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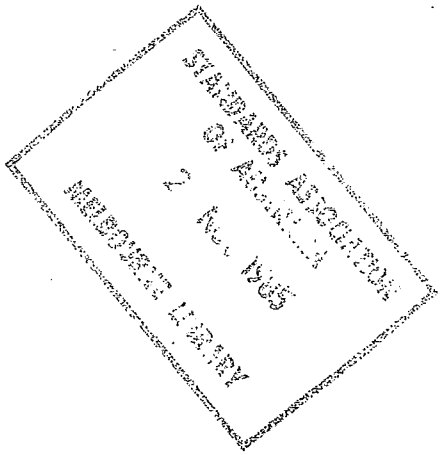
ELECTRICAL INSTALLATIONS—PATIENT TREATMENT AREAS OF HOSPITALS AND MEDICAL AND DENTAL PRACTICES



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The following interests are represented on Committee EL/18/7:

Association of Consulting Engineers, Australia
Australian Electrical and Electronic Manufacturers Association
Australian Federation for Medical and Biological Engineering
Australian Private Hospitals Association
Australian Society of Anaesthetists
Building Management Authority, W.A.
Confederation of Australian Industry
Department of Health
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AUSTRALIAN STANDARD

ELECTRICAL INSTALLATIONS—PATIENT TREATMENT AREAS OF HOSPITALS AND MEDICAL AND DENTAL PRACTICES

AS 3003—1985

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PREFACE

This edition of this standard was prepared by the Association's Committee on Wiring of Patient Treatment Areas, to supersede AS 3003—1976, Rules for Electrical Wiring and Equipment in Electromedical Treatment Areas. It specifies special requirements for electrical installations in those patient treatment areas of hospitals and other practices in which electromedical equipment is used for body-type procedures or for cardiac-type procedures. These requirements are additional to those specified in AS 3000, SAA Wiring Rules.

This edition differs from the 1976 edition in several aspects, as follows:

(a) The scope of the standard has been widened to include all medical facilities, i.e. hospitals and medical and dental practices, in which electromedical equipment is used for body-type procedures or cardiac-type procedures.

(b) Areas in which electromedical procedures are undertaken have been reclassified as body-protected electrical areas (formerly Class B areas) and cardiac-protected electrical areas (formerly Class A areas).

(c) The very strong recommendation for protection of supply wiring to areas other than cardiac-protected or body-protected electrical areas has been deleted.

(d) Requirements for body-protected electrical areas have been brought forward in the standard to discourage premature judgement by readers that the more complex and costly requirements for cardiac-protected electrical areas should always be specified.

(e) The requirements for body-protected electrical areas are less onerous and are intended to encourage the classification and protection of as many patient treatment areas as possible.

(f) The order of specifying requirements has been changed to reflect the priority of the general design and installation requirements.

(g) The need for providing body-protected electrical areas and cardiac-protected electrical areas, depending on a hospital's decision to elect to undertake cardiac-type procedures and the influence of equipment with isolated patient-circuits (Class B or Class A) is clarified and further discussed in a new appendix.

(h) The requirements for supply wiring protection and earthing of fixed, permanently wired electrical and electromedical equipment have been relaxed under certain conditions.

(j) The performance requirements for core balance earth leakage devices have been relocated in AS 3190, Approval and Test Specification for Current-operated (Core Balance) Earth-leakage Devices, and the performance requirements for line isolation monitors have been relocated in an appendix.

(k) The extent of the equipotential (EP) area has been reduced and now aligns with that described by IEC TC 62 as a patient environment.

(l) The requirements for earthing of structurally connected metallic fittings and permanently wired equipment in cardiac-protected electrical areas have been clarified.

(m) There is no minimum resistance specified for antistatic flooring in cardiac-protected electrical areas, because electrical protection is provided by the supply wiring protection specified herein and AS 1169, Minimizing of Combustion Hazards Arising from the Medical Use of Flammable Anaesthetic Agents, which specifies requirements appropriate for protection against explosions.

(n) The requirements for cardiac-protected electrical areas and body-protected electrical areas have been drafted as self-contained requirements as far as practicable. This has been done in response to requests to simplify the standard as far as is practicable and to minimize cross-references which previously necessitated continual interchange between Sections 2 and 3.

(o) Extensive check lists for commissioning tests of body-protected electrical areas and cardiac-protected electrical areas have been included in Appendix K.

It is noted that the above changes, which are generally relaxations of those specified in AS 3003—1976, are considered appropriate in light of—

(i) the advent of electromedical equipment with appropriately isolated patient-circuits (in accordance with AS 3200, Approval and Test Specification for Electromedical Equipment—General Requirements);

(ii) the development of codes of practice for safe use of electricity in patient care (as described in AS 2500, Guide to the Safe Use of Electricity in Patient Care); and

(iii) experience gained in the application of AS 3003—1976.

This standard encourages reference to AS 2500, Guide to the Safe Use of Electricity in Patient Care, and particularly the flow chart included therein to enable the level of electrical supply protection necessary to be determined by evaluating the type of procedures to be undertaken in a particular area and the type of equipment used. Treatment areas in which electromedical procedures are to be electively undertaken can then be identified and wired as body-protected electrical areas or cardiac-protected electrical areas to provide the necessary level of electrical shock protection in the mains supply wiring and, where appropriate, earthing systems.

The standard also encourages the earliest consultation between hospital management and the electrical design engineers, to jointly evaluate the elected procedures likely to be undertaken, in order to determine which areas of the hospital/medical practice should be wired as body-protected electrical areas or as cardiac-protected electrical areas. The standard also includes Appendices advising on methods for measuring magnetic fields and for avoiding interference therefrom (Appendices D and E).

The standard is intended to apply only to installations (or alterations or additions thereto) made or carried out after the date on which it comes into operation. However, it is strongly recommended that hospital managements carefully evaluate the procedures undertaken within existing installations, and that they take steps to implement the appropriate electrical safety requirements specified herein for areas which are used for cardiac-type procedures or for procedures involving the regular use of electromedical equipment.

While the standard is intended to apply to new installations or extensions, some guidance is given concerning conversion of older installations, e.g. where bonding of specified structurally connected items to the patient equipotential junction is not required if measured voltages do not exceed 100 mV.

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out the requirements for electrical installations in those patient treatment areas of hospitals and other medical and dental practices, in which the administration or practitioner has elected to undertake procedures which involve the use of electromedical equipment for procedures which may be classified as either body-type procedures or cardiac-type procedures (see Clause 1.4.1 and 1.4.3 respectively).

The requirements are applicable to the electrical installations, certain conductive items and mobile trolleys supporting electrical equipment in these areas.

Patient treatment areas other than body-protected electrical areas or cardiac-protected electrical areas are not covered by the standard, but the relevant requirements of AS 3000 apply to such areas.

NOTES:

1. If a hospital or medical practice has elected to undertake cardiac-type procedures, then appropriate cardiac-protected electrical areas must be provided.
2. The number and disposition of cardiac-protected electrical areas which should be provided will be dependent on the types of procedures which the hospital or medical practice has elected to undertake.
3. Hospitals and medical practices which may not propose to undertake cardiac-type procedures may, in the case of emergency, temporarily upgrade an area in accordance with the recommendations and limitations identified in AS 2500, to provide temporary electrical protection.
4. The increasing use and application of electromedical equipment in medicine and the range of electrical protection provided by such equipment, ranging from no isolation to full isolation, makes it difficult to determine which patient treatment areas will require cardiac-type or body-type electrical protective measures in the electrical installation. It is therefore recommended that, during any electrical installation in patient treatment areas—
   (a) close attention be given to the relevant requirements herein (earthing, subcircuit layout, etc) that will facilitate conversion of areas to either body-protected or cardiac-protected electrical areas;
   (b) attention be given to the recommendations of AS 2500 listing the electrical supply and equipment protective measures appropriate for particular medical procedures; and
   (c) consideration be given to core balance protection of other patient treatment areas where equipment to be used will be likely to be subjected to spilling or splashing of liquids (see Clause 2.1).
5. It is therefore important for hospital managements and the electrical design engineers to jointly evaluate the elected procedures likely to be undertaken and to determine which areas of the installation should be wired as body-protected electrical areas or as cardiac-protected electrical areas.

1.2 APPLICATION. Electrical installations in body-protected or cardiac-protected electrical areas shall be carried out in accordance with the appropriate requirements of AS 3000, and with the relevant additional requirements of this standard. The additional requirements include the following:

(a) *For body-protected and cardiac-protected electrical areas:*
   (i) Provision of protected power supplies.
   (ii) On isolated circuits, double-pole switching of plug sockets and permanently connected equipment.

(b) *For cardiac-protected electrical areas:*
   (i) Additional earthing requirements.
   (ii) Modified resistance of plug socket earthing contacts.
   (iii) Insulation of earthing connections.
   (iv) Particular requirements for the 'looping in' of earth conductors.
   (v) Requirements for extra-low voltage supplies.

This standard applies to those installations (or alterations or additions thereto) made or carried out after the date of publication of the standard. However, it is strongly recommended that hospital management carefully evaluate the procedures (see Clauses 1.4.1 and 1.4.3) electively undertaken within existing hospitals and take steps to implement the requirements specified herein for the appropriate class of area (see Clauses 1.4.2 and 1.4.4).

1.3 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1125	Conductors in Insulated Electric Cables and Flexible Cords
AS 1169	Minimizing of Combustion Hazards Arising from the Medical Use of Flammable Anaesthetic Agents
AS 1319	Safety Signs for the Occupational Environment
AS 2500	Guide to the Safe Use of Electricity in Patient Care
AS 3000	SAA Wiring Rules
AS 3008.1	Electrical Installations—Selection of Cables Part 1—Cables for Alternating Voltages up to and Including 0.6/1kW
AS 3100	Approval and Test Specification for Definitions and General Requirements for Electrical Materials and Equipment