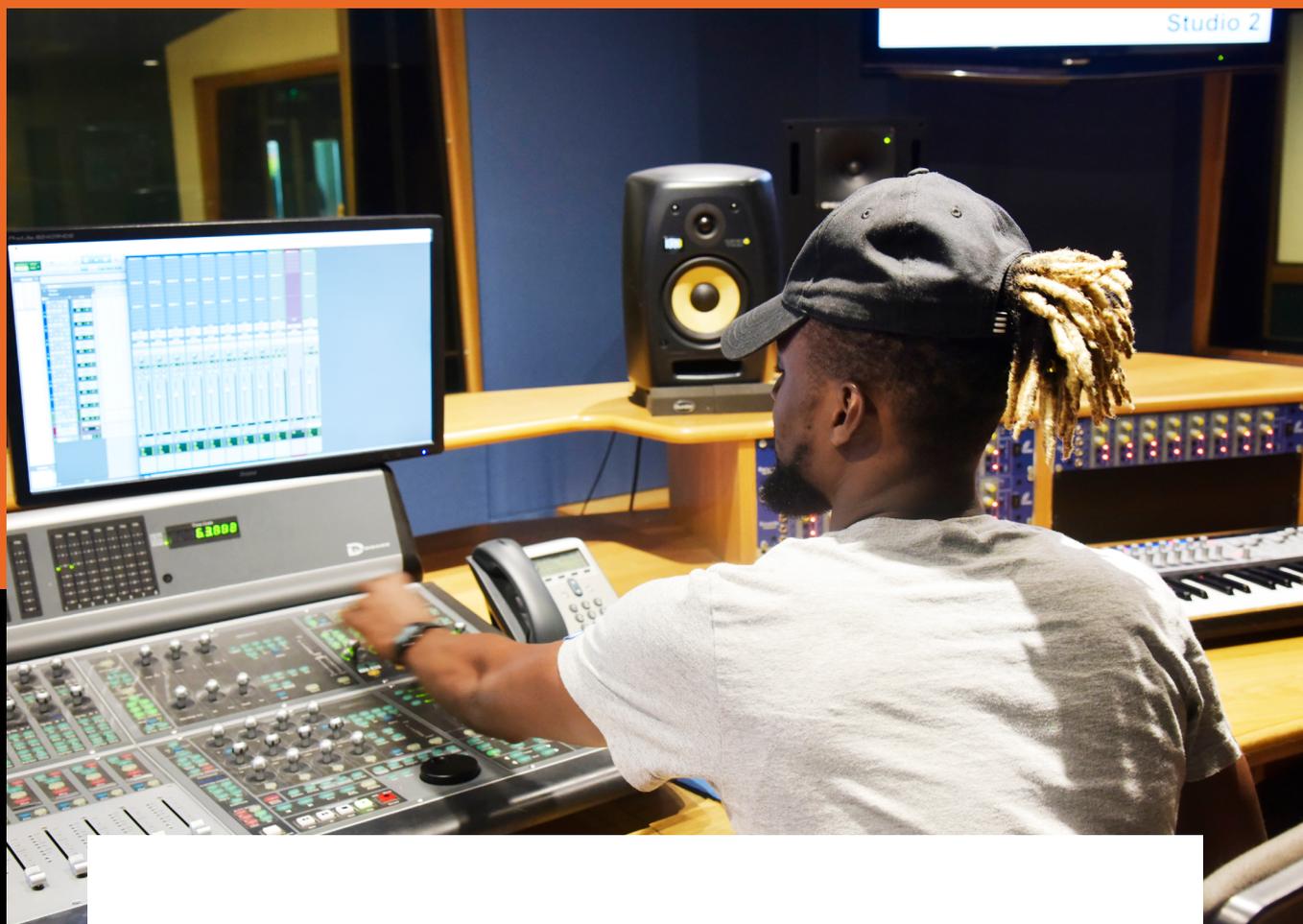




BUCKINGHAMSHIRE  
NEW UNIVERSITY

EST. 1891



# PORTABLE APPLIANCE TESTING (PAT)

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## Introduction

- 1 This document specifies the arrangements for the periodic inspection and testing of Portable Electrical Equipment owned by the University and in use on the premises of the university. It defines the duties of specified individuals using this equipment.

## Summary of duties

- 2 Sections 2 and 3 of the Health and Safety at Work Act 1974 (HSW Act) require the university to ensure the safety of the employees and others, including students, contractors and members of the public. Employees are required under section 7 of the HSW Act to take care of their own health and safety and that of others.
- 3 The main duties imposed upon employers and employees with regard to electrical safety are contained in the Health and Safety at Work Act 1974 (HSW Act) and the Electricity at Work Regulations 1989 (EAWR).
- 4 Regulations 13, 14 and 15 of the EAWR require employers to ensure that work activities, including maintenance, are carried out safely. Under regulation 16, persons carrying out electrical work must be competent for the tasks, which are assigned to them.
- 5 The purpose of the arrangements is to reduce the possibility of electrical shock, burns and consequential injury arising from the use of the University's portable electrical equipment.
- 6 Other measures such as the use of extra low voltage, reduced low voltage, double insulated and all insulated portable electrical equipment, or the use of residual current devices to supplement other protective measures, should be considered to give added protection against electric shock.
- 7 The advice of the university's Health & Safety Manager should be sought in the event of difficulty in interpreting the requirements of this document.

## Definition of portable electrical equipment

- 8 For the purpose of this documentation, portable electrical equipment is defined as those items which are operated by a 230 volt electrical supply via a flexible lead fitted with a plug and socket connection.

## Responsibilities

### Estates Director

- 9 The Estates Director has the responsibility of purchasing portable appliance check units and to ensure that the arrangements are carried out for the safe and proper use of portable electrical equipment. He/she is responsible for appointing adequate numbers of testing personnel and for defining their areas to ensure an efficient and effective system is maintained. Record keeping of persons carrying out the PAT will have to be kept.

## **Estates Supervisor**

- 10 The Estates Supervisor will oversee the arrangements within the department for ensuring the provision of safe systems and of safe portable electrical equipment.
- 11 These arrangements may involve the issue of any necessary instructions or procedures, and the appointment of suitable competent testing personnel.
- 12 Provision should also be made for the storage or disposal of defective appliances.

## **Testing personnel**

- 13 Testing personnel have the basic responsibility to ensure that all items are inspected and, where satisfactory, labelled at the time of periodic test.
- 14 Each testing personnel will be issued with a copy of this documentation on appointment.

## **All users**

- 15 All employees must clearly understand their duty to use only those items of portable electrical equipment which bear the correct, current test/inspection label.
- 16 All visitors and contractors must also clearly understand their duty to use only those items of portable electrical equipment which have been currently tested.
- 17 All students wishing to bring any personal equipment into the university workshops must ensure that the equipment is checked/tested before it is used. The department concerned may need to carry out the check/test.
- 18 Employees and Students are not permitted to bring in the following electrical appliances (e.g. portable heaters, coffee machines, toasters, sandwich makers, fans etc.) unless they have received authorisation from the Estates Directorate and the unit has been PAT tested.

## **Record keeping**

- 19 Records should be kept of the following:
  - a Inspections and tests of the following:
    - date tested
    - name of tester
    - date of next test
    - defects
    - details of any modifications or repairs made
  - b Instruments and test equipment used for electrical work.
  - c Matters relevant to personal competence and training in respect of persons who carry out electrical testing.
- 20 Where a problem arises related to electricity at work, employees must inform the Estates department immediately and the university will then take the necessary measures to investigate and remedy the situation.

## Information and training

- 21 Competent persons must only carry out electrical testing. Where it is found necessary to use in-house technical employees to carry out such work, they will be adequately trained to the level required.

## Safe system at work

- 22 Most people should be aware of the health and safety hazards associated with electricity. To avoid injury, or worse, it is essential to adopt the following precautions:
- a Faulty Equipment: Report faults immediately
    - Do not use, or continue to use, faulty equipment
    - Do not carry out repairs etc., or even fit plugs, unless you are authorised to do so
  - b Portable and transportable electrical equipment:
    - Personal issued equipment should be visually inspected at least once a week by the user
    - Equipment used out of doors should be 110 volt or be supplied via a residual current device (RCD)
    - Avoid using long extension leads wherever possible. If their use is unavoidable, ensure that the connector is manufactured to BS 4343 (this has been replaced by BS EN 60309-2, but still remains current).

## Frequency of inspection

### Equipment

- 23 All portable electrical equipment, as defined in this documentation, must be inspected. The preferred interval for these inspections is as follows:

Equipment/environment	User Checks	Formal visual Inspection: (Leads, Cables, Plugs, Fuse etc.)	Combined inspection and testing
Battery-operated: (less than 40 volts)	No	No	No
Extra low voltage: (less than 50 volts AC): Telephone equipment, low-voltage desk lights	No	No	No
Desktop computers, VDU screens	No	Yes, 4 years	No if double insulated, otherwise up to 5 years
Photocopiers, fax machines: Not hand-held. Rarely moved	No	Yes, 4 years	No if double insulated, otherwise up to 5 years

Equipment/environment	User Checks	Formal visual Inspection: (Leads, Cables, Plugs, Fuse etc.)	Combined inspection and testing
Double insulated <input type="checkbox"/> (class II) equipment: Not hand held. Moved occasionally, e.g. fans, table lamps	No	Yes, 4 years	No
Double insulated <input type="checkbox"/> (class II) equipment: Hand- held, e.g. some floor cleaners, some kitchen equipment	Yes	Annually	No
Earthed equipment (Class I): Electric kettles, some floor cleaners, some hand tools and irons	Yes	Annually	Yes, 1-2 years
All extension leads	Yes	Annually	Annually
Residential equipment supplied by students		<p>The University is not responsible for equipment brought in to halls by the students. However, a leaflet is provided for every student informing them that their electrical equipment must be in good, safe working order before use.</p> <p>On the leaflet, will be a checklist for students to be able to visually check the plug etc. Students will also be notified that if they have any doubts or are not sure whether the equipment is safe, they can contact the Estates department who will, for a small charge, check the equipment.</p> <p>Authorisation will be needed to enable the Estates department to gain access to student rooms when necessary.</p>	

## Details of arrangements and tests for items of general equipment

### Inspections and tests

- 24 The tester will check the register number of each item presented for test against the issued list. He/she will add any additional items to the list.
- 25 The following tests and inspections will be carried out:
  - a Examination of the flexible lead and plug
  - b Fuse rating
  - c Examination of the general condition of the item
  - d Earth continuity, where applicable
  - e Wiring

- 26 The tester will record the result of the test and where this is satisfactory, remove any existing marker label and fit a new plug label showing the test date.

### **Faulty items**

- 27 In the event of an item found to be defective, it will immediately be withdrawn from use. The tester will arrange for repairs to be carried out by the Estates department as soon as possible. If it is not considered economic to repair the item, the Estates department will inform the tester and ensure that the item(s) are rendered irreparable before disposal action is taken.

### **Report**

- 28 The report will contain a list of items tested in the area, including the test result and any items found to be faulty.
- 29 A copy of this record will be sent to the Health & Safety Manager.

### **General**

- 30 Protection against electric shock can only be assured by the provision of safe items of electrical equipment. Their safe condition must be retained by vigilance, inspection and maintenance.

## Appendix 1: Information Sheet 1 – Electricity in the Workplace

- 1 Electrical equipment is in use in almost every workplace, even if it is only a kettle. Electricity has certain dangers that are not necessarily present with other equipment. As a result there is a particular need to ensure the safety of all people that use electrical equipment as part of their work, or who could be exposed to danger by faults in electrical equipment.
- 2 Portable electrical equipment. The term 'portable' is not determined by the size of the equipment by the means in which it is connected to the mains power supply. Portable electrical equipment is connected to the mains by a plug and cable. There are different types of plugs, the most common of which is the 13A three-pin plug, which is usually marked as complying with BS1363.

### Dangers of electricity

- 3 Electricity poses three main dangers:
  - a Electric shock
  - b Electric burns
  - c Fire
- 4 Most people are aware of the risk of electric shock. The danger of serious injury or death is increased if the resistance through the body of the person touching a live conductor is lowered. In general, this would occur if the point of contact with the conductor of the ground on which the person was standing were wet. Electrical equipment should never be used or switched on or off by someone with wet hands, or in a damp environment such as a washroom. Some electrical equipment is specifically designed to cope with wet or damp environments.
- 5 If an electric current passes through the body, it will generate heat. The main problem is that the burns caused by the passage of current will not just occur at the surface of the body. The burns caused by electricity can be very severe and are often within the body. The burns at the surface, at the point of entry of the current flow, tend to be deep and take a long time to heal.
- 6 If more current flows in an item of electrical equipment or a cable, excessive heat may be generated. The cause of too much current flow may be a fault condition or because the wrong cable is being used which cannot carry the load. The result of this excess heat can often be the cause of the fire. Many fires in industry and in the home, including halls of residence, are caused by electrical faults.

### Legislation and records

- 7 In the workplace, the university has a general duty, as set out by the Health and Safety at Work etc. Act 1974, to ensure the safety of employees and those affected by the work (students, visitors, etc.). The dangers must therefore be identified and this is done by complying with the requirements of the Management of Health and Safety at Work Regulations 1992, to undertake risk assessments. There is a requirement under the Provisions and Use of Work Equipment Regulations 1998 to ensure that all types of equipment used, is suitable for the purpose for which it is provided or utilised. This is

general legislation and covers all equipment in the workplace; it is not specific to electrical equipment. More specific requirements to ensure safety with regard to electrical equipment are provided in the Electricity at Work Regulations 1989.

### **Portable appliances checklist**

- 8 The flex should be checked to ensure that it is in good condition. Ensure the outer sheath has been checked for damage by cuts, burns, abrasions and that it is not fraying. Check the location of the flex whilst in use to ensure that it cannot become trapped between or under furniture, or be damaged by people walking on it or tripping over it. The flex should be checked for any improper joints, for example, where insulating tape has been used instead of a proper connector.
- 9 The plug should be checked to ensure that it is in good condition and the cable is secure. Check for any broken parts in the plug casing or scorch marks, and that the outer sheath securely grips the cable.
- 10 The socket outlet into which the plug normally goes needs to be checked to see if there are signs of overheating and that it is in good condition. Check for scorch marks, cracks or damage and that the socket is firmly fixed. It is important to remember not to touch the socket if it is loose, or if it is sufficiently broken such as the live parts being exposed.
- 11 The appliance itself should be checked to ensure that it is in good condition and works properly. Check the mains switch to ensure that it switches on and off correctly and that any indicator lamps fitted to it work and indicate correctly.
- 12 The environment in which the equipment is to be used should also be checked to ensure that it is suitable for the design of the equipment. Normal office type electrical equipment is not suitable for use in damp, corrosive atmospheres, or in areas where there are extremes of temperature, such as cold stores.
- 13 Finally, you should ensure that the equipment is being used for the sole purpose that it was originally intended. If you are unsure, you should seek guidance from the Halls Manager or the Safety Manager.

## Appendix 2: Information Sheet 2 – Plugs and Cables

- 1 All new equipment sold must now be fitted with a plug, so there is less need for people to know how to wire one up. However, it may be necessary to remove a plug, for example to pass it through a narrow hole or space, or an item of older equipment may be in use that does not have a moulded on plug. The most common type of plug is the 13A three-pin plug, which is usually marked as complying with BS1363.

### Wiring of a Mains Plug

- 2 The mains plug has three connections: live, neutral and earth. It is important that the correct connections are made when fitting the cable. Some plugs have small letters moulded into the shell to indicate the correct connections. In addition to this, the cable is colour coded to indicate the right connections. Not all plugs are the same, although most follow a similar layout. If there is doubt as to the correct connections/terminals to use, refer to the plug manufacturer's instructions or consult a competent person.
- 3 Some equipment, known as double insulated (class2), does not have an earth wire and so this terminal can be left empty. In all other cases, there should be three wires (class 1) and they must all be connected.
- 4 When wiring a plug, it is important that the correct fuse is also selected. The following guidelines for fuses should be applied:
  - for equipment up to 720 Watts use a 3amp fuse
  - for equipment between 720 Watts to 1200 Watts, use a 5amp fuse
  - for equipment over 1200 Watts, use a 13amp fuse
- 5 The fuse used should conform to BS1362 and under no circumstances, must loose fuse wire or anything else be used in its place. The function of the fuse is to automatically disconnect the power in the event of a fault causing a high current flow. It is important to remember that the fuse will not prevent a lethal current flowing in the event that someone touches a live part. The fuse is designed to protect the equipment and prevent a fire, not to prevent a lethal current flowing.
- 6 It is also important that the correct cable is used to wire up a plug. This would normally be supplied with the equipment. However, it is important that you seek advice as to the correct cable to use. If the wrong cable is used it could overheat and cause a fire.

### Preparation of a cable

- 7 In most plugs, the wires connecting to the three terminals are not required to be of the same length and it can cause a problem if they are. The instructions with the plug will give details, but they are usually as follows:
  - a After carefully removing 38mm of the outer sheath of the cable, so as not to nick the inner insulation, cut the inner wire to:
    - Live – Brown – 18mm
    - Neutral – Blue – 28mm
    - Earth – Green/Yellow – 38mm
  - b The last 6mm of the insulation of each wire should then be stripped away leaving:
    - Live – 12mm

- Neutral – 22mm
  - Earth – 32mm
- c Twist the strands of wire neatly, so as to prevent strands away. Do not apply anything to the ends of the strands.
- d Connect each wire to the correct terminal in the plug. The screws on the terminals should be tight enough to hold the wire firmly, but not so tight as to deform the plug shell. The wires should be laid in plug so as not become trapped by the shell when the cover is replaced.
- e Fix the outer sheath tightly into the cord grip to secure it.

