23 Electrical Safety

Contents

Introduction

23.1.1 This chapter sets out the WNAT procedures and guidance for electrical safety which includes the management, maintenance and safe use of electrical equipment and systems.

23.1.2 Portable electrical equipment is equipment that has a lead (cable or flex) and plug. It may be equipment that is moved around, such as vacuum cleaners, kettles, toasters, power tools or laptops. It may also be equipment that could be moved around, e.g. computers, printers and photocopiers.

This document is not intended to cover the selection, repair or general safe use of electrical equipment, e.g. provision of 'trip' devices, hazardous environments, etc.

23.1.3 The dangers from electricity include the risk of electrical burns, electrical shock and even electrocution. A person forming a path for an electrical current to flow will suffer an electric shock or burn. The severity being dependent on the nature of the electricity, the duration of the contact, the amount of current which flows and the route it takes as it passes through the body. Susceptibility to electric shock is increased if a person is in good electrical contact with earth. This potential for increased risk should be taken into account when using electricity in damp/wet conditions or in conducting locations such as inside a metal tank.

23.1.4 Each year many people die from electric shock or from burns received from an electric shock at work. An electrical accident may result in a fatal electric shock, serious injury, or a major fire affecting the whole premises. Most electrical accidents occur because people are working on or near electrical equipment:

- that is thought to be dead but which is still live;
- that is known to be live but those involved do not have adequate training and/or experience;
- with a lack of supervision and/or poor planning;
- when using equipment for the task that is not appropriate; or
- Knowingly taking unnecessary risks (e.g. not following a safe system of work or permit to work).

23.1.5 A significant percentage of fires on the DofE estate are either started by electrical faults or the misuse of electricity. Fires may be started by:

- overheating of electrical equipment/systems due to overloading;
- the failure of electrical equipment;
- the leakage of electrical current due to poor, inadequate or faulty insulation;
- overheating of materials placed too close to electrical equipment which is otherwise operating normally;

- the ignition of materials in the vicinity of electrical equipment caused by arcing or sparking.

23.1.6 Nearly a quarter of all reportable electrical accidents in the UK involve portable equipment; for which poor maintenance is a major cause. The recommended maintenance strategy is based on a straightforward, inexpensive system of visual inspection that can be undertaken by any member of staff; the HSE have estimated that around 95% of faults or damage could be identified this way.

23.1.7 The management, use and maintenance of electrical equipment/systems by WNAT staff and on WNAT premises/equipment must be carried out in compliance with the Electricity at Work Regulations.

23.1.8 Any item of equipment that is to be used to do a job of work is work equipment. This includes any machinery, appliance, apparatus, tool or installation for use at work. Examples include:

- Hand tools and ladders
- Portable electrical equipment
- Office equipment such as photocopiers and shredders
- Shelving
- Mobile equipment such as fork lift trucks
- Laboratory apparatus
- Fire alarm systems and other fire safety equipment e.g. emergency lighting and extinguishers
- IT equipment
- Workshop equipment e.g. circular saws, lathes, soldering irons and welding equipment
- Grounds maintenance equipment e.g. tractors, mowers, chainsaws and strimmers
- Lifting equipment e.g. cranes, lift trucks, mobile elevated work platforms, hoists (people, materials and vehicle lifting varieties), gin wheels and accessories such as chain slings and eye bolts

Roles and Responsibilities

Service/Infrastructure/Equipment Provider

23.2.1 The Service/Infrastructure/Equipment Provider should provide assurance to the Executive Head teacher that all electrical systems and/or installed equipment for which they have ownership and/or maintenance responsibilities for is regularly inspected and maintained to the correct standard.

Headteachers

23.2.2 The Headteacher should ensure that where the infrastructure or equipment is managed, owned and/or maintained by a third party organisation (e.g. Maintenance Management Organisation (MMO), project team, external contractor) that the point of demarcation (and responsibility) is agreed (e.g. at the equipment isolator switch, domestic supply wall socket, or power distribution board), clearly defined and documented. The

Headteachers should ensure that effective two way communication exists with any such third party organisations to provide assurances that all electrical systems and/or installed equipment is regularly inspected and maintained to the correct standard.

23.2.3 Suitable procedures should be put in place to identify; inspect; test and maintain electrical equipment/systems not managed by third party organisations and maintain records of formal tests/inspections of any such electrical equipment/systems. The procedures should include the isolation/removal and reporting of defective portable and fixed electrical equipment/systems on the WNAT estate. The planned maintenance, inspection and test regime should be risk based (minimum frequencies/requirements at Annex A). Any defective items should be removed from service and/or secured and identified as 'unsafe do not use'. Inspection and testing can be performed simultaneously and should be carried out:

- where there is a reason to suspect equipment may be faulty, damaged or contaminated but this cannot be confirmed by visual inspection; and
- after any repair, modification or similar work to the equipment, when its integrity needs to be established.

23. 2.4 The decision to allow personal portable electrical equipment and appliances to be used on the WNAT estate (including clubs etc) rests with the Headteacher. A local policy/procedure should be developed and promulgated to all staff which defines where the use of personal electrical equipment/appliances is allowed, and the control measures (i.e. test and inspection) to be adhered to. Local policy/procedures should define what is and what isn't covered in the scope of personal electrical equipment and any restrictions on their use. In an office or in living accommodation, mobile phone or e-book should be out of scope; however in an explosive atmosphere they may be classified as electrical equipment and their use prohibited. The charger for a mobile phone or e-book which plugs into the mains should be included as personal electrical equipment and subject to inspection (Annex A).

Managers

23.2.5 Managers should ensure that for all areas and staff under their control, risk assessments consider the potential electrical hazards that may arise when working on or using electrical equipment/systems due to damage, age, history, users, the environment in which it is installed/used etc. and that suitable and sufficient control measures (Safe Systems of Work, Permits to work, etc.) are in place. The frequency and regime to which electrical equipment/systems are inspected/tested should be established (based on a combination of risk and where appropriate the table at annex A, and in line with local procedures) and all relevant electrical equipment/systems made readily available for inspection/testing in accordance with this regime/local procedure. Any inspection/test only identifies that a piece of electrical equipment is safe to use at the time of that inspection/test. To ensure ongoing electrical safety, managers should ensure that staff using electrical equipment routinely check that there is no visible damage to the equipment or leads before use.

23.2.6 Procedures for staff under the control of the manager should be in place to ensure and record that they receive suitable and sufficient information, training

(induction and refresher) and where appropriate supervision, when working with electrical equipment/systems. Only competent persons (or, if in training, under supervision of a competent person) are allowed to maintain electrical equipment/systems (having sufficient knowledge, training, experience and ability, and where appropriate, qualified). The type of training that should be considered includes, but is not limited to:

- general safety induction training;
- training on particular pieces of electrical equipment;
- training on working in high risk areas;
- regular refresher training.

Inspection and test will determine whether equipment/systems are fully serviceable or if remedial action is necessary. Some extra low voltage or battery operated equipment does not require testing; however mains operated battery chargers may need to be subject to test/inspection (Annex A).

All staff

23.2.7 All staff should comply with all information, instruction and training provided by managers, local procedures and with manufacturers safety instructions for the safe use of electrical equipment/systems. Personnel should perform routine user visual checks (Annex A) ensuring that any suspected electrical faults are reported to their manager, the equipment taken out of service until it has been examined by a competent person and passed inspection/testing, as appropriate. Portable electrical equipment should be plugged into the nearest suitable socket to avoid over stretching of the equipment's cable and in the event of an emergency for it to be easily disconnected from the power supply.
Sockets should not be overloaded; an extension lead of appropriate length may be used but only for temporary operations. Extension leads should be subject to the same inspection regime as applied to portable electrical equipment; unless they form an integral part of a static cable management system (e.g. built into a fixed desk) that is subject to a defined inspection schedule.

23.2.8 Under no circumstances should staff change, modify or bypass safety related devices (e.g. fuses, circuit breakers or Residual Current Devices (RCDs)) as these are there to reduce the risk of harm to the user and/or protect the electrical system from overloading. Portable equipment used outdoors should always be plugged into an RCD protected socket.

23.2.9 Staff should not modify or use modified electrical equipment provided for use at work unless the modification has been authorised and carried out and tested by a competent person.

23.2.10 Where personal electrical equipment is permitted to be used on the WNAT estate (including clubs etc) all staff should comply with local policy relating to its use, testing and inspection.

Legislation and Guidance

- Legislation.Gov.uk -Health and Safety at Work Etc Act;
- Legislation.Gov.uk - Management of Health and Safety at Work Regulations;
- Legislation.Gov.uk - Electricity at Work Regulations;
- HSE - HSR25 - Memorandum of guidance on the Electricity at Work Regulations;
- The Merchant Shipping (Guarding of Machinery and Safety of Electrical Equipment) Regulations;
- Legislation.Gov.uk - Provision and Use of Work Equipment Regulations;
- Legislation.Gov.uk – The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations
- HSE - HSG85 - Electricity at work – Safe working practices;
- HSE - HSG107 - Managing portable and transportable electrical equipment;
- HSE – INDG236 – Maintaing Portable Electrical Equipment in Offices and other Low Risk Environments
- HSE - INDG231 - Electrical safety and you – A Brief Guide;
- IET Wiring Regulations

Annex A

Inspection and Testing of Electrical Equipment/Systems

User Visual Checks

User checks should include but not be limited to checking for:

- damaged, poorly maintained or poorly installed plugs or cables;
- correct connectors used to join cables (no twisted wires or taped joints);
- incorrect use of extension leads (e.g. two or more connected together)
- signs of scorching or burn marks;
- loose wires or missing or damaged insulation;
- damaged equipment casing;
- correct marking (e.g. in-date test labels).

Formal Visual Inspections

This does not have to be undertaken by a qualified electrician. Visual inspections can be carried out by a competent member of staff provided they have been given appropriate training and have acquired sufficient experience. A visual inspection must be conducted with the equipment isolated, and should ensure that:

- there is no damage e.g., cuts and abrasions (apart from light scuffing) to any cable covering;
- there is no damage to any plug e.g. the casing is not cracked or pins are bent or misaligned;
- the outer covering (sheath) of the cable is securely gripped where it enters the plug or the equipment, and that the coloured insulation of the internal wires are not visible without removing the plug or equipment cover;
- the equipment shows no sign of having been used in an environment where it is not suitable (eg, wet or muddy);
- there is no damage to the outer cover of the equipment, e.g. obvious loose parts, screws missing or cracks in the casing;
- there are no signs of overheating (burn marks or staining);

and may also include checking that:

- the cable terminations are secure and the correct polarity;
- the correct rated fuse is fitted.

Testing

Formal testing of electrical equipment shall only be performed by a competent person (having the required knowledge, training and experience). A person not skilled in electrical work but trained in the use of and routinely using a simple ‘pass/fail’ type of portable appliance tester (PAT) and the knowledge to calculate the correct fuse rating may be adequately competent for testing portable equipment; providing the appropriate test procedures are rigorously followed and acceptance criteria are clearly defined. The testing of any equipment/system that is hard-wired to an electrical supply above Extra Low Voltage must be carried out by a competent qualified electrician.

Annex A

Recommended Initial Inspection/Testing Intervals For Electrical Equipment

Equipment/environment	Daily User visual checks	Formal visual inspection	Combined inspection and test
Power leads, Extension leads, plugs and cables.	Yes	As per category used with below	As per category used with below
Heavy industrial use, high risk of equipment damage, e.g. circular saws and.angle grinders.	Yes	Yes, Weekly	Yes, 6-12 months
Residual Current Devices (RCDs)	Yes Functional Test (socket outlet & portable RCDs)	Yes, Weekly	Yes, 6-12 months
Light industrial use, e.g. bench mounted diagnostic and test equipment.	Yes	Yes, 6 months	Yes, 6-12 months
Earthed equipment (Class 1): e.g. electric kettles, some floor cleaners	Yes	Yes, 6 months-1 year	Yes, 1-2 years
Hard wired equipment: cooker, engineering workshop machines (e.g. lathe or power-press),	Yes	Yes, 1 year	Yes, 1-5 years.
Information technology: e.g. desktop computers, VDU screens	No	Yes, 2-4 years or after reconfiguration	Yes, 1-5 years if not double insulated
Fixed systems and earthed equipment only moved occasionally, NOT hand-held, e.g. photocopiers and fridges.	No	Yes, 1-4 years	Yes, 1-5 years
Double insulated equipment frequently moved or hand-held e.g. phone/laptop chargers, irons, hair dryers.	Yes	Yes, 6 months-1 year	No
Double insulated Moved occasionally, NOT hand-held, e.g. fans, table lamps, slide projectors	No	Yes, 2-4 years	No
Battery operated (less than 40 volts)	No	No	No
Extra low voltage: (less than 50 volts AC) e.g. telephone equipment, low voltage desk lights	No	No	No

Annex A

Risk assessments should identify changes to the above need and frequency of inspection and testing depending on the equipment type, its usage and the operating environment. Where the inspection/testing regime is picking up a number of faults then consideration shall be given to increasing the frequency of inspection and testing.

Records

Formal inspection and testing records should include:

- The description of the piece of equipment;
- An asset number or equipment serial number (unique identifier);
- Location of the equipment;
- Date of next inspection/test;
- Inspection/test Pass or Fail;
- Details of any inspection/test failures.