

# Purchase and Acquisition of Electrical Equipment at UQ

## SCOPE

- electrical equipment, new and used (as defined by Australian Standards, Appendix 4)
- purchased from overseas and within Australia
- equipment for use at UQ by staff and students

## INTRODUCTION/OBLIGATIONS

Designers, makers and installers of plant have specific health and safety obligations as per state and federal electrical and safety regulations and standards (appendices).

### Solar Power

With the rising prominence of solar powered electrical equipment or solar power generating systems, UQ may wish to avail itself of this technology. The scope of this guideline does not reach to this and research into such maybe required by interested parties.

## PRE PURCHASE CONSIDERATIONS

### Equipment requiring special consideration

Some equipment requires special consideration if listed in an Act or Regulation and may require special reporting considerations and/or registration to regulatory bodies. Some of these types are :

- Prescribed equipment or plant as listed in the Electrical Regulations (Appendix 1).
- High Risk and Registrable plant as per schedule 3 of the WH&S Regulation 2008.
- Radiation devices as per Radiation Safety Standards & section 5 of the Radiation Safety Regulations 1999.

Equipment in the above categories must comply with the requirements of the Act, Regulation or Standard.

### Comparison of purchase from Australia against importing from overseas

Before purchase, the total cost, including shipping, freight and insurance, plus customs & quarantine fees if applicable, should be calculated and compared with an Australian purchase.

In many cases, if purchased within Australia, installation, calibrations, servicing agreements and training can be negotiated with the supplier at no cost, or a low additional cost.

The cost of electrical re-wiring should be considered.

Considerations are:

- Freight
- Insurance
- Customs duties
- AQIS/quarantine charges
- Rewiring to Australian Standards (mandatory)

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Equipment over \$1000AUD will incur customs fees, whilst used equipment may need a quarantine permit and approvals.

## **Transport & Placement**

Ensure that you have obtained accurate dimensions and weight of the equipment. You will need to ascertain that the equipment will fit through doorways, inside elevators etc. Load limits of benches and floors may need to be considered, as well as ease of movement around the equipment and accessibility for maintenance. Further to this, if placed near a wet zone, it may need an IPX rating (waterproofing). Your equipment may further adversely affect your local air conditioning and power consumption.

### ***Size***

- will it fit where it is intended to be placed
- will it fit through doors, elevators etc
- will it allow sufficient egress

### ***Weight***

- is the weight within the limits of elevators
- what is the loading for the bench and/or floor
- will a special bench be required
- what is the integrity of the floor where the equipment be located, will the floor need to be structurally strengthened
- are cranes or special lifting aids required

### ***Proximity to other equipment***

- Combined heat loading
- Air conditioning requirements
- Water or dust permeability (near safety showers, sinks etc)
- Accessibility for servicing and maintenance

### ***Electrical Load & local power requirements***

- Suitable voltage, current, frequency
- RCD (Residual Current Device, safety switch) limits
- Transformers
- Rewiring
- Class I, II or III insulation

## **Additional safety aspects**

- Ergonomics & ease of use
- Guarding for moving parts as per Australian Standards “machinery and safety series” including access to rotating belts, wheels, blades etc
- Safety Interlocks
- Limit switches or other limiters
- Emergency isolation or shut-down switches – availability and accessibility
- Factory calibrations
- Availability of legible manuals for operation and servicing
- Noise
- Maintenance & service contracts
- Warranty, Guarantee conditions (onsite compared to return to base)
- Manufacturer/supplier training provisions

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## PROCESS OF PURCHASE

1. Authorisation of prescribed, high-risk equipment, registrable plant and radiation devices is required by the purchaser's supervisor, and local Safety Officer.
  - 1.1. Purchase of equipment assets are to be approved by the local Safety Officer. Where equipment assets are purchased through UniFi, the local Safety Officer is to be made as one of the approvers in the UniFi system. The local Finance Officer is to arrange this.
  - 1.2. The local finance officer to include the following phrase to the supplier (via the purchase order) where equipment assets are purchased "equipment to comply with the Electrical Safety Act and Australian Standards, failure to do so may result in return of item for full refund" or similar wording.
  - 1.3. Local safety officer to determine if purchaser must meet any special requirements, as indicated in 'PRE PURCHASE CONSIDERATIONS' (page 1) of this document.
  - 1.4. Following information to be provided to local safety officer: proof of electrical safety assessment by a competent person, safety assessment of appropriate guarding on moveable parts, ergonomic and handling considerations, emergency shut-down devices & limiters if appropriate, consideration as per 'PRE PURCHASE CONSIDERATIONS' (page 1) of this document.

## POST PURCHASE REQUIREMENTS

### Arrival

On arrival an inspection of the equipment should be carried out by a competent person. This should include test and tagging and an assessment as to whether the equipment meets Australian Standards. In some cases this may be done by the supplier onsite. The equipment may be returned for full refund if it doesn't meet the required safety aspects.

### Installation

Ensure that appropriate persons have been arranged to install the equipment. This may require professional movers, or in some cases the supplier will install the equipment. Staff moving or installing heavy equipment should conduct a risk assessment before attempting to do so.

### Certification

In some situations calibration and certification is required by an accredited provider, as is the case with some equipment being used in PC2 premises.

### Servicing

A servicing contract may be available from the supplier. Servicing should be conducted by a competent person at intervals according to the manufacturer's instructions. A guide should be listed in the equipment manual. If not, contact the supplier or manufacturer.

### Training

Before use, training should be provided by a competent person. In some cases this can be arranged with the supplier. Record the training of all persons to meet legislative obligations.

## Contact for Additional Information

**OHS Division**

**Email:** [ohs@uq.edu.au](mailto:ohs@uq.edu.au)

**Phone:** 07 3365 2365 (ext 52365)

## Appendix 1: Prescribed and non-prescribed equipment

### Prescribed equipment:

Electrical Safety Regulation 2002 - S96 and S97 – **Meanings of prescribed class and type**

- 1) Schedule 3 lists classes of electrical equipment. (58 items) e.g. Arc welder, battery charger, bayonet lamp holder etc, etc
- 2) Each class of electrical equipment listed is a **prescribed class** of electrical equipment.

### Nonprescribed equipment:

**Nonprescribed electrical equipment means** electrical equipment of a type that is not a type of electrical equipment of a prescribed class (i.e. anything not listed as prescribed).

Electrical Safety Act 2002 Division 8 - Nonprescribed electrical equipment

#### **S 120 Sale of particular nonprescribed electrical equipment prohibited**

A person must not sell an item of nonprescribed electrical equipment to which the safety criteria in AS/NZS 3820 (Essential safety requirements for low voltage electrical equipment) apply unless the item of electrical equipment complies with the safety criteria as in force at the later of the following—

- a) on 5 October 1998;
- b) when the item was manufactured or imported.

### Prescribed Classes of Equipment:

Appliance connector	Hair care appliance	Residual current device
Arc welding machine	Hedge clipper	Room heater
Battery charger	Immersion heater	Sewing machine
Lampholder (bayonet & Edison)	Insect electrocutor	Socket outlet
Lampholder adaptor	Iron	Soldering-iron
Blanket	Kitchen machine	Supply flexible cord
Bread toaster	Lawn care appliance	Swimming pool/spa equipment
Clothes drier	Liquid heating appliance	Television receiver
Control or conditioning device	Luminaire – portable	Therapeutic lamp
Cooking appliance – portable	Massage appliance	Tool - portable
Cord extension socket	Microwave oven	Vacuum cleaner
Cord-line switch	Miniature over current circuit-breaker	
Decorative lighting outfit	Outlet device	Wall Switch
Dishwashing machine	Plug	Washing machine
Extra-low voltage power supply unit	Projector	Waterbed heater
Fence energiser	Range	Water heater
Flexible heating pad	Range hood	
Floor polisher/scrubber	Razor/hair clipper	
Fluorescent lamp ballast & starter	Refrigerating appliance	

**Note:** This list may be subject to change, refer to schedule 4 of the Electrical safety Regulation for the most current list. <http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/E/ElectricalSR02.pdf>

### List of Registrable Plant:

Air-conditioning units	Escalators
Amusement devices	Mobile cranes
Boilers	Pressure vessels
Building maintenance units	Tower cranes
Cooling towers	Truck-mounted concrete booms
Lifts	

**Note:** This list may be subject to change, refer to Schedule 3 of the Queensland Workplace Health and Safety Regulation 2008. <http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/W/WorkplHSaR08.pdf>

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## APPENDIX 2: OBLIGATIONS OF THE ELECTRICAL SAFETY ACT 2002

### Electrical Safety Act 2002

#### *S 26 Obligations for electrical safety*

The following persons have obligations under division 2 for electrical safety—

- electricity entities
- employers
- self-employed persons
- designers of electrical equipment and electrical installations
- manufacturers of electrical equipment
- importers of electrical equipment
- suppliers of electrical equipment
- installers of electrical equipment and electrical installations
- repairers of electrical equipment and electrical installations
- persons in control of electrical equipment
- workers at places where electrical equipment is located
- other persons at places where electrical equipment is located

#### *S 31 Obligation of designer of electrical equipment*

A designer of electrical equipment or an electrical installation has an obligation to ensure that—  
the electrical equipment or installation is designed to be electrically safe; and  
if the designer gives the design to another entity who is to give effect to the design, the design is accompanied by information about the way the electrical equipment or installation must be used and installed to ensure the equipment or installation is electrically safe.

#### *S 32 Obligation of manufacturer of electrical equipment*

- 1) A manufacturer of electrical equipment has an obligation to ensure that—
  - a) the processes followed for the manufacture of the electrical equipment ensure that the electrical equipment, when made, will be electrically safe; and
  - b) the electrical equipment, when made, is electrically safe.
- 2) Without limiting subsection (1)(b), the obligation includes ensuring that the electrical equipment, when made, is tested and examined to ensure it is electrically safe.

#### *S 33 Obligation of importer of electrical equipment*

- 1) An importer of electrical equipment has an obligation to ensure that the electrical equipment is electrically safe.
- 2) Without limiting subsection (1), the obligation includes ensuring that the electrical equipment—
  - a) is designed to be electrically safe; and
  - b) is tested and examined to ensure it is electrically safe.

#### *S 34 Obligation of supplier of electrical equipment*

A supplier of electrical equipment has an obligation to ensure that when the electrical equipment leaves the supplier, it is accompanied by information about the way the electrical equipment must be used to ensure that its use is electrically safe.

**Note – penalties apply if obligations are not discharged. Sections of the Act and Regulations detailed above are not definitive and are intended as a guide only.**

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# APPENDIX 3: OBLIGATIONS OF THE WORKPLACE HEALTH AND SAFETY ACT 1995

## Part 3: Workplace health and safety obligations

### Division 1 Preliminary

#### **23 Obligations for workplace health and safety**

- (1) The following persons have obligations under division 2 to ensure workplace health and safety—
- persons who conduct a business or undertaking, whether as employers, self-employed persons or otherwise
  - persons in control of workplaces
  - designers, manufacturers and suppliers of plant
  - erectors and installers of plant
  - owners of plant
  - manufacturers and suppliers of substances
  - persons in control of relevant workplace areas
  - persons in control of fixtures, fittings or plant included in relevant workplace areas.

#### **32 Obligations of designers of plant**

- 1) A designer of plant for use at a relevant place for the plant has an obligation to ensure that—
  - a) the plant is designed to be safe and without risk to health when used properly; and
  - b) if the designer gives the design to another entity that is to give effect to the design, the design is accompanied by information about the way the plant must be used to ensure health and safety.
- 2) Also, a designer of plant for use at a relevant place for the plant has an obligation to take the action the chief executive reasonably requires to prevent the use of unsafe plant anywhere.

#### **32A Obligations of manufacturers of plant**

- 1) A manufacturer of plant for use at a relevant place for the plant has an obligation to ensure that—
  - a) the plant is manufactured to be safe and without risk to health when used properly; and
  - b) the plant, when manufactured, is tested and examined to ensure it has been manufactured to be safe and without risk to health when used properly; and
  - c) the plant, when supplied to another person, is accompanied by information about the way the plant must be used to ensure health and safety.
- 2) Also, a manufacturer of plant for use at a relevant place for the plant has an obligation to take the action the chief executive reasonably requires to prevent the use of unsafe plant anywhere.

#### **32B Obligations of suppliers of plant**

- 1) A supplier of new plant for use at a relevant place for the plant has an obligation—
  - a) either—
    - i) to examine and test the plant to ensure the plant is safe and without risk to health when used properly; or
    - ii) to ensure the manufacturer of the plant has given an assurance that the plant has been examined and tested to ensure it is safe and without risk to health when used properly; and
  - b) to ensure the plant is accompanied by information about the way the plant must be used to ensure health and safety.
- 2) A supplier of used plant for use at a relevant place for the plant has an obligation—
  - a) to take all reasonable steps to ensure the plant is safe and without risk to health when used properly; and  
*Example of reasonable steps a supplier of used plant might take* — A reasonable step for a supplier to take might be to examine and test the plant to establish that it will be safe and without risk to health when used properly.
  - b) to ensure the plant is accompanied by information about the way the plant must be used to ensure health and safety, if the information is available.
- 3) Also, a supplier of plant for use at a relevant place for the plant has an obligation to take the action the chief executive reasonably requires to prevent the use of unsafe plant anywhere.

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- 4) Despite subsections (1)(b) and (2)(b), if the supplier is supplying plant by hiring it to another person, the supplier is obliged only to have the information available at the point of hire.
  - 5) In this section— *supplier* does not include a manufacturer when supplying, but does include an importer when supplying.

### ***33 Obligations of erectors and installers of plant***

An erector or installer of plant at a relevant place for the plant has an obligation—

- a) to erect or install the plant in a way that is safe and without risk to health; and
- b) to ensure that nothing about the way the plant was erected or installed makes it unsafe and a risk to health when used properly.

***Note – penalties apply if obligations are not discharged. Sections of the Act and Regulations detailed above are not definitive and are intended as a guide only.***

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## Appendix 4: Relevant Australian Standards (referred to by the Act or Regulation)

- Available via the UQ library database "Australian Standards Online"

### **AS/NZS3000:2007 - Wiring rules**

Sets out requirements for the design, construction and verification of electrical installations, including the selection and installation of electrical equipment forming part of such electrical installations.

These requirements are intended to protect persons, livestock, and property from electric shock, fire and physical injury hazards that may arise from an electrical installation that is used with reasonable care and with due regard to the intended purpose of the electrical installation.

In addition, guidance is provided so that the electrical installation will function correctly for the purpose intended.

### **AS/NZS3760:2003 – In-service safety inspection and testing of electrical equipment**

Specifies the procedures and criteria for the in-service safety inspection and testing of electrical equipment which is designed for connection by a flexible cord. It also applies to cord extension sets, portable outlet devices, portable residual current devices and portable isolation transformers. Appendices include detailed test methods

### **AS/NZ3820:2009 - Essential Safety Requirements for Electrical Equipment**

Sets out requirements for electrical equipment, to ensure that electrical equipment is constructed in accordance with good engineering practice in regard to safety such that it does not endanger the safety of persons, domestic animals or property, when properly installed and maintained and used in applications for which it was made.

### **AS/NZS4417:2009 (Series) – Marking of Electrical products to indicate compliance with regulations**

#### ***AS/NZS4417:2009.1 - General rules for the use of the mark***

Specifies the requirements for the use of a trademark, called the Regulatory Compliance Mark (RCM), on electrical and electronic products to indicate compliance with regulations applicable to aspects of the product as covered in other parts of this Standard.

#### ***AS/NZS4417:2009.2 - Specific requirements for electrical safety regulatory applications***

Specifies the requirements that apply to the use of the Regulatory Compliance Mark (RCM) on electrical and electronic products to indicate compliance with electrical safety regulations in Australia and New Zealand. It is applicable to low voltage electrical products and products used in low voltage installations.

#### ***AS/NZS4417:2009.3 - Specific requirements for electromagnetic compatibility regulatory applications***

Specifies the requirements that apply to the use of the Regulatory Compliance Mark (RCM) on products to indicate compliance with electromagnetic compatibility regulations in Australia and New Zealand.

***Note – Australian Standards listed above are not definitive and are intended as a guide only, refer to relevant Act or Regulation for other Australian Standards. Where the Act or Regulation refers to an Australian Standard, the standard must be observed.***



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## **APPENDIX 5: ERGONOMICS & Manual handling**

### **ISO 9241 part 3**

An ergonomic standard that covers hardware, software, workplace, and environment. It addresses the actual application at the work place. The objective of part 3 is to ensure that the visual display shall be legible, readable, and comfortable in use.

## APPENDIX 6: AUSTRALIAN CONFORMITIES

### ELECTRICAL CLASS TYPE'S

Electrical appliances are categorised into classes, namely

- Class I – single earth system;
- Class II – double insulated equipment;
- Class III – low voltage equipment, DC (direct current), solar power)
- Class L – leads and powerboards

**All electrical testing should only be performed by a competent qualified person, using a *PAT* tester, under AS/NZS 3760.**

#### Class 'I' Electrical Equipment.

All live parts of a '*class I*' electrical appliance are insulated. In addition to the insulation an earth connection is fitted via a flexible electric cord and power outlet to accessible conductive parts of the appliance. If for some reason the insulation fails, accessible parts will not become live. Electric shock is still possible if a connection is formed between the live components and earthed components.

Following are examples of '*class I*' type of electrical appliance:

- Refrigerator
- Computer, & monitor
- Electric toaster
- Electric Kettle



\*Electric kettle, Class I.

#### Class 'II' Electrical Equipment.

A '*class II*' electrical appliance relies on double or reinforced insulation, and has NO EARTH pin. Double insulated electrical appliances offers basic protection with the first layer of insulation, if this layer fails, secondary protection is offered by a second layer of insulation preventing contact with live electrical components

Following are examples of '*class II*' type of electrical appliance:

- Circular saw
- Electric drill
- Angle grinders
- Most hand held power tools
- Electric hair dryers
- A/C power packs



\*Electric fan, class I.

#### Class 'L' Electrical Equipment.

The '*class L*' electrical equipment are referred to as electrical extension leads, power boards etc. These electrical equipment have earth, active, and neutral connections.

Following are examples of '*class L*' type of electrical appliance:

- Electrical power boards
- Electrical extension leads
- Computer cables



\*Electric jig saw, class II.

### Class 'III' Electrical Equipment.

The 'class III' appliances are referred to as electrical equipment that operates under their own power. Normally battery powered electrical appliances.

Following are examples of 'class III' type of electrical appliance:

- Battery operated drill
- Any other battery operated electrical device

### Residual Current Device 'RCD' Electrical Equipment.

The 'RCD' residual current device, maybe known as earth leakage circuit breaker, or safety switches. This device has two important factors, it may detect electrical earth leakage in wiring accessories, and secondly detects electricity leaking to earth is harmful to operators of electrical equipment, if the 'RCD's operating correctly it will switch the electricity of immediately if either of these defects are detected.

Following are examples of 'RCD' electrical devices:

- Type I
- Type II

\* Illustrations from Access Communications Pty Ltd.



\*Electric drill, class II



\*Electrical lead, class L



\*Battery operated drill, class III



\*Typical RCD unit

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## APPENDIX 7: OVERSEAS CONFORMITIES, STANDARDS AND COMPLIANCES

### Electrical Wiring Colour Codes

Pin Connection	USA / Japan	EUROPE	UK
Live	Black	Brown	Brown
Neutral	White	Blue	Blue
Earth (Ground)	Green	Green/Yellow	Green/Yellow

### GS

A German certification, Geprüfte Sicherheit ("tested safety"). End products can be GS-certified by TÜV for expected safety concerns, meaning they have been evaluated and have met German standards. Typical end products are desktop touch monitors.

### IC Class A

A Class A compliance statement means the design has been tested for compliance with Industry Canada's ICES 03 Class A RF emissions limits, and is suitable for use in non-residential settings. Industry Canada's RF emissions limits are identical to the FCC's. See also FCC Class A.

### IC Class B

A Class B compliance statement means the design has been tested for compliance with Industry Canada's ICES 03 Class B RF emissions limits, and is suitable for use in residential or non residential settings. Industry Canada's RF emissions limits are identical to the FCC's. See also FCC Class B.

### MPR II

A set of Swedish safety standards that covers the levels of magnetic and electrical fields in both VLF and ELF ranges.

The Swedish National Board for Measurement and Testing (SWEDAC) requires that products sold in Sweden comply with MPR II. To measure emissions, a sophisticated test that screens out background radiation must be in place.

Since distance to the CRT and orientation of the measuring device affects measurement, precise placement of the measuring device is essential and difficult to repeat. In addition, the actual image displayed can have an impact on emissions, so that a given set of measurements may not predict the emissions a user would actually encounter.

It is worth noting that there are no scientific studies that conclude that measurements above MPR II levels are hazardous. See also TCO95 and TCO99.

### TCO95 and TCO99

A standard set by the Swedish Tjänstemännens Central Organization (TCO) in 1991. It is even more stringent than MPR II, especially for alternating electric fields (AEF).

Not only are the permitted field levels reduced compared with MPR II, but the measuring distance is reduced as well. Ergonomic and ecologic requirements are included for TCO95.

For TCO99, it is expanded to include more ergonomic and ecologic requirements. See also MPR II.

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## **CE**

The CE (Conformite Europeene) marking on end products indicates compliance with all applicable directives. For information technology equipment (ITE), this typically means Low Voltage Directive 73/23/EEC (LVD), and the EMC Directive 89/336/EEC.

Typical end products are desktop touch monitors. Components typically do not carry the European Union's CE marking. Properly applied, they will comply with the LVD and EMC Directives.

Typical component products are touch screens, controllers, and kiosk touch monitors. Refer to the product Declaration of Conformity (DOC) for test levels.

## **EMI**

### **Electro Magnetic interference**

This interference in the operation of a device is caused by incompatibility with ambient signals. Common sources of EMI include transmitters and receivers (radio, TV, cell phone), power mains (lightning, surges, brownouts), appliances, computer oscillators, and electrostatics.

Many countries have established laws (such as FCC and CE) governing EMI source limits.

See also CE, FCC Class A, FCC Class B, EMC, and RFI.

## **C-Tick**

A trademark registered to the Australian Communications Authority, indicating compliance with the electromagnetic radiation emissions limits of Australia and New Zealand.

## **ENERGY STAR®**

A voluntary partnership between the U.S. Department of Energy, the U.S. Environmental Protection Agency, product manufacturers, local utilities, and retailers.

ENERGY STAR labelled products use less energy than other products. Partners help promote efficient products by labelling with the ENERGY STAR logo and educating consumers about the benefits of energy efficiency.