

ELECTRICAL EQUIPMENT

Electric Shock - If anyone experiences or reports an electric shock, associated with a piece of equipment, it must be immediately removed from service, appropriately tagged and the incident reported to their supervisor, the University electrician and UWA Safety and Health. See TAGGING TO PREVENT USE OF EQUIPMENT.

Electrical Equipment Tags – Electrical equipment operated in electrically non-hostile environments, must be visually inspected before being put into service and also at regular intervals. Equipment located in electrically hostile environments requires regular testing and a tag of the current year colour showing the next retest date.

Physical Damage - Equipment exhibiting signs of physical damage must be removed from service and arrangements made for repair or replacement. See TAGGING TO PREVENT USE OF EQUIPMENT.

Overheating Equipment - If electrical equipment is overheating or exhibiting a burning smell, it must be removed from service and reported. See TAGGING TO PREVENT USE OF EQUIPMENT.

Noisy Fans - Where there are indications of abnormal operations or overheating turn off the equipment and advise your supervisor. Arrangements should be made to have the equipment serviced.

Loose or Missing Covers and Guards - It is hazardous to use equipment in this condition. Advise your supervisor and have the equipment removed for repair. See TAGGING TO PREVENT USE OF EQUIPMENT.

Equipment Suitability - Domestic electrical equipment is generally not suitable for workshop or laboratory use.

Power Consumption - The maximum power rating of a standard power point is 2.4 kW (or 10 Amps x 240 Volts = 2,400 Watts). The total consumption of all electrical devices plugged into a power board or double power point must not exceed this rating. Information on power consumption can usually be found on the compliance plate attached to electrical equipment. If in doubt seek expert advice.

Laboratory Refrigerators - Domestic refrigerators contain switching contacts within the cold space such as the light circuit, thermostat and fan. Their use for storage of flammable materials has resulted in serious explosions with significant damage. Do not store flammables (Dangerous Goods class 3) in a domestic refrigerator (cooling and storage of flammables must only be done in a spark proof refrigerator or freezer).

Unattended Heat Sources - Minimise fire risk and do not leave heaters, hot plates and ovens unattended whilst still hot. Do not store combustible materials near them.

Combustible Material - Serious fires often result from an electrical fault igniting combustible material. Never allow combustible material to accumulate and do not leave flammable substances near heat sources. Always ensure that air intakes and cooling fans on electrical equipment remain unobstructed to prevent overheating.

Light Fittings - Ensure that the wattage of the globe never exceeds the rating of the fitting. Note that halogen globe desk lamps get hot enough to ignite paper in contact with the lamp.

Removing Power Leads - It is good practice to isolate the power before removing power leads. Hold the plug and never exert force on the lead.

Laptop Computers and other personal electrical equipment - The electrical safety of this equipment is the responsibility of those students, visitors and staff who bring them to UWA workplaces. Electrical leads are to be inspected for damage. Leads must not create a trip hazard. Personal electrical equipment may only be used with permission from workplace supervisors.

TAGGING TO PREVENT USE OF EQUIPMENT

Faulty electrical equipment must be removed from service for repair or disposal. Fix an 'Out of Service' (yellow and black) tag to it clearly marked with the fault, the date, your name and contact details. 'Danger Tags' (red and black) warn that equipment is being worked on and must not be operated. They may only be removed by the person who signed the tag. Both types of tag are available from UWA Safety, Health and Wellbeing.

INSPECTION, TESTING and TAGGING

The *Department of Commerce, WorkSafe; Guide to testing and tagging portable electrical equipment and residual current devices at workplaces; April 2014*, other than construction sites requires that:

- A risk management approach is taken to determine the type of inspection and, if necessary, the type of testing required.
- Inspection needs to be done more frequently in an operating environment where electrical equipment is, during normal usage, subjected to adverse operating conditions likely to result in damage.

UWA uses a risk management approach to determine where specific testing of electrical equipment is necessary. This is achieved by defining workplaces as hostile or non-hostile electrical environments and then specifying the required frequency of visual inspections or testing and tagging. White visual inspection tags are available from Safety, Health and Wellbeing

Non-hostile environments

This is a workplace that is dry, clean, well organised and free of operating conditions that may result in damage to electrical equipment or the flexible supply cord. It is sufficient to visually inspect equipment and cords for damage prior to use and thereafter on a regular basis. Tagging is not a requirement but white visual inspection tags can optionally be applied to supply cords if workplaces wish to designate inspected items.

Hostile environments

This is a workplace wherein the equipment or appliance may be subjected to events or operating conditions which could result in damage to the equipment or a reduction in its expected lifespan. This includes but is not limited to physical abuse, exposure to moisture, heat, vibration, chemical damage and other harsh conditions where cables could be damaged. White, visual inspection tags are applied to new electrical equipment prior to its initial use. Regular electrical testing and tagging using coloured tags (denoting the year of testing), must be carried out for the workplace by an authorised competent person. Any white visual inspection tags are then removed and replaced with the coloured test tag.



ELECTRICAL SAFETY

A GUIDE TO THE USE OF ELECTRICAL EQUIPMENT ON UWA PREMISES

September 2014

CONTACTS

Electrical Maintenance

Campus Management Help Desk Tel. 6488 2025

Electrical Accidents

Technical Officer (Electrical) Tel 6488 5917
Mob 0417 690 175

Building Services Electrical Workshop Supervisor

Tel. 6488 2016

UWA Security (24 hours)

Tel. 6488 2222

UWA Safety and Health

General enquiries Tel. 6488 3938

REFERENCES

Electrical Safety Information and procedures:
<http://www.safety.uwa.edu.au/topics/electrical-safety/>

RELEVANT LEGISLATION

Department of Commerce; WorkSafe - Guide to testing and tagging portable electrical equipment and residual current devices at workplaces

Occupational Safety and Health Act 1984

Occupational Safety and Health Regulations 1996

Electricity Act 1945

Electricity Regulations 1947

Electrical (Licensing) Regulations 1991

AS/NZS 3760 In-Service Safety Inspection and Testing of Electrical Equipment

GENERAL ELECTRICAL SAFETY

Electricity can cause burns, muscle damage, breathing difficulties or death. Currents as low as a few milliamps can cause cardiac arrhythmia and be fatal.

It is essential to avoid contact with electrical conductors and to follow proper electrical procedures to avoid the risk of electrocution.

Never use equipment if it is damaged, faulty or displays tags marked 'Out of Service' or 'Danger'. Only qualified persons may carry out electrical repairs.

Residual Current Device (RCD) protection is not always effective in preventing electrocution. The presence of an RCD is not a substitute for proper electrical safety practices. All RCDs require regular testing under AS/NZS 3760.

Insulated-pin power plugs are compulsory on all new electrical equipment to prevent possible finger contact with live terminals.

Ensure that power plugs are pushed completely into the socket and are not placed under strain.

Where non-moulded plugs are used, they should be transparent plastic for easy verification of correct wiring.

Do not spray cleaning solutions onto power connections or electrical cables as they can cause damage to insulating plastics which could result in electric shock.

Water and electricity don't mix. Keep appliances away from water, especially in kitchens and laboratories.

Do not handle electrical appliances with wet hands or wipe electrical equipment with a wet sponge or cloth.

Isolate electrical power before entering any damp or flooded area.

Wearing rubber or insulating soled footwear is a further precaution against electrocution.

Learning Cardio Pulmonary Resuscitation (CPR) may help save a life, but do not touch anyone who may be in contact with electricity until the power has been switched off or disconnected.

Any person who suffers an electric shock must receive medical attention whether or not they lose consciousness. The WA Electrical (Licensing) Regulations require that all electrical accidents are reported. Notify the UWA Technical Officer (Electrical) on 6488 2031 / 6488 5917 and complete a UWA Confidential Incident / Injury / Near Miss Report Form at <http://www.safety.uwa.edu.au/incidents-injuries-emergency>.

INSPECTING ALL TYPES OF POWER LEAD

Damaged leads on electrical equipment, power boards and extension leads can present a significant electrical hazard, particularly in electrically hostile environments. They are vulnerable to damage from a variety of causes including heat, abrasion, stretching, being crushed and other misuse. A damaged power lead may be out of sight and be in contact with metal structures or combustible materials. They may also be handled regularly by people whilst connected to the power. Users must regularly check power leads as follows:

- Check that the outer sheath is not damaged by working your way along the lead looking for cuts, abrasions or discolouration indicating possible chemical damage.
- Flex the lead to check that the insulating material itself is not brittle and remains unbroken with no cracking.
- Check there are no exposed wires at plugs with the outer insulation covering the inner wires right into the plug.
- If used in an electrically hostile environment they have a current electrical test tag.

POWER DISTRIBUTION

Power points and the electricity distribution network are administered by UWA Campus Management and are outside the jurisdiction of local staff. Campus Management relies on feedback across campus to identify all operational and safety related issues concerning power distribution and switching.

Users are responsible for advising Campus Management of the following:

- Damaged power points or switches
- Power points that are not RCD protected and appropriately labeled.
- Power points that are not marked with a circuit number.

Users must also ensure that the total amount of current drawn from a power point does not exceed 10 amps causing overload (or plug in equipment drawing more than 2,400 watts). Groups of power points sharing the same identification number are on a common circuit which could be overloaded. Double adapters and piggyback plugs may not be used at UWA. Instead, use a power board with overload protection.

POWER BOARDS

Power boards should only be considered as a temporary solution and ideally all electrical devices should operate from individual power points for improved electrical safety. General guidelines for the use of power boards:

- They should have overload protection and it is recommended that they have built-in on/off switches.
- They should have their own RCD protection if the supply outlet is not already RCD protected.
- Industrial power boards should be used in outdoor or trades areas.

EXTENSION LEADS

Extension leads should only be regarded as a temporary arrangement for power distribution. They are often used in electrically hostile environments and can be easily damaged. Users are advised to inspect and, if necessary, replace older leads on a regular basis. Extension leads should have molded connectors.

The extension lead should be uncoiled or removed from a reel if it is to be used with an appliance which draws high current.

Disconnect from the power source when not in use. Do not run extension leads where exposure to water is likely.

Do not run extension leads across pedestrian traffic areas or through doors and windows where they may be subject to damage. Leads should be run overhead or behind structures for protection and to avoid creating hazards to passersby.

Heavy-duty extension leads have thicker insulation. These should always be used for outside applications and in other demanding situations, particularly where movement or abrasion is likely.