vacuum cleaners	Fan heaters
Angle poise lamps	Kettles	Floor polishers	Hotplates
Electric fires	Vacuum cleaners	Food mixers	Floor washers
Darkroom dryers and glazers	Fan heaters	Extension leads	Darkroom enlargers
	Variacs, etc.		Timers and RCDs
(H) Hand held –Intended to be held in the hand during normal use.			
Drills	Laboratory air-dryers	Heavy-duty soldering irons	Inspection lamps
Domestic irons			

It is most important that all items of hand-held portable equipment are tested because faults in this type of equipment account for a high proportion of electrical accidents.

Class I appliances rely on earthing of the conductive case and one layer of insulation covering its live internal parts for protection against electric shock. Typical Class I items include toasters, kettles, washing machines, lathes and pillar drills.

Class II appliances are “double insulated”, i.e. they rely on two layers of insulation between live internal parts and the user for protection against electric shock. Examples of Class II equipment would include food mixers, drills and table lamps.

Competent Person is a person who is employed or contracted by the University who has received suitable and sufficient training in Portable Electrical Appliance Inspection and Testing (see Section 5.12).

5.8. Schedule of Inspection and Testing

User Check

This is a simple visual check performed by the user of the equipment, or a supervisor giving equipment out to students.

User checks are not recorded unless a defect is noticed.

Check the item has a current PAT test label.

The following schedule is recommended:

Component	Common fault to look for
Mains Lead	Cuts/Fraying Tool long/short Taped joints
Plug	Is flex secured in gripper? Shows signs of overheating Cracked casing
Socket outlet or Mains Lead outlet	Shows signs of overheating Cracked casing

Component	Common fault to look for
Appliance	Does it work? On/Off switch functioning Cracked casing Chemical or corrosion damage to casing Damage resulting in access to live parts
Environment	Suitability for the environment it will be used in
Job	Suitability for the work to be undertaken

Formal Visual Inspection

This is a more detailed user check which is recorded. Since over 80% of electrical faults are discovered by visual inspection, this is the most important element of Inspection and Testing.

The following schedule is recommended:

Component	Common fault to look for
Plug	Cracked casing Bent pins Incorrectly rated fuse Incorrectly connected wires Loose connections Loose cable clamp
Mains Lead	Cuts, fraying, brittle Kinked, coiled Taped joints Overloaded (overheated) Male connector (if fitted) Non-standard (IEC 320, BS4491, CEE22) Not secured by grommet/clamp on appliance

Component	Common fault to look for
Appliance	Suitability for the environment or work being undertaken Damage/faulty operation of off/on switch Damage to casing Loose parts Missing screws Evidence of overheating Evidence of moisture Missing double insulation mark () on insulating casing (where appropriate) Accessible fuse holders: damage or removal of carrier permits live part to be touched Exposed output connections have marked voltage rating >50V

Electrical Tests

Equipment

A commercially available Portable Appliance Tester (PAT) is required for electrical testing of robust appliances. Some PATs have a facility for testing 110 V equipment. **A PAT should not be used** on very sensitive electronic equipment, as permanent damage may be caused by the high test voltages and currents.

The PAT should have a numerical readout for test results.

PATs should be calibrated annually.

Tests

The following schedule is recommended, carried out in the order as written.

(Greater detail is provided in the IEE: Code of Practice for In-Service Inspection and Testing of Electrical Equipment, including pass/fail criteria).

Class I Appliances

- Earth Continuity / Bonding Test

This test is for checking the earth lead continuity and earth connection (or bonding) to the metal casing of an appliance.

- Insulation Test

This test checks the integrity of the appliance's insulation.

For Class 1 appliances the test voltage is applied between the appliance's mains supply plug P (phase) and N (neutral) pins connected together, and the E (earth) pin which is held at earth potential.

- Earth Leakage Test

This test shows the level of leakage current in the appliance by monitoring the difference in currents flowing in the phase and neutral connections; any difference must be flowing to earth. This provides a useful way of predicting approach of appliance breakdown since the level of leakage current is a guide to the condition of insulation. Since many appliances are designed with earth leakage, this test is not mandatory; faults are indicated in the Insulation Test described above.

- Flash Test (Dielectric strength test)

These tests are **no longer carried out** during PAT testing.

- Operation V/A Test (**Optional**)

This test indicates that the appliance is in good working order and not drawing excessive current.

Class II Appliances

Test as for Class I Appliances, except with the omission of the Earth Continuity / Bonding Test.

Very Sensitive Electronic Equipment

Earth Continuity / Bonding Test **only**.

Do **not** use a PAT device.

Using a multimeter able to read to 300 milliOhm, the resistance between the earth pin and any exposed metal (not signal sockets) should be less than 300 milliOhm.

Three phase equipment

The inspection and testing of three phase equipment is a specialist task which must be carried out, either:

- under service contract or
- by Buildings and Estates Division, Electrical Section.

Extension Leads

These should be tested by connecting, in turn, to each of the sockets an electrical appliance that has already been shown to be electrically safe, and then performing the usual electrical tests (depending on whether the extension lead and appliance are class 1 or class 2).

Power Leads

These should be tested by being connected to an electrical appliance that has already been shown to be electrically safe, and then performing the usual electrical tests (depending on whether the extension lead and appliance are class 1 or class 2).

5.9. Frequency of Inspection and Testing

Deciding on the frequency of testing and inspection is a matter of judgement, and should be based on an assessment of risk. This can be taken as part of the assessment of risks under the Management of Health and Safety at Work Regulations 1999.

The factors to be considered when choosing an appropriate testing frequency are:

- the environment – equipment used in benign environments will suffer less damage than equipment used in an arduous environment.
- the users – if equipment is likely to receive unreported abuse, more frequent inspection and testing may be required.
- the equipment construction – the safety of class 1 equipment is dependent on the fixed electrical installation; The safety of class 2 equipment is not. If equipment is known to be Class 2, in a low risk environment, such as an office, recorded testing (but not inspection) may be omitted.
- the equipment type – appliances which are hand held are more likely to be damaged than fixed appliances.

In order to provide a basis for the initial testing regime, the following testing frequencies are recommended by the IEE in accordance with HSE guidance. (Figures show interval in months, unless otherwise indicated). It is expected that some Departments may wish to vary these testing frequencies to better fit in with the diverse equipment and locations they have. Any such variation **MUST** be based on risk assessment and the justification recorded in writing.

Area / Use	Type of Equipment Note (1)	User checks Note (2)	Class I		Class II Note (4)	
			Formal Visual Inspection	Combined Formal Visual Inspection & Electrical Tests	Formal Visual Inspection	Combined Formal Visual Inspection & Electrical Tests
			Note (3)	Note (5)	Note (3)	Note (5)
Building, construction or maintenance work.	S, IT, M#, P#, H#	None	3	6	3	6
Manufacturing, Commercial kitchens, Cleaning Equipment	S, IT	Weekly	None	12	None	12
	M	Before use	6	12	6	12
	P, H	Before use	3	6	3	6
Used by Public (other than students)	S, IT	Note (6)+	1	12	3	12
	M, P, H	Note (6)+	Weekly	6	1	12
Teaching / Research Laboratories	S, IT	Weekly+	None	12	12	48
	M, P, H	Weekly+	4	12	4	48
Accommodation, Offices, Computer Rooms, Lecture Theatres	S, IT	None	24	48	24	None
	M, P	Weekly	12	24	24	None
	H	Before use	6	12	6	None

NOTES: (1) S Stationary equipment

IT Information technology and Business Equipment

M Moveable equipment

P Portable equipment

H Handheld equipment

(2) User checks are not recorded unless a fault is found

(3) The formal visual inspection may form part of the combined inspection and tests when they coincide, and must be recorded

(4) If class of equipment is not known, it must be tested as Class I

(5) The results of combined inspections and tests are recorded

(6) For some equipment a daily check may be necessary

+ User check performed by the supervisor/member of staff

110 V earthed centre tapped supply. 230V portable or hand held equipment must be supplied via a 30mA RCD and inspections and tests carried out more frequently.

5.10. Recording of Inspection and Testing Results

A dated test label must be affixed to the appliance (and to the plug, if the lead is detachable). The lead should show the following:

- **Pass or Fail**
- Test given (Formal Visual Inspection or Combined Inspection and Test)
- Unique identification for the equipment (e.g. Departmental Inventory number)
- The due date of the next test.

A record must be kept of the inspection and test results, either as paper records (see Appendix A) or computer records.

5.11. Remedial Action

If inspection and testing show the appliance is faulty, it is **unsafe** and it **must be taken out of service until remedial action is taken**.

If a Test Person suspects that an item that has failed the tests may be used illicitly before repair, the item should be either placed in a secure location (i.e. locked away) or the supply plug removed from the cable, or in extreme cases the cable removed, to deter future use.

If an item of electrical equipment cannot be repaired, or is not required any more, it must be disposed of in accordance with the University policy on the disposal of Waste Electrical and Electronic Equipment.

5.12. Training

Inspection and Testing must be carried out by Competent Persons i.e. staff who have received suitable and sufficient training.

The decision as to whether an individual is competent to undertake a particular task is left to the department. It is necessary to weigh up the job's skill content against the individual's attributes, taking into account his or her:

- electrical knowledge
- electrical experience
- understanding of the system/equipment to be worked on
- understanding of the hazards which could arise and
- the ability to recognise at any time whether it is safe to continue to work

Both formal theoretical training and practical "on the job" training, using the test equipment, are normally necessary. The former can be arranged with a training provider. The latter carried out within the Department under direct supervision of a Competent Person.

The Competent person should have access to the following documents:

IEE: Code of Practice for In-service Inspection and Testing of Electrical Equipment

HSE: HS(G)107: Portable Appliance Testing.

Where external electrical contractors are employed, University staff should request written evidence of their competence.

6.0 Guidance Notes

6.1. General

Nearly a quarter of all reportable electrical accidents involve portable equipment. The majority of these accidents result in electric shock; others result in fires, e.g. nearly 2000 fires in 1991 were caused by faulty leads to appliances. A major cause of such accidents is failure to maintain the equipment. The likelihood of accidents occurring and their severity will vary, depending on the type of electrical equipment, the way in which it is used, and the environment in which it is used.

Under no circumstances should a person use electrical apparatus if they have any doubts as to its safety. If in doubt they should consult their Supervisor/ Tutor/ Departmental Safety Officer (DSO) as appropriate or the Safety Office directly.

Specialised appliances frequently require special precautions to be taken and reference should always be made to the manufacturer's instructions.

6.2. Electrical Hazards

Personal Injury

Electric Shock

Electric shock is the effect produced on the body, particularly its nervous system, by an electrical current passing through it. The extent of injury depends upon the current strength which in turn depends upon the voltage,

the path the current takes through the body, the surface resistance of the skin (much reduced when wet) and several other factors. A voltage as low as 15V can produce discernible shock effects and 70 V has been known to cause death. But, generally speaking, fatalities involve domestic voltages (240Vac) and currents of 25-30 milliamps. The most common cause of death from shock is suffocation and accordingly it is highly desirable that those dealing with electricity should be trained in resuscitation. Minor shocks in themselves may not be serious but they can lead to serious consequences; for example, the associated muscle contraction may lead to falls from working platforms or ladders.

Burns

These are caused by the passage of heavy current through the body or by direct contact with an electrically heated surface. They may also be caused by the intense heat generated by arcing from a short circuit. Electrical burns are a very unpleasant form of burn and require immediate medical attention.

Explosions

The main causes of electrically induced explosions are:

- In situations where flammable gases or vapours are present so that a spark could initiate an event. In such environments all electrical equipment should be flame-proofed.
- Where electrical arcing takes place in a confined space causing intense local heating with consequent bursting of the enclosure by the expansion of trapped air.

Fires

A large percentage of fires are of electrical origin, caused by one or more of the following:

- Sparks

A spark arises from a sudden discharge through the air between two conductors or from one conductor to earth. The current produced is usually small so that serious fires are unlikely unless explosive gases or vapours are present, or highly flammable material is in contact with the conductor.

- Arcs

An arc is a much larger and brighter discharge where the current flow may be hundreds of amps. It usually arises when a circuit is broken or when a conductor melts or fractures leaving a gap across which the current continues to flow. When an arc is struck, the air in the vicinity becomes ionised and forms a conductor which may allow current to flow to a nearby metal framework. Any combustible material in the vicinity could therefore lead to a fire.

- Short circuits

A short circuit is formed when the current finds a path from the outward conductor wire to the return wire other than through the equipment to which it is connected. The current flow may be large because of the low resistance of the leads and arcing often occurs at a contact between the conductors. Insulation may therefore burn and set fire to adjacent flammable material.

6.3. Assessment of Risk

High Risks

High risks would result from the use of an electrically-powered pressure water cleaner outside, powered by 240 volt electrical supply, with the cable trailing on the ground, where it can be damaged by vehicles and other equipment, and where water is present. Damage to the cable or other parts is likely to result in the operator or others receiving an electric shock. Similar risks result when other electrical equipment such as drills and portable grinders are used in harsh environments, e.g. construction sites, where there is a high probability of mechanical damage resulting in danger.

Medium Risks

Medium risks would result from floor cleaners or kettles which are usually used in a more benign environment, e.g. offices, but can be subject to intensive use and wear. This can eventually lead to faults which can also result in a shock, burns or fire.

Low Risks

Specialised equipment, e.g. information technology (IT) equipment (computers and printers), photocopiers, fax machines, etc. are considered low

risk; they are usually double insulated, are used in dry clean environments and are infrequently moved or stressed.

Other Factors to Consider

Equipment which is held by hand or is handled when switched on will present a greater degree of risk because, if a dangerous fault occurs, then the person holding it will almost certainly receive an electric shock.

The risk of receiving an electric shock will be greater when the equipment user is standing on the ground outside or a concrete floor, scaffolding or similar which is a good conductor, than if standing on a wooden floor or dry carpet and not in contact with earthed metal work (i.e. using double insulated appliances or 110 volt tools which have a centre tapped transformer to give 55 volts between live and earth).

Because the consequences of an accident are so serious -potentially fatal electric shock, or fire affecting the whole premises -the inspecting and testing system is designed to be proactive, i.e. planned to prevent incidents arising, rather than reactive where action is taken following an incident/accident. The frequency of inspection and testing is directly related to risk.

The greatest overall reduction of risk will take place when the inspection and testing regime is first put into practice. Thereafter it will take time to establish the appropriate test frequency based on experience. A low failure rate would indicate that the test interval can be increased and a high failure rate that the interval should be shortened.

6.4. Frequently Asked Questions (FAQs)

What should I do if the equipment is broken or not working?

If the equipment is broken (i.e. damage to the case/flex/plug) then it will fail the visual inspection. If the equipment is not working, it will fail the functional test. If the cause is not obvious, it should be referred for repair, and the equipment owner advised to contact the manufacturers for further information.

What if the equipment has no CE mark?

Older equipment may not have a CE mark, but as long as it passes all the electrical tests/inspections, it should be passed.

Do I fail the equipment if it only fails one or more of the tests?

Yes.

If the cause of the failure is unclear, the equipment owner should be advised to contact the manufacturer for further information.

Should I do a flash test (dielectric strength test)?

No.

Flash tests are performed by the manufacturers. They can damage sensitive electronic equipment, and can lead to the degradation of insulation if performed frequently on equipment.

Do I need to test New Equipment?

Not normally; however, it should be subject to a full combined inspection and test within its first 12 months in service. New equipment would only be tested if it was suspected that it was defective or hand-held appliances subject to heavy use.

Where equipment is to be used for demonstrations, exhibitions or development work, it must be tested as a matter of course even when new.

7.0 Relevant Statutory Provisions

7.1. Definitions

Reasonably practicable: The employer must assess and balance the risks of danger against the cost, time and effort involved in removing that danger. If the risk is small but the associated costs in money time and effort are high, it may not be reasonably practicable to remove it. However, as risk increases, the more difficult it becomes for the employer to show that it is not reasonably practicable to take action against it.

Absolute: If the requirement is absolute (e.g. the employer shall) then it must be met regardless of the time, cost and effort involved.

7.2. The Health and Safety at Work, etc. Act (1974)

Duties of Employers

As an employer the University has a duty to ensure, so far as is reasonably practicable, the health safety and welfare of its employees (Section 2 (1)).

This duty includes:

- the provision and maintenance of plant (e.g. portable electrical appliances) and systems of work that are safe and without risk to health (Section 2.2(a))
- the making of arrangements for ensuring safety and absence of risk when using, handling or transporting articles and substances (Section 2.2(b))
- the provision of appropriate health and safety information, instruction, training and supervision

The University also has a duty to conduct its work in such a way as to ensure that, so far as is reasonably practicable, persons not in its employment (e.g. students, visitors and members of the public) are not exposed to risks to their health or safety (Section 3(1)).

It shall be the duty of any person (within or outside the University) who designs, manufactures, imports or supplies any article for use at work: to ensure, so far as is reasonably practicable, that the article is so designed as to be safe and without risks to health when properly used (Section 6.1(a)):

- such testing and examination is carried out to allow the article to be used safely and without risk to health (Section 6.1(b)); and
- adequate information about the use for which it was designed is provided (Section 6.1(c)).

Duties of Employees

It shall be the duty of every employee of the University, while at work:

- to take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions (Section 7(a));
- as regards any duty or requirement imposed on his employer (or any other person by or under any of the relevant statutory provisions) to co-operate with him, so far as is necessary to enable that duty or requirement to be performed or complied with (Section 7(b)).

7.3. Electricity at Work Regulations (1989)

All systems shall at all times be of such construction as to prevent danger (Regulation 4.1).

As may be necessary to prevent danger, all systems shall be maintained so as to prevent, so far as is reasonably practicable, such danger (Regulation 4.2).

Every work activity, including operation, use and maintenance of a system and work near a system, shall be carried out in such a manner as not to give rise, so far as is reasonably practicable, to danger (Regulation 4.3).

Any equipment provided for the purpose of protecting persons at work on or near electrical equipment shall be suitable for the use for which it was provided, be maintained in a condition suitable for that use, and be properly used (Regulation 4.4).

7.4. Provision and Use of Work Equipment Regulations (1998)

Every employer shall ensure that work equipment is maintained in an efficient state, in efficient working order and in good repair (Regulation 6.1).

Every employer shall ensure that where any machinery has a maintenance log, the log is kept up to date (Regulation 6.2).

7.5. Management of Health and Safety at Work Regulations (1999)

Every employer shall make a suitable and sufficient assessment of:

- the risks to the health and safety of his employees to which they are exposed whilst they are at work (Regulation 3.1(a)); and
- the risks to the health and safety of persons not in his employment arising out of or in connection with his undertaking (Regulation 3.1(a)).

8.0 References

IEE: Code of Practice for In-service Inspection and Testing of Electrical Equipment,
IEE 2008, ISBN 0-86341-833-4

Maintaining portable and transportable electrical equipment

HS(G)107, HSE 2009 ISBN 0 7176 0715 1.

Maintaining portable electrical equipment in offices and other low-risk environments

IND(G)164L HSE 1994 ISBN 0 7176 0718 6.

Maintaining portable electrical equipment in hotels and tourist accommodation

IND(G)160L HSE 1994 ISBN 0 7176 0719 4.

Memorandum of guidance on the Electricity at Work Regulations 1989

(EAW memorandum) HS(R)25, HSE ISBN 0 11 883963 2.

A guide to the Health and Safety at Work Act 1974

L1 HSE. ISBN 0 7176 0441 1

Management of health and safety at work Approved Code of Practice

L21, HSE 2009 ISBN 0 7176 2488 9.

*Safe Use of Work Equipment -Provision and Use of Work Equipment Regulations
(PUWER) 1998 Approved Code of Practice and Guidance,*

HSC ISBN 0 717 61626 6.

Portable Appliance Testing,

RS (Components) Ltd Data Library, A18051, free on request, TEL 0536 405545, FAX
0536 401590.

Appendix A – Equipment Inspection and Test Record

Equipment Inspection and Test Record							1. Identification Number							
2. Description of equipment				3. Construction Class		4. Equipment Type		5. Location and particular requirements of location			6. Frequency of			
											Formal Visual Inspection		Combined Inspection & testing	
7. Make				8. Voltage				9. Date of Purchase			10. Guarantee			
Model				Rating										
Serial No				Fuse rating										
Formal Visual Inspection							Electrical Test							
11. Date	12. Environment / use	13. Disconnect	14. Socket	15. Plug	16. Flex	17. Body	18. Continuity		19. Insulation		20. Functional Check	21. Comments / other tests	22. OK to use	23. Signature
							Ω	√	Ω	√				

Notes:

1. Identification Number – This is a unique identification number for the piece of equipment. E.g. Departmental Inventory Number
2. Description of Equipment, e.g. computer monitor, hand drill
3. Construction Class – Class 1, 2 etc.
4. Equipment types – Stationary (S), Information Technology (IT), Moveable (M), Portable (P), Hand held (H).

Health and Safety Policy on Electrical Appliance Testing and Inspection

5. Location – What type of environment is the equipment generally used in? e.g. Office, Construction site, Laboratory
6. Frequency of Inspection – generally as suggested in the code of practice.
Formal Visual Inspection – items 11 to 17 and 20 to 23 will be completed
Combined Inspection and Test – items 11 to 23 will be completed
7. Make, Model, Serial Number – enter as much information as possible
8. Voltage, rating, fuse rating – enter the voltage the equipment runs at (230V, 110V, 24V etc), the power rating in Watts, and the fuse rating of the appliance.
9. Date of purchase – if known
10. Guarantee – what date does the manufacturers guarantee run out on?
11. Date the test took place.
12. Environment and use. It must be confirmed that the equipment is suitable for use in the particular environment and is suitable for the use to which it is being put.
13. Is authorisation required from the user to disconnect equipment such as computers and telecom equipment where unauthorised disconnection could result in loss of data.
Authority must also be obtained if such equipment is to be subjected to the insulation resistance and electric strength tests.
14. Socket/flex outlet – the socket or flex outlet must be inspected for damage including overheating.
If there are signs of overheating of the plug or socket, the socket connections must be checked as well as the plug. This work should only be carried out by an electrician.
15. The inspection required is described in section 5.8 Formal Visual Inspection
16. See 15
17. See 15
18. Tests – these are described in section 5.8 Electrical Tests.
Further detail is contained within the IEE Code of practice for the in-service inspection and testing of electrical equipment.
Numerical test results must be entered where appropriate.
19. See 18
20. Functional check – a check is made that the equipment works properly.
21. Comments / other tests – to identify failure more clearly, and to indicate other tests carried out, e.g. Earth leakage, flash test.
22. OK to use – **'Yes'** must be inserted if the appliance is satisfactory for use, **'No'** if it is not.