St Chad's College
Durham

Portable Electrical Appliance Policy

1. Introduction

1.1 Portable electrical appliances must be regularly inspected and tested by competent persons to ensure that they can continue to be used safely.

1.2. The planned inspection and testing will include:

- Visual Inspection for signs of damage or deterioration; and
- Electrical tests, i.e. an earth continuity test; and
- Relevant Insulation tests.

1.3 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.

1.4 Where the College allows students and staff to use their own appliances, e.g., kettles, coffee percolators, electric fans, they must be included in the inspection and testing arrangements. If they are found to fail in any way, they must be removed from the premises and repaired at the owner's expense before they can be re-tested. The use of personal electric heaters is not permitted unless provided by College.

2. Definitions

2.1 A Portable Electrical Appliance is 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, eg, "intrinsically safe" equipment used in potentially explosive environments and equipment designed to operate at 110 volts. The definition does not include equipment that is "hard" wired, e.g., heavy equipment supplied by a fixed, armoured, power cables, which is tested using other regimes.

2.2 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.

2.3 Class II appliances are "double insulated", ie they rely on two layers of insulation between live internal parts and the user for protection against electric shock.

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

3. Schedule of Inspection and Testing

3.1 Visual Inspection: 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
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
Appliance	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

3.2 Electrical Testing: 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 must not be used on sensitive electronic equipment such as computers, as permanent damage may be caused by the high test voltages and currents.

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

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. A voltage is established between the appliance's mains supply earth pin and its case. There are usually two tests available: (I) 4 A / 300 mW for light duty supply cables (up to 6 A); and (II) 25 A / 300 mW for heavy duty supply cables. The resistance between the earthed case and the earth pin on the mains plug must not be more than 300mW.
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. The insulation resistance must withstand a high voltage (500V dc / 2 MW) for five seconds.
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	This test shows the response of the insulation to ac voltage (indicating problems due to excessive capacitive current) and gives an early warning of insulation problems. There is normally a choice of two flash tests; low and high voltage. Since the high voltage test may stress the insulation and cause degradation, it is recommended that the low voltage flash test only is used.
Operation VA 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.

Sensitive Electronic Equipment

Earth Continuity / Bonding Test ONLY.
Do NOT use a PAT device.
Using a multimeter able to read to 300 mW, the resistance between the earth pin and exposed metal (not signal sockets) should be less than 300mW.

Three phase equipment

The inspection and testing of three phase equipment is a specialist task which must be carried out by a member of staff qualified under 'Part P' or under a service contract.

4. Frequency of Inspection and Testing

4.1 There is no statutory frequency of inspection and testing. The frequency should reflect the risk of the appliance causing damage or injury. This increases with amount of appliance use and the harshness of its working environment. The following is recommended as a minimum standard:

- Visual Inspection: On initial use and after moving the appliance and regularly during its lifetime.
- Visual Inspection and Portable Appliance Testing

Risk level	Examples	When to check
High risk	Heavy use / Outside use, eg tools and equiqment used outside or in a way such that their power leads may be subject to mechanical damage or will get wet	Every 6 Months
Medium risk	Frequently moved and used but used inside in dry, benign environments, eg hand held appliances, kettles, laboratory stirrers, heating mantles	Every 12 Months
Low risk	Infrequently moved but regularly used, eg desk lamps analytical instruments, vacuum pumps , heaters	Every 24 Months
Very low risk	Stationary equipment, normally double insulated, power leads have no likelihood of stress, mechanical damage (eg personal computers, power leads only	Every 5 years

5. Recording of Inspection and Testing Results

5.1 When new electrical appliances are purchased it is a good idea to label them with a date of purchase. No PAT test is required initially but the date of the first PAT test, based on risk, can be easily determined from reading the label.

5.2 A dated test label indicating PASS or FAIL and its identification (eg inventory number) must be affixed to the appliance (and to the plug, if the lead is detachable).

5.3 The inspection and test results must be kept in written form: on record cards, sheets or in a book. Computers may aid record keeping.

5.4 The Facilities and Housekeeping Manager should keep the results centrally, as the Enforcing Authorities (eg the Health and Safety Executive) may wish to inspect them.

6. Monitoring of Inspection and Testing Results

6.1 Results should be recorded centrally, i.e. number of appliances tested; and test result (pass or fail). This will provide important information on the number and condition of appliances held.

7. Remedial Action

7.1 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.

7.2 Unless remedial action is immediate a "DO NOT USE" label must be attached to the appliance and plug.

8 Training

8.1 Inspection and Testing must be carried out by Competent Persons i.e. a member of staff who has received suitable and sufficient training.

8.2 The decision as to whether an individual is competent to undertake a particular task is left to the Facilities & Housekeeping Manager. 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.

8.3 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.