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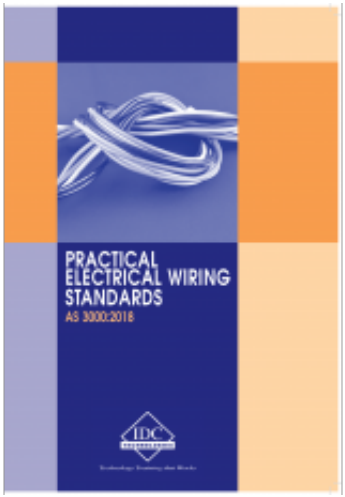
AW-E - Practical Electrical Wiring Standards - AS/NZS 3000:2018



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Short Description

This manual aims to familiarise readers with the requirements of standard AS/NZS 3000:2018

, commonly known as Australia-New Zealand Wiring Rules. For those installations covered in the scope of this standard, its provisions are mandatory and must be followed. Any engineer involved in planning and design of electrical systems, their installation or maintenance must have a clear idea about the various requirements contained in the standard.

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The introductory sections of this manual outline the basic principles that should be understood for a better appreciation of the standard. These include sections

which illustrate the calculation for the power demand of a system and the computation of earth fault current as discussed in the appendices of the standard, which are informative in nature but yet are very important in making an electrical system safe for operation. The actual provisions of the standard are then discussed in detail in the subsequent sections. Note: This manual is NOT the standard itself, it is a guide to the implementation of the standard.

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First Chapter
Introduction to AS/NZS 3000:2018

The latest edition of AS/NZS 3000 Wiring Rules was published in the year 2018. This standard, approved by the council of standards in Australia and New Zealand, defines the regulations to be adopted in selection, design and installation of Electrical distribution systems mainly falling under low voltage category. In this chapter we will go through the history of this standard and the objectives with which this standard had been framed along with a review on the needs and benefits of such regulations. The chapter also includes an overview on the scope of this standard with brief introduction to the various topics covered in the standard and how they are organized in the latest publication before going into a more detailed discussion on each of the sections and their importance in the subsequent chapters.
Learning objectives

- Objectives of the course
- Need for regulations
- Background and evolution of AS/NZS 3000
- Objectives of the AS/NZS 3000 regulations
- Scope of Wiring Rules
- General exclusions
- Other related standards and regulations
- Arrangement of AS/NZS 3000
- Objectives of the course

The objective of this course is to familiarize the participants with the Australian / New Zealand Wiring Rules (Fifth edition) published as Australia / New Zealand

standard AS/NZS 3000: 2018. This standard covers the requirements to be adopted for electrical installations of nominal voltages up to and including 1000V ac and 1500V dc. It contains stipulations covering issues of safety, selection, installation testing and verification of electrical equipment in common areas as well as in special locations. The topics contained in the standard are of interest and relevance to all practitioners of electrical technology whether they are designers of electrical installations, erection engineers or personnel responsible for operation and maintenance of the installations.

In order to appreciate the requirements and stipulations contained in the standard better, it is necessary to have a clear understanding of the fundamental principles that the standard aims to address. In preparing this manual an attempt has been made to give the reader an insight into the relevance of the stipulations of the standard by first touching upon the basics of the relevant aspects of electrical theory before going on to study the requirements contained in the standard. As such the chapters of this manual cover the following main objectives of this course.

- Review the basic electrical theory related to selection of equipment and circuit connections in low voltage systems and the importance of the regulations defining the rules for safe use of electrical equipment and systems
- Review the important and basic safety aspects related to electrical systems covering insulation, enclosure, earthing, etc.
- Review the various sections and requirements of AS/NZS:3000: 2018
- Areas of applications of these regulations in Electrical installation
- Understand the simple calculations for these systems related to conductor sizes, main and earthing conductor sizes, maximum demand, etc. to ensure safe design and reliable operation
- Review on the recommended checks and tests to be carried out in an electrical installation before energisation and also periodically to ensure its longevity.
- Need for rules and regulations

Today the rules and regulations have become necessary to ensure that the people in the society get fair deal in every aspect of their daily life. These can range from the basic need for food to specific needs related to the travel, dresses, etc. With electricity becoming an important commodity in the modern society it is necessary to ensure that it is used in a safe and reliable manner. The electrical system today comprises of power generation limited to specific locations in a country but its transmission, distribution and consumption being extended to all the parts and remote corners, in an extensive and elaborate

manner. Hence it is absolutely essential that the distribution systems and consumer equipments are designed and installed with features that would ensure safe consumption of electricity and also help regular maintenance, revamping, additions/ alterations, etc in a safe way. With due consideration for the same, regulations have been brought in to specify the kind of features essential for the safe use and also strictly enforced as rules to fulfill the following.

- To ensure uniform practices in the construction/ installation for enabling interchangeability for identical equipment when needed and also for avoiding interchangeability when not desired to meet the fundamental safety aspects.
- To ensure a stable source of supply and loads in the system for longevity in service of the equipment as well as for the electrical systems.
- To define the aspects that are to be considered in the design of the systems such as characteristics of available supply, nature of demand, emergency supplies for safety services, environmental considerations, conductors to be used, type of wiring, protective equipment, emergency control, isolation and switching, accessibility for operation etc in order achieve the earlier two.
- To ensure availability of correct and dependable electrical equipment to suit the voltage and frequency of the supply system followed in the country.
- To enable the designers in selecting correct and matching devices that shall be uniformly available in the market satisfying basic safety needs
- To make certain that the manufacturers, designers and installation contractors follow uniform regulations for the safety of people, properties and livestock coming in close contact with these systems in day to day life
- To support quality and reliability of installations and equipments for safe and continuous service.
- To ensure safety against shocks, and also against failures or damages due to thermal effects consequent to over current, fault current and over voltage.
- To aid equipment erection using good workmanship and proper materials, use of conductors with proper sizing and rating, proper jointing and connections at terminal points, installations in a manner not to cause temperatures in excess of the design temperatures and verification and testing of equipment periodically to avoid degradation.

We will illustrate few of these major objectives further.

1.2.1 Ease of Interfacing

Imagine for a moment, that there are no standards for electrical appliances. The

result would be that each product manufacturer might choose a different voltage rating for his product. It would mean that we will have electrical heaters, ovens, toasters etc. each of different voltage, different plugs, etc that cannot work on a common electrical system but would require tailor made system to serve their purpose. Your power supply company might have a distribution voltage that is unsuitable for any or all of your gadgets. This obviously is not helpful and not desirable.

Thus a standard has to be established and its adherence made mandatory within a national or geographical entity so that generation, transmission, distribution and utilization of electrical energy are done at stipulated voltages and frequency which will vary only within acceptable bands specified for each parameter.

Such a standard enables the designer of an appliance to choose a suitable voltage and frequency at which the appliance can function and also the variations of these parameters which have to be taken care of in the design for the operational range of the appliance. It also allows the designer to select appropriate conductors and configuration of power supply connectors forming part of the appliance.

In turn, this enables people to buy an off-the shelf appliance and connect it to the electrical outlet at home and use it without worrying too much about the suitability of the appliance for the electric supply provided by the power company. Anyone who has traveled with a device made in one country and tried to use in another where different standards prevail would certainly appreciate the convenience which uniform standards provide us with.

Also the use of standards reduces the number of variant appliance designs a manufacturer has to plan and manufacture; an issue which will have adverse cost implications to the manufacturer and hence to the buyer. Low cost mass production is thus a direct result of standards benefitting millions across the globe.

1.2.2 Ensuring Quality of supply, equipment and installation

Equipment and installations have to deliver functionalities for which they are designed without any undue hazards to the users or the environment for their entire design life under varying operating conditions. The provisions of a standard therefore define the parameters for functionality, safety and maintainability. They also contain stipulations that lay down the tests that the device has to withstand to either prove a design (by what are called Type tests conducted on prototypes or selected samples) or ensure that the output and quality parameters are met (by Routine Tests done on each piece manufactured). Thus when you buy an appliance or equipment that is declared as conforming to a particular standard,

you have an assurance that it will perform under conditions defined by the standard, is safe to use and will deliver the output or functionalities which the manufacturer furnishes in accordance with the standard for the period it is expected to serve.

An installation standard has a similar objective too. When an installation is carried out in accordance with a standard, it has to follow the methodologies stipulated in the standard using recommended accessories which, in turn will ensure that the installation achieves the intended quality minima, is safe for personnel and environment, and will have adequate provisions for maintainability. An installation standard also usually lays down the procedures for initial inspection and testing for certifying that the installation is fit to be put in service and the periodicity and detail of subsequent inspections and testing to ensure that it is fit to remain in service till the next scheduled inspection.

1.2.3 Ensuring safety

The regulations also specify some of the finer aspects related to the practices to be adopted right from basic design, during selection, installation and also tests/ verifications to be carried out periodically so that the people and livestock in close proximity to these systems are protected against various hazards commonly prevailing in such systems. The following are some of the main regulations defined in the standards and are expected to be followed by the system designers so that safety becomes part of the design, selection and installation when the systems are put into use.

- Regulations for protection against direct and indirect contacts that otherwise could lead to shocks
- Regulations for enclosure and equipment design features for protection against thermal effects, over current, fault current and over voltage that otherwise could lead to fire accidents or equipment failures.
- Methods to be followed for selection of electrical equipment with guidelines for properly sizing the conductors, providing emergency services, safe isolation and switching, accessibility, etc
- Erection methods to be followed to ensure minimum quality with consistent workmanship by use of proper materials, proper jointing and connections and methods to safeguard against high surface temperatures, etc
- Regulations and mandatory procedures for inspection and testing of equipment by competent personnel to ensure that the installed equipments meet some basic characteristics desired in the regulations and also are having provisions for taking out the failed equipments from service without impacting the healthy equipments.
- Background and evolution of AS/NZS 3000

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-001, represented by the following agencies/ authorities.

- Australian Building Codes Board
- Australian Energy Council
- Australian Industry Group
- Communications, Electrical and Plumbing Union - Electrical Division
- Consumer New Zealand
- Consumers Federation of Australia
- Electrical Contractors Association of New Zealand
- Electrical Regulatory Authorities Council
- Electrical Safety New Zealand
- Electrical Workers Registration Board
- ElectroComms & Energy Utilities Industries Skills Council
- Energy Efficiency & Conservation Authority of New Zealand
- Energy Networks Australia
- Engineers Australia
- Institute of Electrical Inspectors
- Master Electricians Australia
- National Electrical and Communications Association
- National Electrical Switchboard Manufacturers Association
- New Zealand Manufacturers and Exporters Association
- NSW Department of Industry, Skills and Regional Development
- Wellington Electrical Association
- WorkSafe New Zealand

The earlier 2000 edition superseded Australian standard AS 3000:1991, Electrical installations – Buildings, structures and premises (known as SAA Wiring Rules). In New Zealand the 2000 edition had superseded selected parts of NZS 3000:1997 Electrical installations – Buildings, structures and premises (known as the NZS Wiring Rules). The 2000 edition was further updated with Amendments No. 1 (September 2001), No. 2 (April 2002) and No. 3 (July 2003).

The development of the 2018 edition of the standard had been based on the following considerations by the council of standards.

  - new technology, new equipment and improved installation techniques;
  - industry feedback regarding readability and compliance;
- identification and clarification of normative (mandatory) requirements and informative guidance material throughout the document; and
- experience gained in the application of the previous edition as expressed

to Standards Australia and Standards New Zealand.

During preparation of this Standard, reference was made to IEC 60364, Electrical installations of buildings (all parts) and acknowledgment is made of the assistance received from this source. The 2007 edition had been published on 12 November 2007 after being approved on behalf of the Council of Standards Australia on 19 October 2007 and on behalf of the Council of Standards New Zealand on 9 November 2007. This Standard was superseded by AS/NZS 3000: 2010 from its date of publication. The edition was improved with additional diagrammatic representation of concepts and by including more practical examples adopted in the user installations as desired by the industry. The edition is divided into two parts with Part 1 (Section-1) covering Scope, application and fundamental principles of safe electricity use and is generally made complete in itself without cross-referencing to Part 2. The edition also establishes the 'deemed to comply' status of AS/NZS 3018 relating to simple domestic applications.

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.
(ii) Applicable in New Zealand only.

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.

Objectives of AS/NZS 3000

The main objective of regulations for electrical installations in any country is to provide the rules for the design and erection of electrical installations for safety and proper functioning. It is also necessary that when use of a new material or invention in an installation results in deviation from one or more stipulations already prevailing in the regulations, the degree of safety shall not get compromised by such deviation. The fact of such use shall also be recorded on the electrical installation certificate as reference for anyone who is concerned with the safe functioning of the installation. Keeping these basic objectives and to enable ease of understanding of the regulations, the AS/NZS 3000 Wiring rules standard is divided into two main parts – Part 1 and Part 2.

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.
-
- **Scope of AS/NZS 3000 Wiring Rules**

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.

Changes to AS/NZS 3000:2018 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 has 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:

- MEN system further defined for clarity.
- MEN connection requirements have been added regarding location in an accessible position.
- Acceptable earth electrodes types have been updated.
- Earthing requirements for SELV and PELV systems have been updated.

- Equipotential bonding requirements have been expanded and clarified through enhanced requirements for showers, bathrooms, pools and spas.
- Earthing of conductive building materials in combined outbuildings.
- Earthing requirements for individual outbuildings and combined outbuildings.
- Earthing requirements for conductive switchboard enclosures associated with unprotected consumer mains.
- Earthing of conductive reinforcing in combined outbuildings that contain showers or baths.
- Conductive pool structures and the bonding connection point required to be installed and bonded to the installation earthing system regardless of other specified requirements.
- Figure showing bonding arrangements for pools and spas has been added.
- 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:

- Additional content applying to water containers into which persons do not normally put a part or all of their body.
- Installation requirements for deluge showers have been clarified.
- Showers Zone 1 has been clarified for different shower head configurations.
- Fixed water container size reduced from 45 L to 40 L.
- A figure for showers with a hinged door has been included.
- Specified capacity for spa pools or tubs has been increased from 500 L to 680 L.
- Electricity generation systems, including inverters have been excluded from being installed in classified zones.
- 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:

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

revised.

Section 8:

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

Appendices:

- Appendix A—Now a single list of referenced Standards.
- Appendix B—Table from FAQ34 (voltage drop and EFLI values comparison) added for further guidance.
- Appendix C—Expanded and the information provided on maximum demand has been clarified and updated.
- Appendix D—Revised to provide more comprehensive guidance information for the construction of private aerial lines.
- Appendix E—Updates incorporated and building classifications Class 1 and Class 10 have been added.
- Appendix F—A recent update carried out by Committee EL-024 on protection against lightning.
- Appendix K—Switchboard equipment summary has been added to provide a checklist of requirements for switchboards.
- Appendix L—Appendix deleted. Formerly on first aid in Australia.
- 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.
- Appendix N—New Appendix to provide guidance on the types and variations of conduit available for electrical installations.
- Appendix O—New Appendix to provide guidance on the installation of Arc Fault Detection Devices (AFDDs).
- Appendix P—New Appendix to provide guidance for circuits intended to supply energy to electric vehicles.
- 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.
- General exceptions and exclusions

Italic print in the Code 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. As applicable in any country, the wiring rules does NOT cover the requirements for design/manufacture of electrical equipment but limits itself to their selection and application in electrical installations.

- Other related regulations and standards

Appendix A of the standard provides detailed list of other regulations and standards that are referenced in the rules. Table 1.1 tries to identify some of the important standards that are to be additionally reviewed by the practitioners to ensure compliance with the stipulations in AS/NZS 3000.

Table 1.1
Partial list of standards/ regulations referred in AS/NZS 3000

Standard	Title
AS 2067	Switchgear assemblies and ancillary equipment for alternating voltages above 1 kV
AS 60269	Low-voltage fuses
AS 60947	Low-voltage switchgear and controlgear
AS 60947.2	Part 2: Circuit-breakers
AS 60947.4.1	Part 4.1: Contactors and motor-starters—Electro mechanical contactors and motor-starters
AS 60947.8	Part 8: Control units for built-in thermal protection (PTC) for rotating electrical machines
AS/NZS 2430	Classification of hazardous areas
AS/NZS 3008	Electrical installations—Selection of cables—Cables for alternating voltages up to and including 0.6/1 kV
AS/NZS 3008.1.1	Part 1.1: Typical Australian installation conditions
AS/NZS 3439	Low-voltage switchgear and controlgear assemblies
AS/NZS 3439.1	Part 1: Type-tested and partially type-tested assemblies

AS/NZS 3439.2	Part 2: Particular requirements for busbar trunking systems (busways)
AS/NZS 3439.5	Part 5: Particular requirements for assemblies intended to be installed outdoors in public places—Cable distribution cabinets (CDCs) for power distribution in networks
AS/NZS 3820	Essential safety requirements for low voltage electrical equipment
AS/NZS 5000	Electric cables—Polymeric insulated
AS/NZS 5000.1	Part 1: Electric Polymeric insulated cables for working voltages up to and including 0.6/1 (1.2) kV
AS/NZS 5000.2	Part 2: Electric Polymeric insulated cables for working voltages up to and including 450/750 V
AS/NZS 61009	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)
ABCA and NZBC	Building Code of Australia (ABCA) and the New Zealand Building Code (NZBC)

A number of other standards covering fire protection systems, storage battery systems, hoists, elevators, etc are also listed for further reference and guidance, which are not covered in this table.

- Summary

The regulations are needed to ensure uniform practices adopted in all equipment and installation practices for safety and reliability of the installations. AS/NZS 3000 standard covers regulations to be followed for design, selection and installation of LV electrical systems of common and special premises in Australia and New Zealand. The 2018 year edition had been updated with many illustrations and worked out examples compared to the earlier edition based on the feedback from industry and the end users. The standard is divided into two parts. Part-1 of the standard provides basic compliance requirements to be met in the design, selection and installation of the systems with an objective to achieve high level of safety in the systems without referencing part-2. The second part is divided into a number of sections and outlines guidelines and procedures to be adopted by the designers and installation contractors for achieving the high level safety objectives of part-1 in specific application areas.

This book is not intended to replace the AS/NZS Wiring Rules as a work of reference but is merely an introduction to it. As all of us are aware, the standards are dynamic in nature in the manner that they continuously undergo amendments and revisions to match the pace of the growth in the technology. In case further information is required it is recommended that the participants shall directly refer the standard as well as other references such as the reference documents identified in appendix A of the standard. A lot of published literature is available on these topics by industry bodies and reputed manufacturers of electrical equipment as well as on the Internet and can be referred for assistance in solving specific problems one may come across.