HS437 Residual Current Devices Guideline

Policy Hierarchy link	WHS Act 2011 WHS Regulation 2011 WHS Policy
Responsible Officer	Director, Human Resources
Contact Officer	Manager HS Unit: a.janssen@unsw.edu.au
Superseded Documents	Webpage on RCDs
File Number	TRIM 2004/2654
Associated Documents	HS418 Portable Electrical Equipment Inspection, Testing and Tagging Guideline

Version	Authorised by	Approval Date	Effective Date
1.0	Director, Human Resources	1/3/2013	1/3/2013

1. Introduction and Scope

This Guideline applies to all workplaces under the control of UNSW.

2. Definitions

Residual current device (RCD)
A mechanical switching device designed to make contacts for carrying and breaking currents under normal service conditions, and to cause the opening of the contacts when the residual current attains a given value under specified conditions. The **RCD** may be fixed or portable (**PRCD**).

RCDs are classified in AS/NZS 3190 according to their rated residual current as follows:

(a) Type I : ≤ 10 mA;
(b) Type II : > 10 mA ≤ 30 mA;

Hostile Environment
A hostile environment in this context is described as a workplace where the electrical equipment or flexible supply cord is, in its normal use, subject to operating conditions that are likely to result in damage to the equipment. This includes an operating environment that may: cause mechanical damage to the item of equipment, or expose the item equipment to moisture, heat, vibration, corrosive substances or dust".

3. Managing Electrical Safety Risks - General

Electrical accidents can be life threatening, so it is very important that all staff and students take care when using either power points or electrical equipment.

Specifically, everyone either using or inspecting power points or electrical equipment should:

- Report any damaged power cords or power points immediately and do not use equipment with damaged cords or damaged power points. Students should tell the nearest staff member about the electrical hazard.
- Staff members who notice an electrical hazard or to whom a student has reported the hazard, should immediately put a system in place to ensure nobody can use the equipment (e.g. taping off a powerpoint or removing equipment to a locked cupboard etc.). The hazard must them be reported on myUNSW and assigned to the most appropriate person for corrective action.
- A handwritten notice should be placed either or on or immediately adjacent to the equipment indicating the hazard has been reported, the date it was reported, by whom and a warning not to use the equipment.
- If you are doing any work that involves portable electrical equipment or power cords, please be aware of trip hazards. Make sure power cords do not run across pathways or ensure that they are run in cable ramps.
- Always use residual current devices (RCDs) with portable electrical equipment, including extension cables. This guideline provides more information on RCD protection. These devices will reduce the risk of electrocution if the equipment develops an electrical fault.

3.1 How do RCDs work?

The majority of electrical related fatalities could have been prevented by the use of a properly installed and maintained RCD (Residual Current Device). RCDs commonly referred to as "safety switches", are electrical safety devices designed to immediately switch off the supply of electricity when electricity leaking to earth is detected at harmful levels. RCDs offer high levels of personal protection from electric shock.

3.2 Legal Requirements for RCDs

Clause 164 of the WHS Regulation 2011 requires RCD protection for electrical equipment operating under “Hostile Operating Environments”.

From 1 January 2013, requirements for residual current devices (RCDs apply to workplaces where "plug in" electrical equipment (electrical equipment supplied with electricity through a socket outlet) is used in the following operating environments:

- electrical equipment is exposed to operating conditions that are likely to result in damage to the equipment (or a reduction in its expected life span) including conditions that involve exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust;
- electrical equipment is moved between different locations in circumstances where damage to the equipment or to a flexible electricity supply cord is reasonably likely;
- electrical equipment is frequently moved during its normal use;
- electrical equipment forms part of, or is used with, an amusement device.

If electricity is supplied through a socket outlet that does not exceed 20 amps, then the RCD must have a tripping current that does not exceed 30 milliamps. You may need to seek technical advice from a competent person about the kinds of RCDs that are appropriate for your workplace.

Note:

- **All new installations and modifications to pre-existing installations:** Non-portable (fixed) RCDs are required for all new installations and for modifications to pre-existing installations. Refer to AS/NZS 3000:2007 Clause 2.4: Fault protection & 2.6: Additional protection by RCDs. For exemptions refer to 2.6.3.1 and 2.6.3.4.

- **RCDs trip rating of 10mA or 30mA:** Only type I (10mA) or type II (30mA) RCDs are to be used and they must comply with:
  AS/NZS 3190:2011: Approval and test specification - Residual Current Devices (current operated earth-leakage devices).

3.3 Examples of hostile environments at UNSW for electrical safety

The following are examples of work environments within these categories at UNSW

Hostile Environment	Non Hostile Environment
Workshops Reaching and Research Laboratories Kitchen, kitchenettes, tea rooms Campus retail tenancies Toilets, amenities, shower areas General campus areas Student housing and field stations	Computer labs Teaching rooms Lecture theatres Computer rooms General offices

3.4 RCD - Facilities Management RCD roll out strategy

To meet RCD compliance, FM is currently rolling out an RCD upgrade strategy. The program has taken the following steps:

a. Risk analysis undertaken to identify hostile environments [Complete].
b. Identification of distribution boards servicing hostile areas but lacking RCDs [Complete].
c. Engineering level control upgrade by retro fitting of RCDs to necessary boards [Ongoing].

The program commenced mid 2012 and is expected to take ~ 3 years from start to completion.

3.5 Local area risk management – Portable RCD's

During the FM roll out program, local areas containing hostile environments within their operations are **still required to adequately control the risk of electrical shock**. This can be achieved through the normal electrical safety / maintenance program (refer to procedure HS418 Electrical Testing and Tagging Guideline). However in addition portable RCD protection is also required for portable electrical equipment used in hostile environments. Portable RCDs must be able to meet the technical requirements of the task at hand (i.e. nominal voltage, tripping current, switching current etc)**.** Local areas can check technical requirements by consulting the following:

- Standards and Codes of Practice listed in the reference section of this guideline;

- Contact the listed procurement supplier;
- Consult a licensed electrician.

3.5.1 How can I get assistance with this?

1. Contact FM Assist x5111 to find out whether the electrical supply board to your hostile environment is RCD-protected. If it is, no further action required.
2. Ensure that all your equipment is electrically tested and tagged.
3. Fit portable RCD protection on all electrical appliances in the hostile environment. Do this by purchasing a portable RCD, see the options below.....

Examples of non-portable (fixed) protection (i.e. Facilities responsibility)

Example of Non-portable (fixed) RCD that can be fitted to a switchboard
(Facilities responsibility)

Non-portable (fixed) SRCD incorporated within the powerpoint
(Facilities responsibility)

Examples of portable protection
(Local area responsibility after identifying equipment used in hostile environments – see section 3.6 and 3.7).

RCD attached to power cord

Plug in RCD

RCD protected portable outlet

3.6 What equipment needs RCD protection?

Depending on the type of appliance, installation and environment, RCD protection may be provided by either portable or fixed RCDs.

HAND HELD ELECTRICAL PLANT

- Power tools
- Hair dryers
- Electrical knives

ELECTRICAL PLANT WHICH IS MOVED DURING OPERATION

- Vacuum cleaners
- Floor polishers
- Extension cords/ Power boards
- Portable lighting

PLANT IS MOVED BETWEEN OPERATION WHERE DAMAGE TO PLANT OR THE SUPPLY CORD COULD OCCUR

- Electrical welders
- Portable bench saws
- Audio visual equipment
- Extension cords/ power boards

WHERE ELECTRICAL SAFETY COULD BE AFFECTED BY THE OPERATING ENVIRONMENT

- Appliances used in wet areas such as kettles and other kitchen appliances
- Any equipment is used in an environment where it is exposed moisture, heat, vibration, mechanical damage, corrosive chemicals or dust.

3.7 Equipment that does <u>not</u> need RCD protection

- Extra low voltage equipment (less than 50V Alternating Current);
- Equipment supplied by direct current systems (less than 120V ripple free Direct Current);

- Equipment supplied from an isolated winding from an unearthed generator that provides an equivalent level of protection;
- Equipment supplied from an isolating transformer that provides an equivalent level of protection;
- Specialised scientific equipment where the use of an RCD may compromise the operation of the equipment or safety of a patient. (However, steps should be taken to ensure a high level of safety is maintained such as a more frequent and extensive testing program).

3.8 Where can I purchase portable RCD protection devices?

The following UNSW preferred suppliers are available for stakeholders to purchase portable RCD's through, please check their website (http://www.jrt.com.au) for available options or contact the supplier directly:

(i) Supplier One (good for heavy duty applications)

John R Turk
Supplier ID: 0000029207
ABN: 59011009064
Status: Approved
Category : Stationary
Open for ordering: yes
Email: deptors@jrt.com.au
Order from: Kingsford Trade Sales, 297 Anzac Pde, Kingsford, NSW 2032, Aust
Pay to: PO Box 681, Paddington Qld 4064
http://www.jrt.com.au

Cost: $103.58/piece: *****Suitable for most lab / workshop operations, but check technical specifications to ensure compatibility with your requirements prior to purchase and use*****

Portable RCD example

	Code : **CLI485P4CB15/30EO** *Switching current 15.0 A* *Earth leakage switch with IFN 30 mA* *Nominal voltage 250.0 V*

To purchase please use the purchase order system via the UNSW NS financials site, you can also access further information via the following link: http://www.procurepoint.nsw.gov.au/contracts/c500

(ii) Supplier Two (not yet listed as a UNSW preferred supplier)

"Tag and Test supplies" (http://www.testandtagsupplies.com.au/zencart/) will give you the following options (highlighted):

Clipsal Bodyguard RCD 485 Protected Portable Power Outlet

Special - Limit 4 per customer
Overview
Portable power outlets with built-in residual current and overload protection. $132.00

PDL Portable RCD - In-line type 955

Description PDL Portable RCD (Residual Current Device).
This in-line RCD helps protect the user from risk of electrocution $119.90

PDL Portable RCD - Plug connector type 951

Description PDL Portable RCD (Residual Current Device). This plug-in RCD helps protect the user from risk of electrocution.

$31.90

PDL Portable RCD - Plug-top type 952

Description PDL Portable RCD (Residual Current Device). This plug-top RCD helps protect the user from risk of electrocution.

$31.90

Power Tech Plus Portable RCD - Plug connector type

Description Power Tech Plus Portable RCD (Residual Current Device). This plug-in RCD helps protect the user from risk of electrocution.

$31.90

3.9 Testing of RCDs

RCDs used in a workplace must be tested regularly by a competent person to ensure the devices are working effectively. A record of testing (other than daily testing) must be kept until the device is next tested or disposed of.

There are two types of test required for RCDs

- The manual push button (Trip) test
- The leakage to Earth (10mA or 30mA leakage) operating time test: using an electrically isolated RCD test instrument

The **manual push button (Trip) test** can be performed by the user to determine the RCDs tripping function and approximate tripping time.
The **Leakage to Earth operating time test** is usually performed by an electrician and measures how long the RCD takes to trip.

3.10 Recommended testing intervals for RCDs

Referenced from:
AS/NZS 3760:2010 In service safety inspection and testing of electrical equipment
and WorkCover Catalogue Number WC00301 Electrical Practices for construction work

Equipment type	Push button test	Operating test time
Equipment in hostile environments or where cord is subject to flexing	Portable RCD"s: every 3 months Non-portable RCDs: every 6 months	Portable RCD"s: every 12 months Non-portable (fixed) RCDs: every 12 months
Hire Equipment	Portable RCD"s: Push button test by hirer prior to hire and before each use. Non-portable (fixed) RCDs: Push button test by hirer prior to hire	Portable RCD"s:Operating time test by Hirer prior to hire and every 3 months Non-Portable (fixed) RCDs: Operating test time by hirer prior to hire and every 12 months
Repaired equipment	Test before re-introduction to service	Test before re-introduction to service
On construction/demolition sites	Portable RCD"s: before and after use each day Non-portable (fixed) RCDs: every month	Portable RCD"s: every 3 months Non-portable (fixed) RCDs: every 3 months

4. References

- National Code of Practice: Managing electrical risks at the workplace
  WorkCover RCD bulletin

The following standards may be accessed via the UNSW library:

- AS 3760:2010 Australian and New Zealand Wiring Rules – AS/ANZ 3000:2007
- AS/NZS 3760:2010. In-service safety inspection and testing of electrical equipment
- AS/NZS 3190:2011 Approval and test specification – Residual current devices (current-operated earth-leakage devices)
- AS/NZS 3000:2007 Electrical installations

Appendix A: History

The authorisation and amendment history for this document must be listed in the following table. Refer to information about Version Control on the Policy website.

Version	Authorised by	Approval Date	Effective Date	Sections modified
1.0	Director, Human Resources	1/3/2013	1/3/2013	This is a new guideline – previously information was available on our webpage.