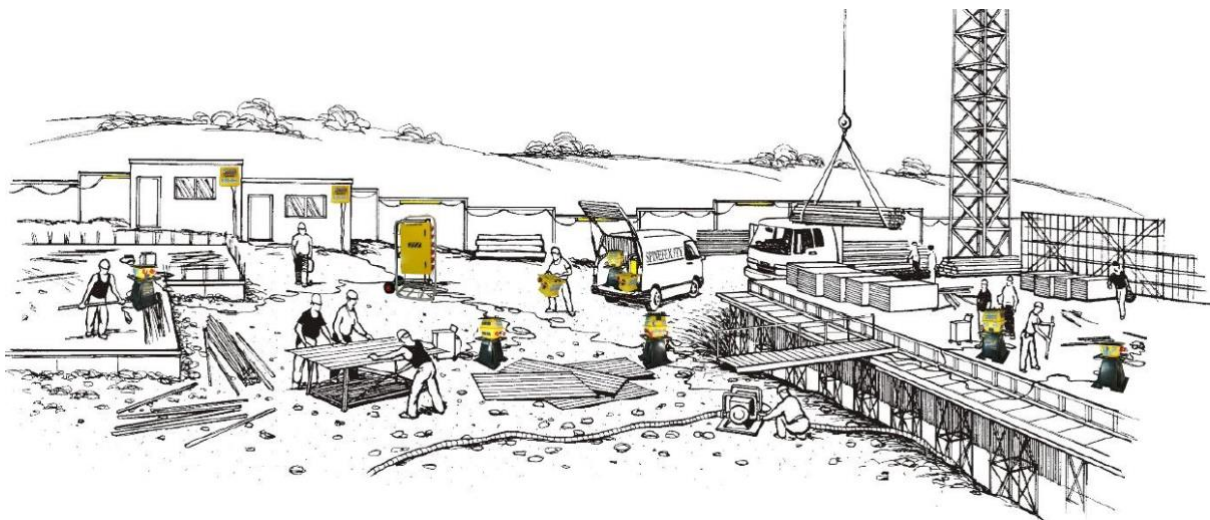


LIFEGUARD® ELECTRICAL SAFETY SYSTEMS MANUAL

ASSEMBLIES FOR CONSTRUCTION SITES (ACS)

For use on Construction and Demolition Sites and Special events



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INTRODUCTION

This manual is based on the requirements of AS/NZS3012 and its Appendix I. The objective of this Standard is to establish sound practices for the *safe use of temporary electrical services on construction and demolition sites and special events*. Compliance with this Standard will meet the requirements of the Electrical Regulations.

This manual is an additional guide and advice for use of Lifeguard® Electrical Safety Systems, ACS, (Assemblies for Construction Sites).

The numbering of the clauses in this Manual, correspond with the clauses in AS/NZS 3012.

STANDARDS

1.1 SCOPE

Lifeguard® Electrical Safety Systems (Lifeguard®)

The **Lifeguard®** ACS System was born of the need for a reusable, easily assembled, fully portable Power Distribution Equipment, delivering power supplies over a large area with maximum safety to the end user.

Lifeguard® fulfils these requirements with a system largely based on *AS/NZS 3012* and *AS/NZS 61439.4:2016*, it has been designed for 100% total recovery at the end of the job and ready for reinstallation on the next site.

Lifeguard® can be supplied from builder's temporary power supply, site permanent wiring, generator set and on some occasions, mains power from a power pole.

Lifeguard® are common place on most Australian construction sites, demolition sites, plant shutdowns and mining. **Lifeguard®** is used widely for special events of a short term nature, indoor or outside. School Fairs, Wine and Food Festivals and Exhibitions.

1.2 APPLICATION

The **Lifeguard®** system provides a cascadable arrangement of ACS, usually bright yellow enclosures that can be installed across the area requiring power outlet sockets for appliances, power tools, lighting, heating etc. (consumer sockets).

All the sockets outlets to provide an IP rating of at least 66.



Figure 1



Figure 2

Lifeguard® Residual Current Devices rated for Personnel Protection 30mA are used to protect all consumer final sub circuits and sockets ensuring the safety of all users. Identified by Green Inverted Triangle label. [Figure 1.]

Some **Lifeguard®** provide detachable connection and are interconnected by special yellow heavy duty Earth Screened Safety cable with a plug and a connector.

Interconnecting cables between **Lifeguard®** are classified as submains and have special installation requirements.

These **Lifeguard**® interconnecting cables are considered construction wiring and are marked with the wording 'LIFEGUARD® ELECTRICAL SAFETY SYSTEMS' to identify it from the permanent installation wiring.

The cascading supply inlet plug and outlet socket must be identified as NOT RCD PROTECTED, not suitable for power tools. Identified by red triangle label [Figure 2].

Provision can be made for Direct Connection of ACS as it is a requirement of some states Local Regulations.

Lifeguard® has been designed to the European ACS system which is now referred to in AS/NZS 3012 as AS/NZS 61439.4:2016

Lifeguard® equipment allows the distribution system to split into different directions or added to at will.

Lifeguard® utilizes single and three phase power supplied with neutral conductor to ensure maximum demand can be met - be it three phase or single phase applications. All systems have "built in" (MCB) power restriction to prevent the system being "overloaded" and creating unsafe situations.

Detachable installation involves the use of IEC 60309 (CEE Type) plugs and sockets. This type of plug and socket was originally cited in the Australian Wiring Regulations for Portable Switchboards and is now used by many major industries and is specified for Caravans and Marinas. This type of plug and socket is required when supplying power to "connectable installations" in Australia / NZ. The use of these plugs and connectors ensures the ease and correct assembly of the **Lifeguard**® System.

Provision can be made for direct connection of ACS as is a requirement of the Local Regulations.

Lifeguard® ACS, mobile and outgoing units, are now manufactured in high impact Polyethylene imparting excellent insulation properties.

Socket outlets are to customer's requirements with a minimum IP Rating 66.

Switchgear is mounted behind special lockable hinged windows giving IP 66 rating.

Note: Some regulatory jurisdictions require provision to be made on construction and demolition ACS supplying more than one final sub circuit, for the fitting of a lockable or sealable cover over circuit-breakers and RCDs associated with these circuits or other such devices that would control the resetting of circuit-breakers and RCDs, but does not prevent access to isolation switches.

Lifeguard® incorporates the requirements and safety demanded by the terms of the Occupational Safety and Health Regulations and fulfils the conditions specified by the Accident Compensation Commission.

Lifeguard® is built in accordance with AS3439-4, and the RCD have Australian Approval Numbers.

1.3 REFERENCED DOCUMENTS

Lifeguard® Electrical Safety Systems make good use of the following Standards:	
AS/NZS 3112	Approval and test specification – Plugs and socket outlets
AS/NZS 3123	Approval and test specification – Plugs, socket outlets and couplers
AS/NZS 3190	Approval and test specification – Residual current devices
AS/NZS 3760	In-service safety inspection and testing of electrical equipment
AS/NZS 3439.1	Low-voltage switchgear and control gear assemblies
AS/NZS3439.4	Particular requirements for assemblies for construction sites
AS/NZS61439.4:2016	Particular requirements for assemblies for construction sites
AS/NZS 5000	Electrical cables – Polymeric insulated
AS 60529	Rating of Ingress of Water or Solids
IEC 60309	Plugs, socket-outlets and couplers for industrial purposes.

1.4 DEFINITIONS

Lifeguard® Manual refers to AS/NZS 3012 section 1.4 for all definitions.
Also for the purposes of this manual:

ACS	A ssembly for C onstruction S ites, the term for an alternative site supply system (Lifeguard®) complying with AS/NZS61439.4:2016 and installed per AS/NZS3012 Appendix I
Appliance Inlet	The male connection fitting on a Lifeguard® for detachable installation of an interconnecting submain.
Cascade	Cascading allows ACS to be linked together using detachable cables, but only to and from the line side of the portable switchboards. This system uses sockets outlets, plugs, connectors and appliance inlets.
CBS cable	Copper Braided Screened cable manufactured in terms of AS/NZS 3191 and AS/NZS 5000. Please refer to Earth Screened Cable.
CEE Type	Plug and Socket system conforming to IEC 60309, CEE 17. Identified by larger diameter earth pin, (Fat Earth Pin). Usually branded ABL Sursum or Cekon.
Competent Person	A person, who the person in charge of the premises ensures, has acquired through training, qualification or experience, or a combination of these, the knowledge and skill enabling that person to perform the task required correctly, per AS/NZS 3012.
Connector	The female fitting on a cable.
Consumer Sockets	Those socket outlets on a Lifeguard® to which appliances, tools and leads would be attached in normal use. These single phase and three phase sockets are protected by RCD. (Green Triangle)
Detachable Connection	The connection of electrical equipment to a source of supply by means of a plug and socket system.
Direct Connection	The connection of electrical equipment directly to the source conductors by means of a terminal or stud or other such arrangement.

Distribution Cables	Those interconnecting cables between Lifeguard®, distributing power throughout the site. These cables are further defined as submains.
Earth Screened	The outer braided or spiral screen conductor on a Lifeguard® Supply Cable is used as the Earth conductor offering maximum safety in the event of damage. This cable is used as the primary distribution/interconnecting submains for the Lifeguard® ACS System. Cable complies with AS/NZS 5000 and the screen conductor shall be of sufficient size to ensure the required earth protection.
Hook-ups	Any temporary connection to electricity supply from fixed wiring installation or generator sets, other than by means of plugs and sockets, a common term used for Direct Connection. Installation must be done by a Registered Electrician with a current Practicing License.
IP	Rating of Ingress of Water or Solids per AS 60529 Standard. IP44 = Splash proof IP67 = Watertight
MCB	Miniature Circuit Breaker, current limiting device to AS/NZS 60898 or IEC 60898 Standard.
Plug	The male fitting on a cable.
Qualified Person	A qualified person for electrical installation work is a suitably licenced electrician.
RCD	Residual Current Devices to VDE 0664 Standard or AS/NZS 3190. Must not be rated greater than 30 mA for Personnel Protection.
Socket Outlet	Flanged or Surface fitting - the female fitting which is used as a source of power. Socket can be straight (square to mounting surface) or angled up to 25 off square.
Tagging	The fitting of Tag or Label to cable or Lifeguard showing compliance with Test requirements of AS/NZS 3760. Various colours available from Spinefex. “NO CURRENT TAG = NOT ON SITE.”
Trip	The action of the RCD Turning off under fault or Test.
TPL	Temporary Protected Lighting (Detachable)

2.1 SUPPLY

Installation shall be per the requirements of AS/NZS3000, AS/NZS 3012 and below as applicable.

- 2.1.1 Construction wiring shall be supplied from
(a) an electricity distributors main; or

- (b) an existing switchboard in the permanent installation of the site; or
- (c) a low voltage generator complying with the principles of AS2790 and installed in accordance with AS/NZS 3010
- (d) a dedicated socket outlet complete with overcurrent circuit breaker with a rating that matches that socket outlet.

2.1.4 Connection Devices (Socket Outlets)

All consumer socket outlets will comply with AS/NZS 3112, AS/NZS 3123 or IEC60309.
All distribution socket outlets will comply with IEC60309.

2.1.5 All single phase socket outlets shall be terminated so polarity complies with the requirements of AS/NZS3000

All Multiphase socket outlets shall have the same phase sequence to all socket outlets.

2.1.6(e) Separate circuits provided for supply to Transportable Structure - use Lifeguard® 15 Site Hut Daisy Chain System.

- 2.2 Each Lifeguard® ACS shall have an isolator at the same rating declared on the ACS.
Overcurrent protection of the ACS may be incorporated in the isolator or at a point in the supply circuit before the ACS. This overcurrent device shall not be rated higher than the declared rating of the subsequent ACS.

2.3 SWITCHBOARDS INSTALLED FOR THE PURPOSE OF CONSTRUCTION & DEMOLOTION

2.3.1 Location

Lifeguard® shall be located such that they will be protected from mechanical damage during the construction and demolition or event period.

Lifeguard® used at a special event shall not be installed in areas expected to be accessible to the public.

Lifeguard® shall be located so that there will be no requirement to run consumer extension leads from one level to another or across pedestrian or vehicle traffic ways. Cables protectors or ramps must be used when cables have to be run over traffic ways.

2.3.2 Switchboard Construction

Lifeguard® are constructed from robust GRP and Polyethylene to withstand mechanical damage.

Lifeguard® as standard are IP 66, suitable for use indoors or outside.

Lifeguard® are double insulated for maximum safety

2.3.2.1 Lifeguard® has provision for the anchorage of cables and cords to prevent strain on the various socket outlets.

Lifeguard® 16, 17 and 7 have serial numbers engraved on their bases.

2.3.2.2 Lifeguard® are ACS in terms of Appendix I of AS/NZS3012.

2.3.3 Mounting

Lifeguard® are free standing with their own base or stand - on Lifeguard 83, 17, and 16, provision is made for connection of a security chain and padlock (and bolting holes).

Lifeguard® Specification Sheets for Lifeguard® 83, Lifeguard® 17 and Lifeguard® 16 can be found in Appendix A.

2.4 CONTROL AND PROTECTION

- 2.4.1 Each Lifeguard® will have an MCB/isolator to match the rating of the Lifeguard®, which will isolate all outgoing circuits, consumer and distribution.
- 2.4.2 Lifeguard® are fitted with lockable windows covering the various RCD and circuit breakers.
Note; isolators should be accessible at all times.
- 2.4.5.1 Overload and Short Circuit protection of sub-mains shall be fuses, miniature circuit breakers, moulded case circuit breakers. All shall comply with the recognised AS or AS/NZS standard.
- 2.4.6.1 All final sub circuits to consumer sockets are protected by RCD rated at 30mA.
- 2.4.7 All flat pin single-phase sockets are controlled by double pole switches.
Flat pin sockets 10A, 15A and 20A have internal double pole auto switching mechanisms
Round pin 16A sockets are controlled by 2p RCBO or 2p MCB

2.5 CONSTRUCTION WIRING

Refer to AS/NZS 3012 for precise installation details.

- 2.5.1 **Lifeguard®** distribution cables shall be **earth screened safety cable** with the screen being the functional earth **complying with the requirements of AS/NZS 5000.1**
Lifeguard® 32A Distribution cables have 6.00mm conductors
Lifeguard® 63A Distribution Cables have 16.00mm phase and neutral conductors, with the Earth Screen being a 10.00 conductor.
Lifeguard® 125A Distribution Cables have 35.00mm phase and neutral conductors, with the Earth Screen being a 10.00 conductor.



Earth screened armoured wire



Lifeguard Distribution cable
c/w IEC309 Connectors

- 2.5.3 Cables must be installed such that they are not subject to mechanical damage.
This can be achieved by positioning in a location not frequented by traffic.
Cable may be protected by the addition of mechanical barriers or enclosure.
Cables may be suspended from insulated stands or suitable cable hooks.
Cables must be secured to prevent leverage and stress on the socket outlet or the appliance inlet it is connected to.

Driveway or access roads; where cables must cross these areas of traffic, cables should be installed in suitable ducting under the road surface. This ducting should be a minimum of 120mm diameter to allow 63A cable to be inserted without the need to remove a plug or connector.

Lifeguard® cables shall not be attached to freestanding fencing.

LIFEGUARD® DISTRIBUTION CABLES SHALL BE EARTH SCREENED SAFETY CABLE WITH THE SCREEN BEING THE FUNCTIONAL EARTH COMPLYING WITH THE REQUIREMENTS OF AS/NZS 5000.

Appendix I5.5. Overcurrent protection socket outlets for detachable sub-mains

All socket outlets used for the connection of detachable sub-mains shall be provided with overcurrent protection rated at equal to or less than the rating of the socket outlet.
RCD protection is not required on sub-mains.

2.6 ACCESSORIES

Lifeguard® 6.4 Portable Socket outlet assemblies, to AS/NZS 3190, type H CoA VO5583
Lifeguard® 6.6 Portable Socket outlet assemblies, to AS/NZS 3190, type H CoA VO5583
Lifeguard® 7 small portable switchboard (ACS), AS/NZS 3439.4, CS080837V
Lifeguard® 15.07 Site Hut Daisy Chain supply
Lifeguard® 15.72 cascading fluorescent lighting
Lifeguard® 15TSL Temporary Protected Lighting; 25m chain lights with 10 lamps
Lifeguard® 15.250 250w light stand
Lifeguard® 163 32A starter box for Lifeguard 16 ACS system
Lifeguard® 173 63A starter box for Lifeguard 17 ACS system
Lifeguard® Emergency Lighting
Lifeguard® Hire Equipment
Lifeguard® Floodlights

3.0 VERIFICATION (Inspection and Testing)

Lifeguard® shall be tested in terms of AS/NZS 3760
All Lifeguard® are supplied ex works complete with a Test Tag.
RCD Push button test each day while on site.
Time and current testing (RCD Tester) every three months and new tag issued.
Lifeguard® recommends that distribution cables be tested and tagged also every 3 months.
Periodic testing must be performed by a competent person.
Lifeguard® recommends that all Lifeguard® equipment be tested and tagged prior to installation on a new site.
DO NOT USE A MEGGER OR INSULATION TESTER ON RCD CIRCUITS.
LIFEGUARD® TESTING PERSONNEL LEAVE A SITE TEST CERTIFICATE AS WELL AS TAGS ON COMPLIANT EQUIPMENT.

ENSURE RECORDS ARE KEPT OF YOUR TESTING PROGRAMME.
IN THE EVENT OF A PROBLEM ON SITE, THE OPERATOR MUST BE ABLE TO DISPLAY THE OPERATION OF A SAFETY REGIME.

3.4.2 PERIODIC VERIFICATION - Testing on site

In-service safety inspection and testing of Lifeguard® electrical safety systems the following test procedure is based on Australian/New Zealand Standard AS/NZS 3760

Frequency:

All RCD	
Push Button Test	Every day in use
Performance Test	Every 3 months
All other components (e.g. Wall supply, cables etc)	Every 3 months (Recommended)

Should the equipment be re-sited within the above periods, all equipment must be retested and retagged prior to installation.

Should the equipment be hired, all equipment must be tested and tagged prior to installation. The terms of AS/NZS 3760 must then be applied to normal testing and tagging.

Testing personnel:

All testing and tagging shall be done by a competent person. Refer to definitions for competent person.

Test equipment required:

Cable Phase Rotation Tester	Part 103379; 63A 5p (Elektra) Part 98974 32 A 5p (Elektra) Available from Spinefex
Insulation Tester	Nominal measuring voltage 500 VDC
Multimeter	
R.C.D. Tester	Time and current testing or such equipment specially designed to perform these tests
Tagging	Compliant Equipment shall be tagged recording: a) The date the equipment was tested b) The date by which the equipment must be retested c) The registration number or name of person who conducted the test d) A reference to AS/NZS 3760

Non-Compliant equipment must have all test tags removed, and must be immediately removed from site for servicing!

“NO CURRENT TAG = NOT ON SITE”

INSPECTION

The following checks shall be made on all equipment:

- Check that the equipment is free from obvious external damage.
- Check visually for any damage or component defects in the accessories, connector, plugs or outlet sockets.
- Check that the inner cores of supply cables are not exposed and that the external sheaths are not cut, abraded or damaged in any way. Also, check that unprotected conductors or insulation tape are not in evidence.

- d) Visually check that supply cables are effectively anchored in plugs and connectors. Where cables are run vertically, check that they are supported at intervals not exceeding 3 metres. At the top of a vertical run, cables shall be anchored to prevent weight strain on connector or terminals.
- e) For portable outlet devices, check that the warning indicating the maximum load that may be connected to the device is intact and legible.
- f) Check that all portable R.C.D. equipment is clearly marked stating that R.C.D. must be tested daily.
- g) Check that mechanical safety and I.P. rating facilities and devices are in good working order.
- h) Check that protective devices accessible to the user are of the correct rating.
- i) Ensure R.C.D has suitable warning label “Do not use megger or insulation tester”
- j) Ensure cascade sockets have suitable warning labels “Isolate before connection or disconnection”
- k) Ensure cascade sockets have suitable warning labels “Sockets do not have R.C.D Protection - Do not use to supply hand tools” (Red Triangle).

LIFEGUARD MANUFACTURERS EXPLANATIONS AND RECOMMENDATIONS

IEC60309 Plugs socket and connectors:

Why the **RED** and **BLUE** Plugs and Sockets?

The immediately recognizable **RED** and **BLUE** plugs and sockets to IEC60309, are of a non-common consumer Standard which can be used for the Distribution wiring/submains. (ACS System). The **BLUE** circuits are protected by R.C.D. The **RED** cascade sockets are not protected by R.C.D.

BLUE and **RED** colour coding quickly identifies single phase from three phase.

This standard has been adopted by Lifeguard® to reticulate the primary site distribution from Lifeguard® to Lifeguard® (Cascade).

RED - This type of plug and socket is not normally used by the site consumer so it differentiates between the distribution wiring and the consumer/working sockets into which leads and tools may be plugged.

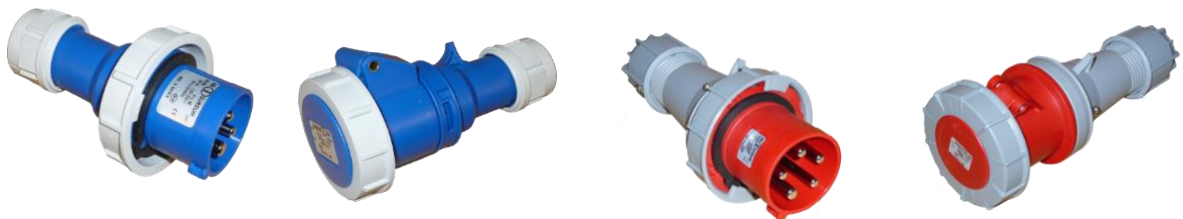
BLUE – This type of plug and socket are typically 16amp, are R.C.D protected, and are typically used for Lifeguard® Lighting Systems.

The ABL Sursum range of plugs and sockets have Nickel Plated contact pins.

IEC 60309 plugs and sockets are easily identified as those with the “Fat Earth Pin”, this ensures that the unit cannot be mismatched even if the keyway is damaged or broken off.

IEC 60309 offers the additional safety of a longer Earth contact tube which ensures “early make / late break” of the earth conductor.

Lifeguard® uses only IEC60309 plugs and sockets with 6 o'clock earth indicating 230V and 415V 50Hz.



Making off a plug or connector;

Should the cable Phase conductors have to be twisted around each other to go to their respective terminals, Try fitting the plug/connector to the other end of the cable. The conductor rotation should now be correct.

When terminating fine stranded cables to Plug, socket terminals - **ALWAYS** use Ferrules.

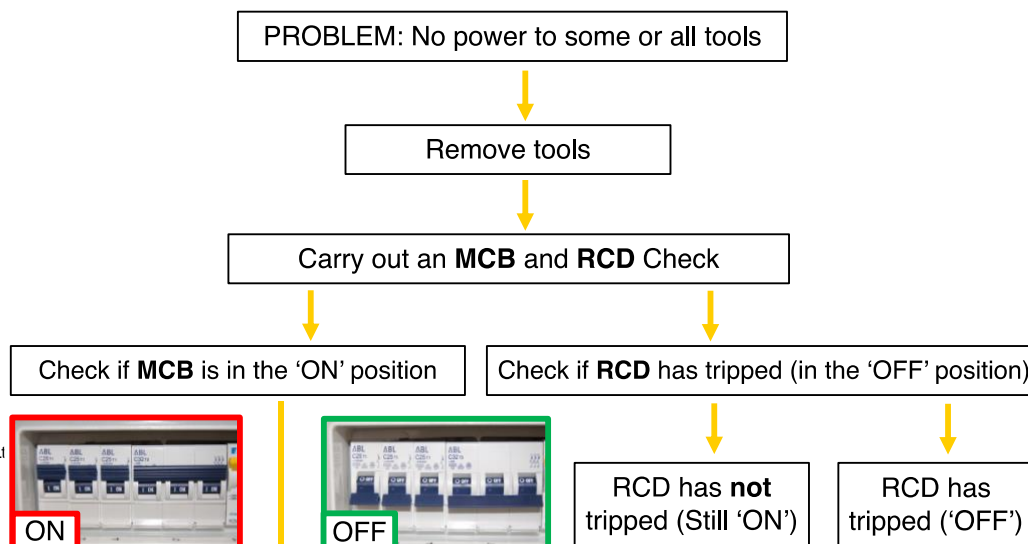
NO SOLDERING: Under no circumstances should conductor strands be soldered together prior to termination. Solder is too hard and may reduce conductor contact area, creating a soft joint generating extra heat, hot enough to melt out the solder.

Terminate one end of the lead, do not fit cover. Terminate other end and do not fit cover. Re-tighten terminal screws from first end and fit cover. Repeat second end.

TEST FOR POLARITY with Multimeter or proprietary test plug (Lifeguard® part 103379 or 98974).

FAULTS

Should a number of the Lifeguard® socket outlets lose power, please refer to the following table and steps:



NOTES FOR SITE PREPARATION (RISK ASSESSMENT)

- Refer to the following standards for additional information regarding site installations;
AS/NZS 3000 Australia/New Zealand Wiring Rules
AS/NZS 3001 Electrical Installations – Transportable Structures and Vehicles, site supplies
AS/NZS 3002 Electrical Installations – Shows and Carnivals
AS/NZS 3012 Electrical Installations – Construction and Demolition Sites
AS/NZS 3760 In-service Safety Inspection and Testing of Electrical Equipment
And Local State Electrical or Workcover Regulations.
- An assessment should be undertaken to establish the level of demand for electrical services at each level or stage of the project.
- These demands may then be equated with the above guides and suitably increased or decreased as evaluated, or such other methods deemed suitable. History and experience can be very valuable in this evaluation.
- A risk assessment should be undertaken as to the location of construction wiring and portable switchboards to ensure adequate protection from mechanical damage.
- A risk assessment should also be made of the environment, wet area, dust area, extreme temperatures and humidity, adjust equipment if required.
- Provision may have to be made for Cranes, Personnel hoists, site amenities and pumps or blowers.
- A risk assessment of work lighting and egress lighting should also be made to ensure the safety of staff at all times and compliance with the appropriate standards and regulations.
- Instructions should be given concerning the installation of Direct Connection and Detachable Connection switchboards (ACS) to ensure correct staff and regulations and standards are complied with.
- A person or department must be made responsible for the electrical installation on site and complete the necessary paperwork.
- A formal testing procedure and recording system must be created to be able to display an active safety regime should there be an event. An up to date Test and Tag system must be evident in terms of AS/NZS 3760 or compliance with the demands of the Site's Safety Instructions.

Thank you for purchasing from us – should you require any further assistance
please contact your Spinefex sales associate, or phone
1800 774 633.