

AS/NZS 3000:2018



Australian/New Zealand Standard

Electrical installations

**Known as the Australian/New Zealand
Wiring Rules**

Superseding AS/NZS 3000:2007

AS/NZS 3000:2018



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Australian/New Zealand Standard

Electrical installations

**Known as the Australian/New Zealand
Wiring Rules**

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-001, Wiring Rules, to supersede AS/NZS 3000:2007, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*.

The development of this edition was based on—

- (a) new technology, new equipment and improved installation techniques;
- (b) industry feedback regarding readability and compliance;
- (c) identification and clarification of normative (mandatory) requirements and informative guidance material throughout the document; and
- (d) experience gained in the application of the previous edition as expressed to Standards Australia and Standards New Zealand.

This Standard may be applied through legislative requirements, as indicated in Clause 1.2. This Standard supersedes AS/NZS 3000:2007 from its date of publication. This may not be practicable in some cases, and a transition period, e.g. 6 months, may need to be arranged. For example, where work on an installation was commenced before publication of this edition, the relevant regulatory authority or electricity distributor should be consulted regarding permission for the installation to be completed in accordance with AS/NZS 3000:2007.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

See Foreword for information on how to interpret and use this Standard.

This Standard comprises two parts, as set out below, with both parts bound as one document.

Part 1 provides uniform essential elements that constitute the minimum regulatory requirements for a safe electrical installation.

Part 1 also provides an alternative regulatory vehicle for Australian and New Zealand regulators seeking to move from the present prescription of AS/NZS 3000 in electrical installation safety and licensing legislation.

Part 1 satisfies the following objectives:

- To allow its content to be called up in regulation as a separate Part or together with Part 2.
- To be generally complete in itself to avoid cross-referencing to Part 2.
- To provide high level safety performance outcomes/conditions without prescriptive work methods that demonstrate means of compliance (which are in Part 2).

- To establish an enforcement link to Part 2. Failure to comply with a work method in Part 2 would breach the requirements of Part 1 unless an alternative method is used.
- To establish the 'deemed to comply' status of Part 2, confirming that installations that comply with Part 2 comply with the requirements of Part 1.
- To maintain alignment with IEC 60364, *Low voltage electrical installations* (series), developments at the level of essential safety.
- To provide a mechanism for acceptance of alternative design and installation practices that are not addressed in, or are inconsistent with those given in the 'deemed to comply' Part 2. This mechanism is intended to apply where departures from the methods in Part 2 are significant rather than minor aspects that remain within the flexibility of Part 2.
- To detail requirements for designers or installers seeking to apply an alternative method to the 'deemed to comply' methods contained in Part 2.

Part 2 provides installation practices that are deemed to comply with the essential safety requirements of Part 1.

Part 2 satisfies the following objectives:

- To allow it to be called up in regulation, in addition to Part 1, to reflect a range of regulatory adoption options.
- To incorporate and elaborate on all requirements of Part 1 with additional requirements and recommendations to clarify and support compliance.
- To restore certain requirements, recommendations and examples of typical, effective compliant solutions from previous editions.
- To emphasize common, practicable and cost-effective methods that achieve safety compliance, fitness for purpose and a level of good practice rather than overly conservative or obscure measures.
- To make greater use of figures and examples to promote understanding of common or difficult aspects, e.g. line diagrams, alternative overcurrent device locations, ingress protection (IP) rating and switchboard access.

Changes in this edition

An asterisk (*) in the left margin against a clause, table or figure indicates where significant changes have been made in this edition of the Standard.

Changes to AS/NZS 3000:2007 include the following:

Section 1:

- 1 New and revised definitions are indicated in Clause 1.4 by an asterisk (*) in the left margin.
- 2 The definition of mains supply has been removed.
- 3 'Direct contact' and 'indirect contact' are now designated 'basic protection' and 'fault protection'.
- 4 IP ratings revised to suit local environmental conditions.
- 5 Requirements for conductors with green/yellow insulation are specified.
- 6 References to AS/NZS 3018 have been replaced with references to other Standards.
- 7 Requirements for alterations and repairs have been clarified and expanded.
- 8 New Part 1 solutions have been added along with details on where they may be used.

Section 2:

- 1 Operating characteristics of switchgear, control gear and switchboards have been added.
- 2 Origin requirements of sub-mains and final subcircuits have been added.
- 3 Requirements for main switch operations have been added.
- 4 Positions of overload protective devices have been clarified.
- 5 Requirements for alternate positions of short circuit protective devices have been updated.
- 6 Discrimination/selectivity of protective devices have been expanded.
- 7 Protection requirements for switchboard internal arcing faults have been enhanced.
- 8 Requirements for RCD protected circuits in domestic, non-domestic, non-residential and medical installations have been added, and RCD requirements for alterations and repairs clarified.
- 9 Illustration of basic clearances for switchboard access has been updated.
- 10 New clause on arc fault detection devices and their installation requirements has been added.

- 11 Requirements for switchboard installations at 800 A or greater have been enhanced, including access and egress, switchroom door sizes and minimum clearances around switchboards in switchrooms.
- 12 Further clarification has been provided regarding rising mains tee-offs.

Section 3:

- 1 Improved installation safety requirements for cables that pass through bulk thermal insulation.
- 2 Colour identification of active, neutral and earth conductors further clarified.
- 3 Requirements for wiring systems installed in positions where they are likely to be disturbed have been clarified.
- 4 Requirements have been clarified for cables of different electrical installations in common enclosures and for segregation of cables.
- 5 Requirements for segregation of cables of different voltage levels have been clarified.

Section 4:

- 1 Revised figures identify where IP rated equipment is to be installed.
- 2 The requirements for installation wiring connected via an installation coupler have been revised.
- 3 Electric vehicle socket-outlet requirements now included.
- 4 Requirements for lighting equipment and accessories have been revised.
- 5 Requirements for the safe installation of recessed luminaires have been enhanced, and an updated list of luminaire classifications added.
- 6 Requirements for cooking appliance switching devices clarified for improved safety outcomes.
- 7 Gas appliances and equipment isolation requirements clarified.
- 8 Further clarification of isolator requirements for airconditioning and heat pump systems.
- 9 A new clause and figures have been added relating to electrical equipment installed in locations requiring protection from the weather.
- 10 Installation and location requirements for socket-outlets for electric vehicle charging stations have been added.
- 11 Clearance requirements for socket-outlets and switches from open gas or electric cooking appliances have been added.
- 12 Requirements for isolating switches to be installed adjacent to all fixed wired water heaters have been added.

- 13 Requirements on hazardous areas presented by gas relief vent terminals have been added.
- 14 Requirements for airconditioners and heat pumps where the internal unit (or units) are supplied from a switchboard or circuit separate to that of the compressor, and new exceptions have been added.
- 15 Requirements for lifts installed for general use and that are not emergency lifts (safety services) have been added.

Section 5:

- 1 MEN system further defined for clarity.
- 2 MEN connection requirements have been added regarding location in an accessible position.
- 3 Acceptable earth electrodes types have been updated.
- 4 Earthing requirements for SELV and PELV systems have been updated.
- 5 Equipotential bonding requirements have been expanded and clarified through enhanced requirements for showers, bathrooms, pools and spas.
- 6 Earthing of conductive building materials in combined outbuildings.
- 7 Earthing requirements for individual outbuildings and combined outbuildings.
- 8 Earthing requirements for conductive switchboard enclosures associated with unprotected consumer mains.
- 9 Earthing of conductive reinforcing in combined outbuildings that contain showers or baths.
- 10 Conductive pool structures and the bonding connection point required to be installed and bonded to the installation earthing system regardless of other specified requirements.
- 11 Figure showing bonding arrangements for pools and spas has been added.
- 12 Requirements on conductive fixtures and fittings installed within arm's reach of the pool edge, and that are in contact with the general mass of earth, either directly or indirectly, have been added.

Section 6:

- 1 Additional content applying to water containers into which persons do not normally put a part or all of their body.
- 2 Installation requirements for deluge showers have been clarified.

- 3 Showers Zone 1 has been clarified for different shower head configurations.
- 4 Fixed water container size reduced from 45 L to 40 L.
- 5 A figure for showers with a hinged door has been included.
- 6 Specified capacity for spa pools or tubs has been increased from 500 L to 680 L.
- 7 Electricity generation systems, including inverters have been excluded from being installed in classified zones.
- 8 Clause excluding pools and spas from being located in areas containing electrical equipment owned by the electricity distributor, that result in such electrical equipment being incorporated into any classified zone.

Section 7:

- 1 Clause 7.2, Safety services, has been restructured.
- 2 Installation requirements for electricity generation systems have been reviewed and clarified in line with applicable Standards.
- 3 Electric vehicle charging system requirements have been added.
- 4 Clause 7.8, Standards for specific electrical installations, has been revised.

Section 8:

- 1 A number of clauses split into subclauses to differentiate between general, application, visual inspection, test requirements and accepted values.
- 2 Extra low voltage installation testing requirements have been relocated to Section 8 from Section 7.
- 3 Clarification of RCD testing and EFLI testing.
- 4 The date of initial energization is now required to be recorded at the installation switchboard.

Appendices:

- 1 Appendix A—Now a single list of referenced Standards.
- 2 Appendix B—Table from FAQ34 (voltage drop and EFLI values comparison) added for further guidance.
- 3 Appendix C—Expanded and the information provided on maximum demand has been clarified and updated.
- 4 Appendix D—Revised to provide more comprehensive guidance information for the construction of private aerial lines.

- 5 Appendix E—Updates incorporated and building classifications Class 1 and Class 10 have been added.
- 6 Appendix F—A recent update carried out by Committee EL-024 on protection against lightning.
- 7 Appendix K—Switchboard equipment summary has been added to provide a checklist of requirements for switchboards.
- 8 Appendix L—Appendix deleted. Formerly on first aid in Australia.
- 9 Appendix M—Formerly on first aid in New Zealand. This content was deleted and a new Appendix on reducing the impact of power supply outages has been added to provide guidance on continuity of supply and back up plans.
- 10 Appendix N—New Appendix to provide guidance on the types and variations of conduit available for electrical installations.
- 11 Appendix O—New Appendix to provide guidance on the installation of Arc Fault Detection Devices (AFDDs).
- 12 Appendix P—New Appendix to provide guidance for circuits intended to supply energy to electric vehicles.
- 13 Appendix Q—New Appendix to provide guidance for the selection of circuit protection and switching devices when being operated on a d.c. supply that would be deemed to meet the design, equipment selection and installation criteria of this Standard.

Standards Australia and Standards New Zealand thank the International Electrotechnical Commission (IEC) for permission to reproduce Figure B4 of IEC TR 61200-413:1996, *Electrical installation guide — Clause 413: Explanatory notes to measures of protection against indirect contact by automatic disconnection of supply*. Copyright of IEC, Geneva, Switzerland. All rights reserved.

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FOREWORD

Application of typefaces

Four different typefaces are used in this Standard. Each of these has a specific purpose as follows:

- (a) **Bold print** Indicates opening statements defining the fundamental principles and requirements.
- (b) Normal print In Sections 1 to 8, this indicates requirements that form the main part of a clause. It also indicates deemed to comply methods that satisfy the requirements. Normal print is used in the Appendices to present informative material for guidance only.
- (c) *Italic print* Indicates exceptions or variations to requirements. Exceptions generally give specific examples where the requirements do not apply or where they are varied for certain applications. They may contain requirements. Examples are also presented in italic text.
- (d) Reduced normal print Indicates Notes which give explanations and advice. They are preceded by 'NOTE' in the manner used in previous editions.

It is important not to read text in any single typeface without consulting the preceding or following paragraphs, which may contain additional or modifying requirements.

National requirements

Certain provisions of the Standard have a different application in Australia and New Zealand. The following symbols appearing in the outer margin indicate that the identified Section or Clause is:

- (i) Applicable in Australia only.

A

- (ii) Applicable in New Zealand only.

NZ

Informative appendices

An informative appendix is for information or guidance only. Informative appendices provide additional information intended to assist in the understanding or use of the Standard.

Deemed to comply

The term 'deemed to comply' means that a requirement can be met by following a specified Standard or method.

So, where an installation is carried out in accordance with the specified Standard or method, within the text of this Standard, the installation is 'deemed to comply' with the requirements of this Standard.

Conformance to a deemed to comply Standard may exceed the minimum requirements of this Standard.

Notes

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

Notes to text are informative and give explanations or advice. They do not form a mandatory part of this Standard.

Cross-references

Where reference to another clause has been made, such reference, unless otherwise stated, includes all appropriate subclauses and paragraphs of the clause or portion thereof referred to.

Frequently asked questions (FAQs)

Answers to FAQs can be found online at the following web address: <www.wiringrulesstandards.org.au>.

Clarifications to requirements of the Wiring Rules that were covered by Rulings and Interpretations in earlier editions will be included in FAQs as the need arises. These FAQs are applicable throughout Australia and New Zealand and are developed by the Joint Standards Australia/Standards New Zealand Committee EL-001, Wiring Rules.

Provision for revision

This Standard is not intended to discourage invention or to exclude materials, equipment and methods that may be developed. Revisions will be made from time to time in view of such developments and Amendments to this edition will be made where essential.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard

**Electrical installations (known as the Australian/New Zealand
Wiring Rules)**

Part 1: Scope, application and fundamental principles

SECTION 1 SCOPE, APPLICATION AND FUNDAMENTAL PRINCIPLES

1.1 SCOPE

This Standard sets out requirements for the design, construction and verification of electrical installations, including the selection and installation of electrical equipment forming part of such electrical installations.

These requirements are intended to protect persons, livestock, and property from electric shock, fire and physical injury hazards that may arise from an electrical installation that is used with reasonable care and with due regard to the intended purpose of the electrical installation.

- * In addition, guidance is provided so that the electrical installation will function correctly for the purpose intended and takes into account mitigating the foreseeable adverse effects of disruption to supply.

1.2 APPLICATION

This Standard may be applied through legislative requirements, made in each state and territory of Australia and in New Zealand, concerned with the safety of electrical installations. The Standard may also be applied in conjunction with any additional requirements, exemptions or restrictions in such legislation.

The principal application of this Standard is to electrical installations in all types of premises and land used by electricity consumers. However, the Standard may also be referenced or applied through legislative or other requirements relating to the effect of electrical installations in matters such as the following:

- (a) Safety of workplaces.

NOTE: For example, any relevant work health and safety legislation and associated codes.

- (b) Safe design and construction of buildings.

NOTE: For example, national building codes [such as the National Construction Code (NCC), New Zealand Building Code (NZBC)] and the associated referenced Standards. See Appendix E for information on NCC and NZBC.

- (c) Electricity generation, transmission and distribution systems.

- (d) Safe connection to electricity distribution systems.

NOTE: For example, service rules and conditions provided by local electricity distributors.

- (e) Qualifications of electricity workers.



AS/NZS 3000:2018 Electrical installations - Known as the Australian/New Zealand Wiring Rules

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