



Office of **Energy**

Office of *ENERGY* WA

## *Electrical* **FOCUS**

### **Caravan Electrical Installations**

Regulation 49 of the Electricity (Licensing) Regulations 1991 requires that an electrical worker must carry out electrical work in accordance with certain standards.

This regulation calls up Sections 1 and 2 of AS 3001 "Electrical installations - Movable premises (including caravans) and their site installations". However, Section 3 which addresses caravan installations, is not referred to.

In the next revision of the Electricity (Licensing) Regulations 1991, it is proposed to amend Regulation 49 to include Section 3 of AS 3001.

In the meantime, the Director of Energy Safety, under Section 33AA of the Electricity Act 1945, has specified that electrical work carried out on moveable premises must comply with Section 3 of AS 3001.

### **Successful AS 3018 Workshop**

Standards Australia recently conducted a series of successful seminar/workshops on the introduction of the new Australian / New Zealand Standard, AS/NZS 3018:1997 "Electrical installations - Domestic installations".

The Standard provides simplified requirements and outlines approved methods for installing electrical equipment, including alterations and additions, in single domestic installations. An installation carried out in accordance with AS/NZS 3018 will be considered as complying with the requirements of AS 3000 (refer to Doc. 3000 R, Rulings to AS 3000-1991, Ruling No 7, published by Standards Australia on 5 July 1997).

Standards Australia has identified minor errors in the document as follows. These will be

addressed by Standards Australia shortly as formal amendments.

1. On pages 33 and 35, Figures 4.1 and 4.2, the label "FRIDGE FRIZZER" for the fridge/freezer circuits should read "FRIDGE FREEZER".
2. On page 36, Figure 4.3, there is an error in the diagram. A link appears in the circuit diagram between the two phase conductors on the line side of the two pole "MAIN SWITCH WATER HEATER (MOCB)". The link should be deleted from the diagram.
3. On page 46, Figure 5.2, the broken line between water tap and driven electrode should be labelled "BONDING CONDUCTOR ALTERNATIVE CONNECTION".
4. On page 62, Figure 7.1, the dimension of 2.5 metres with the wording "Ceiling height or 2.5 metres whichever is the lower" is drawn incorrectly. The top dimension line should be drawn at the top of the shaded area representing the ceiling, not as shown part way down the shaded area representing 1.8 metres above floor level.

#### **Important Note:**

Clause 3.3.5 of AS/NZS 3018:1997 states: "Where unprotected consumers mains are installed, it shall not be possible for unsheathed cables to contact exposed metal such as switchboard or meter enclosures or aerial supports". In such instances, where effective isolation can not be provided, the metal parts shall be earthed in accordance with Clause 5.3.2.4 of AS 3000-1991. Section 16.8.13 of WA Electrical Requirements provides guidance on the application of Clause 5.3.2.4 of AS 3000-1991.

Where sheathed cables provide effective double insulation, then earthing can be carried out in accordance with Section 5 of AS/NZS 3018:1997.

## Electrical Fatality

The Coroner recently held an inquest into the electrocution of an eight year old child.

The Coroner found that:

1. In the installation, the ribbed conductor of a 2-core parallel webbed aerial cable was originally utilised as the active conductor. As the installation was wired prior to the 1986 edition of AS 3000, there was no specific requirement as to which of the conductors had to be the active or neutral conductor.
2. The electrical installation was damaged during a storm in 1996. Repairs were carried out, including connecting the aerial conductors into the mains connection box, utilising the ribbed conductor as the neutral conductor, as required by Clause 3.2.6 of AS 3000-1991.
3. The supply authority carried out the required polarity checks and reconnected supply to the installation. In making the connection, the active supply conductor effectively energised the neutral conductor (and earthed parts) of the electrical installation.
4. The deceased made contact between the earthed bath and the energised parts of the plumbing near the bath.

The riders to the Coroner's report required electrical contractors to be informed that:

- a) two core insulated aerial conductors must be installed in accordance with Clause 3.2.6 of AS 3000-1991; and
- b) electrical contractors must verify, by testing and checking, that the electrical work carried out by them is safe and ready for connection to electricity supply.

## The Fundamentals of AS 3000 SAA Wiring Rules

There are many instances where the specific requirements of AS 3000 SAA Wiring Rules are unclear for a particular situation. For this reason we are often requested to interpret the Rules for individual installations.

Interpretations may be issued by the Office of Energy or published as formal rulings by Standards Australia.

Rulings are given after careful consideration by looking behind the specific requirements to

find the *intent* of a particular rule. The intent is often found by referring to the frequently overlooked section of the Wiring Rules titled "Fundamental Principles and General Requirements". This section describes the two main principles by which protection against the risk of electric shock and fire may be achieved. These are:

1. Protection against *direct* contact with live parts; and
2. Protection against *indirect* contact with live parts.

Protection against *direct* contact means preventing, or limiting the magnitude of, electric current passing through the body of a person. The method of providing this protection is by means of insulation, by the use of barriers or enclosures or obstacles, or by placing live parts out of reach.

Protection against *indirect* contact means providing appropriate safeguards against the dangers of a person coming into contact with exposed conductive parts which are not normally live, but may become live as a result of a fault. This protection can be provided by either preventing or limiting the magnitude of the current passing through a person in the event of such a fault occurring, or by arranging for the supply to be disconnected if a fault causes exposed parts to become live. The method of providing this protection is by the automatic disconnection of the supply (by "earthing" the conductive parts to induce a tripping current), by using double insulation or isolating transformers, by equipotential bonding or by suitable location of conductive parts.

As well as these two main principles, there are four other methods specified to assist in minimising the risk of electric shock and fire:

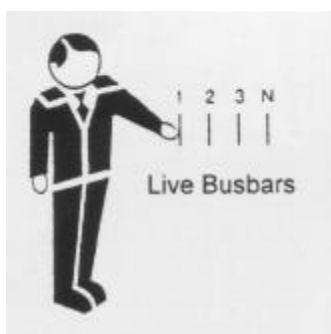
1. protection against overheating which may cause flammable materials to ignite or persons to be burnt;
2. protection against overcurrent which could cause damage through excessive temperatures or electromechanical stresses;
3. protection against the effects of prospective short circuit currents; and
4. protection against the effects of a fault between live parts which are supplied at different voltages.

The means of achieving these objectives are set down as specific rules in the document. This practice of combining the *intent* of providing protection against the risk of electric shock and fire with “deemed to comply” solutions in AS 3000 is about to change. The means of achieving the fundamental principals will not be restricted to one set of options. Providing that the objectives are met, the means of achieving them will be left to those who are responsible for designing or installing the electrical equipment. It may be necessary for the designer or installer to document the basis for claimed compliance with the fundamental principles.

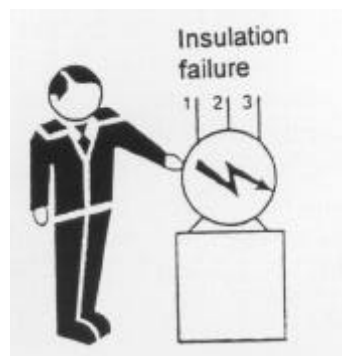
A handbook of “deemed to comply” solutions will be provided for those who choose to implement the conventional methods to achieve the objective. The recently published AS/NZS 3018:1997 “Electrical installations - Domestic installations” is such an example.

Whilst compliance with AS 3000-1991 is still required, many in the domestic installation business will find the new AS/NZS 3018:1997 an attractive alternative to simplify their operations. Those electrical installations which are carried out in accordance with AS/NZS 3018:1997 will be deemed to comply with AS 3000-1991.

The new direction of the AS 3000 SAA Wiring Rules is currently in the early stages of development and is expected to be completed and issued during 1999. Drafts of the new Wiring Rules are expected to be available for public comment in 1998.



**Direct contact** refers to a person coming into contact with a conductor which is live in normal circumstances.



**Indirect contact** refers to a person coming into contact with a conductive part which is not normally live, but has become live accidentally due to insulation failure or some other cause.

### ***In-Service Testing of Electrical Equipment***

Electrical equipment may become damaged or defective during its operational life. This is particularly the case for equipment in use in harsher environments such as construction and demolition sites, factories and workshops. This situation also applies to the hiring of equipment and may also be relevant to certain equipment in some commercial and office environments.

The Standard AS/NZS 3760:1996 “In-service safety inspection and testing of electrical equipment” specifies procedures for routine inspection and testing of electrical equipment in order to provide user safety while the equipment is in use in various environments.

The Standard was revised and republished as a joint Standard in March last year. With the increasing emphasis on occupational safety and health issues and the ongoing implementation of quality control procedures, the benefits that AS/NZS 3760:1996 can provide to users of electrical equipment is growing. The application of the Standard is expanding and with this, a number of issues have arisen. A review of these issues is shortly to commence which may result in a future amendment to the Standard.

Topics currently listed for review include:

- equipment with active electronics such as surge suppression devices;
- equipment with detachable components;
- environment classification;
- insulation testing of double insulated equipment; and
- information regarding safety principles, competent personnel and regulatory authorities.

Users and potential users of this Standard are invited to provide submissions at an early stage for the committee's consideration.

*For further information, please contact: Mike Johns, Standards Australia, telephone 02 9746 4755.*

## **Builder's Supplies for Residential Sites**

Western Power will accept the following builder's supply arrangements:

1. **Contractor owned temporary supply box** - where the meter is fitted and read by Western Power. This method is available for single and three phase supplies in overhead and underground reticulated areas. The supply may remain connected for an indefinite construction period and for use on a unit development site.

2. **Contractor owned and operated portable supply unit.** - available to contractors who use workers specifically trained and authorised by Western Power to carry out connection and disconnection of builder's supply units at underground connection pillars and to read meters. The temporary connection fee does not apply and accounts are set up on L1 Tariff in the name of the contractor. The connection may only be 63 amp single phase and applies only to single domestic sites in underground areas. The construction period should not exceed 20 weeks.

3. **Builder's supply in the permanent meter position** - only available for single domestic sites where the meter box is installed in the permanent meter position and is kept weatherproof for the entire period of construction. Western Power will make the permanent installation connection and fit and read the meter. The temporary connection fee does not apply and the account is set up in the name of the owner (or builder in the case of spec homes). This arrangement is NOT available for multiple unit developments.

In all cases, the installations must comply with AS 3000-1991.

*For further enquiries, please contact: Western Power's Superintendents, Electrical Inspections, Maurie Elvin, telephone 08 9240 0772 or John Illich, telephone 08 9359 9202.*

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### **PROSECUTIONS FOR BREACHES OF THE ELECTRICITY (LICENSING) REGULATIONS 1991 1 April 1997 to 30 June 1997**

<i>Breach</i>	<i>Name (and suburb of residence at time of offence)</i>	<i>Licence No.</i>	<i>Fine &amp; Court Costs (\$)</i>
<i>Unlicensed electrical work Regulation 19(1)</i>	<i>S Clamp (Gosnells)</i>	<i>EW125548</i>	<i>1230.00</i>
	<i>C Mason (Bicton)</i>	<i>NLH</i>	<i>528.00</i>
	<i>G Mason (Armadale)</i>	<i>NLH</i>	<i>520.00</i>
<i>Carried on business as an electrical contractor without a licence Regulation 33(1)</i>	<i>W Mak (Langford)</i>	<i>EW109808</i>	<i>680.00</i>
<i>Substandard electrical work Regulation 49(1)</i>	<i>B Davies (Manning)</i>	<i>EW104808</i>	<i>1000.00</i>
	<i>P Hoare (Leschenault)</i>	<i>EW104304</i>	<i>520.00</i>
	<i>S Nichols (Wanneroo)</i>	<i>EW122473</i>	<i>564.00</i>

**NLH** - No Licence Held