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Australian Standard®
3009—1985

ELECTRICAL INSTALLATIONS—
EMERGENCY POWER SUPPLIES IN HOSPITALS

STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests are represented on Committee EL/18/12:

Association of Consulting Engineers, Australia

Australian Electrical and Electronic Manufacturers Association Limited

Australian Federation for Medical and Biological Engineering

Australian Hospitals Association

Australian Society of Anaesthetists

Building Management Authority, W.A.

Confederation of Australian Industry

Department of Health, Qld

Department of Public Works, N.S.W.

Department of Veterans' Affairs

Electrical Contractors Associations of Australia

Electricity Supply Association of Australia

Health Commission of Victoria

Health Department, W.A.

Institute of Hospital Engineers (Australia)

Institution of Biomedical Engineering (Aust.)

Royal Australasian College of Physicians

Royal Australasian College of Surgeons

Royal Australian Institute of Architects

Royal Australian Nursing Federation

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ELECTRICAL INSTALLATIONS—
EMERGENCY POWER SUPPLIES IN HOSPITALS

AS 3009—1985

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PREFACE

This standard was prepared by the Association's Committee on Emergency Power Supplies in Hospitals in response to requests from medical, hospital and engineering organizations which expressed concern that requests and designs of emergency power supply systems in hospitals were demanding either—

(a) needlessly complex and expensive supply systems; or

(b) systems which were inappropriate and inadequate to cater for the type of patient care likely to be undertaken in an individual hospital.

Interruption of normal electrical service in hospitals may be caused by catastrophes such as storms, floods, fires, earthquakes, or explosions or by failures of the systems supplying electrical power (including those resulting from system damage from traffic accidents), or by incidents within the hospital itself. Outages may be corrected in seconds or may require hours. For all such situations, electrical systems should be planned to limit internal disruption and to provide for continuity of vital services at all times.

Medical and nursing sciences are becoming progressively more dependent upon electrical apparatus for the preservation of life of hospitalized patients. For example, year by year, more cardiac operations are performed, in some of which the patient's life depends upon artificial circulation of the blood; in other patients, life is sustained by means of electrical impulses that stimulate and regulate heart action; in still others, suction developed by electrical means is routinely relied upon to remove body fluids and mucous that might otherwise cause suffocation. In another sense, lighting is needed in strategic areas in order that precise procedures may be carried out, and power is needed to safeguard such vital services as refrigerated stores held in tissue, bone, and blood banks. The maximum acceptable delays prior to restoration of supply varies as a function of the area in question and the nature of the procedures undertaken.

Selecting vital areas and functions considered to be essential, designing safeguards to assure continuity in these circuits, and maintaining the electrical and mechanical components of such essential services so that they will work when called on are complex problems that warrant standardized guidance for regulatory authorities, governing boards and administrators of hospitals and architects and engineers concerned with their construction. Such guidance is offered in this standard.

This standard is only concerned with ensuring that, in the event of interruption of the normal electrical supply, emergency lighting and power will be restored to those circuits deemed to be essential (vital or delayed vital) to ensure that effective and safe care of patients can be maintained.

The standard provides for a variety of forms of emergency power plant (e.g. batteries, static inverters, engine-driven generating sets) and for their automatic or manual operation.

Requirements for emergency evacuation lighting are primarily covered by reference to AS 2293, Emergency Evacuation Lighting in Buildings, Part 1—Installation Requirements, and in the Building Regulations. However, this standard includes some recommendations for location of emergency evacuation luminaires and exit signs for guidance of Regulatory Authorities and for those situations where relevant Building Regulations are not specified.

In the preparation of this standard, the committee was especially requested to review closely what equipment necessitated 'no break' supply. In this regard, investigations and comments from hospital staff revealed that very few circuits genuinely necessitate instantaneous re-energization through 'no break' systems. As a result, most 'essential' circuits within hospitals have been allocated 'vital' (30 s) or 'delayed vital' (2 min) classifications by this standard. These classifications provide for the use of more economical and practicable emergency power plant.

Investigations also revealed that specialist uninterruptable power supplies for sophisticated equipment, e.g. computers, are nearly always required to be 'tailored' to the specialist equipment they serve and are therefore usually 'extras' specified or provided by the equipment manufacturer. Accordingly, this standard does not include requirements for such special power supplies, the details of which should be negotiated with the equipment supplier.

Further investigations and responses to the draft circulated for public comment also caused the committee to not include natural gas as a permissible fuel for engine-driven generating sets. Comments against the use of gas included grave concern for the hazards of explosion, the lack of reliability of supply, and the comparative lack of

knowledge of equipment fuelled by natural gas. This matter, together with the question of fire ratings of cabling supplying fire isolated zones of hospitals will be reconsidered when this standard is next reviewed.

Requirements for wiring systems and cables providing a degree of protection against fire are listed in an Appendix to this first edition of this standard. It is anticipated that requirements for such wiring systems will be developed through committee EL/37 and published in AS ZZZZ, Classification of Wiring Systems*. At that time, the relevant requirements of this standard will be amended to cross-refer to AS ZZZZ.

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* In course of preparation.

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APPENDICES

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Australian Standard for ELECTRICAL INSTALLATIONS—EMERGENCY POWER SUPPLIES IN HOSPITALS

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out requirements for the design, installation and operation of emergency power supplies for standby power and lighting for hospitals. The standard applies to the design, installation, operation and maintenance of those portions of the hospital electrical system in which the failure of the supply from the normal supply authority would jeopardize the effective and safe care of its patients.

Requirements for the wiring of the electrical installation for the normal supply to hospitals are specified in AS 3000.

The standard does not cover the special requirements for uninterruptable power supplies for computer equipment. These special power supplies should be the subject of separate specification and negotiation with the equipment supplier.

NOTES:

1. Attention is drawn to the other standards specifying electrical wiring requirements not covered by this standard, viz AS 2293, Part 1; AS 2398; AS 2500; AS 3003; AS 2676; AS XXXX.1.
2. Attention is also drawn to other standards specifying the performance of normal lighting in hospitals and lighting for specialist applications, viz AS 1680; AS 1765; AS 2501; AS 2502.

1.2. PURPOSE. The purpose of this standard is to reduce the hazards which may arise from interruption of the normal power supply to a hospital or portion thereof.

The standard—

(a) specifies standby lighting and power requirements for those portions of hospitals where restoration of such supply is considered essential to patient care; and

(b) specifies that minimum emergency evacuation lighting must be installed in accordance with AS 2293, Part 1 in locations designated by the relevant Building Regulations (see also Appendix E).

The standard does not prescribe the type or size of hospital or patient-care area that requires emergency power supplies. Instead it identifies those medical treatment areas or functions of which the regular usage necessitates restoration of lighting and power considered essential to the continuing safe care of patients. This identification provides a basis for hospital administrators and designers to evaluate the need and type of standby power and lighting to be provided in a patient-care area.

1.3 APPLICATION. The requirements of this standard apply, where appropriate, to all new electrical installations in hospitals.

The requirements of this standard do not apply to those hospitals or portions of hospitals that are solely residential or custodial care facilities.

NOTE: The emergency evacuation lighting requirements for such institutions are specified in AS 2293, Part 1.

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

AS 1042	Direct-acting Indicating Electrical Measuring Instruments and Their Accessories
AS 1359	Rotating Electrical Machines—General Requirements (several parts)
AS 1501	Method for Rating and Testing Internal Combustion Engines
AS 1530	Methods for Fire Tests on Building Materials, Components and Structures Part 4—Fire-resistance Test of Structures
AS 1680	Code of Practice for Interior Lighting and the Visual Environment
AS 1765	Code of Practice for Artificial Lighting for Clinical Observation
AS 1981	Stationary Batteries of Lead-acid Pasted Plate Type
AS 2191	Stationary Batteries of the Lead-acid Plante Positive Plate Type
AS 2293	Emergency Evacuation Lighting in Buildings* Part 1—Installation Requirements
AS 2398	Fixed Diagnostic X-ray Equipment—Design, Construction and Installation—Safety Requirements
AS 2500	Guide to the Safe Use of Electricity in Patient Care
AS 2501	Surgical Luminaires
AS 2502	The Lighting of Operating Rooms
AS 2676	Installation and Maintenance of Batteries in Buildings
AS 2790	Electricity Generating Sets—Transportable (Up to 25 kW)
AS 3000	SAA Wiring Rules
AS 3003	Electrical Installations—Patient Treatment Areas of Hospitals and Medical and Dental Practices
AS 3126	Approval and Test Specification for Extra-low Voltage Transformers
AS 3200	Approval and Test Specification for Electromedical Equipment—General Requirements
AS ~~XXXX.1~~ 3010.1 ~~3006~~.	Electricity Supply by Generating Sets, Part 1—Engine-Driven Sets*
AS ZZZZ	Classification of Wiring Systems†
ISO 2314	Gas Turbines—Acceptance Tests‡

* In the course of preparation—see DR 83285.
† In the course of preparation.
‡ BS 3135 is identical