

**AS/NZS 3000:2018**

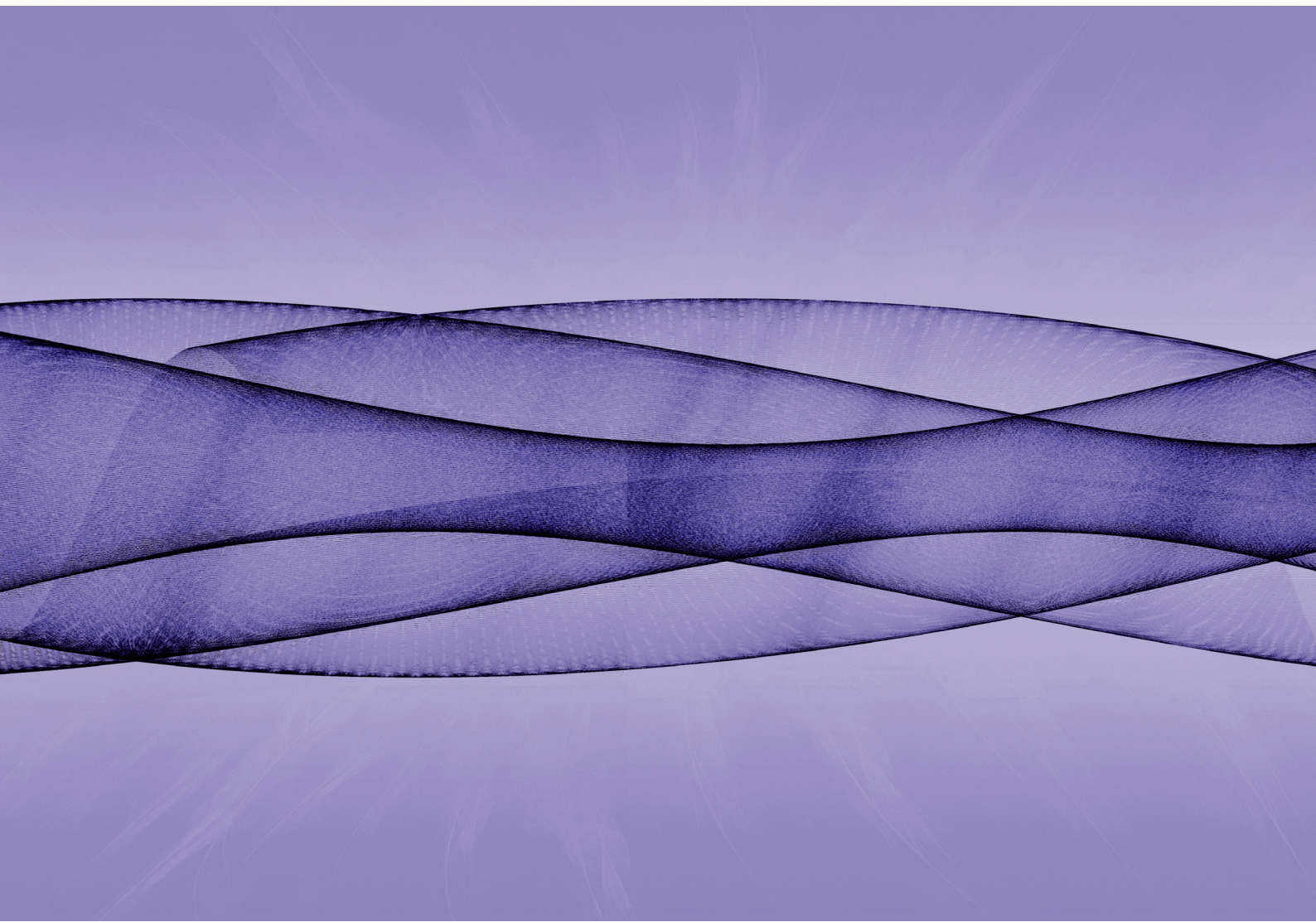
(Incorporating Amendment Nos 1, 2, 3 and Ruling 1)

# Electrical installations “Wiring Rules”



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# Wiring Rules

## **AS/NZS 3000:2018**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-001, Wiring Rules. It was approved on behalf of the Council of Standards Australia on 5 June 2018 and by the New Zealand Standards Approval Board on 3 April 2018.  
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The following are represented on Committee EL-001:

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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  
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For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of Standards Australia or the New Zealand Standards Executive at the address shown on the back cover.

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*This Standard was issued in draft form for comment as DR AS/NZS 3000:2016.*

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## Australian/New Zealand Standard™

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

Originated as part of AS CC1—1931.  
Previous edition AS/NZS 3000:2007.

Sixth edition 2018.

Reissued incorporating Amendment No. 1 (January 2020).

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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)*.

*This Standard incorporates Amendment No. 1 (January 2020), Amendment No. 2 (April 2021) and Amendment No. 3 (June 2023). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected. This Standard also includes Ruling 1 (2024), which has been included at the end of the main text.*

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.

A2

Amendment No. 2 includes text in Clause 2.6.2.2.2 that has transitional implementation arrangements. Users of this document should consult with regulatory authorities to confirm the implementation dates of these requirements.

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.

- A1 | 11 Clearance requirements for socket-outlets and switches from open gas or electric cooking appliances have been added.
- A1 | 12 Requirements for isolating switches to be installed adjacent to all fixed wired water heaters have been added. Application of Clause 4.8 has been clarified.
- 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.
- A1 | 16 A warning about possible adverse effects of air extract systems has 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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## CONTENTS

	<i>Page</i>
PREFACE.....	2
FOREWORD .....	30
<b>Part 1: Scope, application and fundamental principles</b>	
SECTION 1 SCOPE, APPLICATION AND FUNDAMENTAL PRINCIPLES ...	33
1.1 SCOPE.....	33
1.2 APPLICATION .....	33
1.3 REFERENCED DOCUMENTS.....	34
1.4 DEFINITIONS.....	34
1.5 FUNDAMENTAL PRINCIPLES .....	54
1.5.1 Protection against dangers and damage .....	54
1.5.2 Control and isolation .....	55
1.5.3 Protection against electric shock.....	55
1.5.4 Basic protection .....	56
1.5.5 Fault protection .....	59
1.5.6 Additional protection by the use of RCDs .....	62
1.5.7 Basic and fault protection by use of extra-low voltage .....	63
1.5.8 Protection against thermal effects in normal service.....	63
1.5.9 Protection against overcurrent .....	64
1.5.10 Protection against earth fault currents.....	64
1.5.11 Protection against abnormal voltages.....	64
1.5.12 Protection against the spread of fire.....	66
1.5.13 Protection against injury from mechanical movement.....	66
1.5.14 Protection against external influences.....	66
1.6 DESIGN OF AN ELECTRICAL INSTALLATION.....	67
1.6.1 General.....	67
1.6.2 Supply characteristics .....	67
1.6.3 Maximum demand .....	67
1.6.4 Utilization voltage.....	68
1.6.5 Electrical installation circuit arrangement .....	68
1.7 SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT .....	68
1.7.1 General.....	68
1.7.2 Installation work practice.....	68
1.7.3 Equipment selection.....	69
1.7.4 Damp situations .....	70
1.8 VERIFICATION (INSPECTION AND TESTING).....	70
1.9 MEANS OF COMPLIANCE.....	71
1.9.1 Compliance with Part 2 of this Standard.....	71

	<i>Page</i>
1.9.2 Compliance with the requirements of other standards .....	71
1.9.3 Alterations and repairs .....	71
1.9.4 Compliance by specific design and installation.....	71

## **Part 2: Installation practices—Sections 2 to 8**

SECTION 2 GENERAL ARRANGEMENT, CONTROL AND PROTECTION..	75
2.1 GENERAL.....	75
2.1.1 Application .....	75
2.1.2 Selection and installation .....	75
2.2 ARRANGEMENT OF ELECTRICAL INSTALLATION .....	75
2.2.1 Circuits.....	75
2.2.2 Maximum demand .....	77
2.2.3 Selection and installation of conductors .....	78
2.2.4 Operating characteristics of equipment .....	78
2.3 CONTROL OF ELECTRICAL INSTALLATION .....	79
2.3.1 General.....	79
2.3.2 Common control requirements .....	80
2.3.3 Main switches .....	83
2.3.4 Additional isolating switches .....	86
2.3.5 Emergency switching including emergency stopping.....	88
2.3.6 Shutting down for mechanical maintenance .....	90
2.3.7 Functional (control) switching.....	91
2.4 FAULT PROTECTION .....	92
2.4.1 General.....	92
2.4.2 Protection by automatic disconnection of supply .....	92
2.4.3 Types of devices .....	93
2.4.4 Auto-reclose devices.....	93
2.5 PROTECTION AGAINST OVERCURRENT .....	93
2.5.1 General.....	93
2.5.2 Devices for protection against both overload and short-circuit currents .....	96
2.5.3 Protection against overload current.....	97
2.5.4 Protection against short-circuit current .....	99
2.5.5 Protection against switchboard internal arcing fault currents .....	108
2.5.6 Coordination of overload and short-circuit protective devices .....	111
2.5.7 Reliability of supply .....	112
2.6 ADDITIONAL PROTECTION BY RESIDUAL CURRENT DEVICES .....	119
2.6.1 General.....	119
2.6.2 Selection and arrangement of devices .....	120
2.6.3 Additional protection by residual current devices.....	123
2.7 PROTECTION AGAINST OVERVOLTAGE.....	131
2.7.1 General.....	131
2.7.2 Protection by insulation or separation .....	131

	<i>Page</i>
2.7.3 Protection by protective devices.....	132
2.8 PROTECTION AGAINST UNDERVOLTAGE .....	132
2.8.1 General.....	132
2.8.2 Selection of protective device.....	133
2.9 PROTECTION AGAINST FIRE HAZARD DUE TO ARCING FAULTS... ..	133
2.9.1 General.....	133
2.9.2 Type .....	133
2.9.3 Rating .....	134
2.9.4 Arrangement .....	134
2.9.5 Alterations.....	134
2.9.6 Final subcircuits in Australia.....	134
2.9.7 Final subcircuits in New Zealand.....	134
2.10 SWITCHBOARDS .....	134
2.10.1 General.....	134
2.10.2 Location of switchboards.....	135
2.10.3 Construction.....	143
2.10.4 Bars .....	145
2.10.5 Equipment identification .....	147
2.10.6 Wiring .....	148
2.10.7 Fire-protective measures .....	148
SECTION 3 SELECTION AND INSTALLATION OF WIRING SYSTEMS ....	150
3.1 GENERAL.....	150
3.1.1 Application .....	150
3.1.2 Selection and installation .....	150
3.2 TYPES OF WIRING SYSTEMS .....	150
3.3 EXTERNAL INFLUENCES.....	151
3.3.1 General.....	151
3.3.2 Particular influences.....	151
3.4 CURRENT-CARRYING CAPACITY .....	156
3.4.1 General.....	156
3.4.2 Operating temperature limits .....	157
3.4.3 Conductors in parallel .....	159
3.4.4 Coordination between conductors and protective devices .....	160
3.5 CONDUCTOR SIZE .....	160
3.5.1 General.....	160
3.5.2 Neutral conductor.....	161
3.5.3 Earthing conductor.....	163
3.6 VOLTAGE DROP .....	163
3.6.1 General.....	163
3.6.2 Value .....	163
3.6.3 Conductors in parallel .....	164

	<i>Page</i>
3.7 ELECTRICAL CONNECTIONS .....	164
3.7.1 General .....	164
3.7.2 Connection methods .....	164
3.7.3 Joints in cables .....	168
3.7.4 Installation couplers .....	168
3.8 IDENTIFICATION .....	168
3.8.1 General .....	168
3.8.2 Colour identification .....	169
3.8.3 Exceptions and special applications .....	170
3.9 INSTALLATION REQUIREMENTS .....	172
3.9.1 General .....	172
3.9.2 Methods of installation .....	173
3.9.3 Support and fixing .....	173
3.9.4 Protection against mechanical damage .....	174
3.9.5 Wiring systems installed vertically .....	178
3.9.6 Change of direction .....	178
3.9.7 Particular installation requirements .....	178
3.9.8 Prevention of mutual detrimental effects between services .....	182
3.9.9 Selection and installation to minimize the spread of fire .....	185
3.9.10 Limitation of circulating and eddy currents .....	188
3.9.11 Minimization of electromagnetic interference .....	189
3.10 ENCLOSURE OF CABLES .....	190
3.10.1 General .....	190
3.10.2 Wiring enclosures .....	190
3.10.3 Installation of wiring enclosures .....	191
3.11 UNDERGROUND WIRING SYSTEMS .....	193
3.11.1 Suitability and protection .....	193
3.11.2 Classification of wiring systems .....	193
3.11.3 Arrangements .....	194
3.11.4 Installation requirements .....	197
3.11.5 Spacing from other underground services .....	204
3.12 AERIAL WIRING SYSTEMS .....	205
3.12.1 Types of conductor .....	205
3.12.2 Arrangements .....	204
3.12.3 Clearances .....	205
3.12.4 Distance between supports (spans) .....	208
3.12.5 Aerial conductor supports .....	208
3.12.6 Poles and posts (including supports, struts and extensions to structures) .....	209
3.12.7 Joints and connections .....	210
3.13 CABLES SUPPORTED BY A CATENARY .....	210
3.13.1 Types of cables .....	210
3.13.2 Catenary supports .....	210

	<i>Page</i>
3.13.3 Clearances.....	210
3.14 SAFETY SERVICES .....	210
3.15 BUSWAYS, INCLUDING RISING MAINS SYSTEMS.....	211
3.16 EARTH SHEATH RETURN (ESR) SYSTEM.....	211
SECTION 4 SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT .....	212
4.1 GENERAL.....	212
4.1.1 Application .....	212
4.1.2 Selection and installation .....	212
4.1.3 External influences.....	213
4.1.4 Adverse effects and interference.....	215
4.1.5 Air extraction systems.....	216
4.2 PROTECTION AGAINST THERMAL EFFECTS .....	216
4.2.1 General.....	216
4.2.2 Prevention of fire hazard .....	216
4.2.3 Protection against burns .....	218
4.3 CONNECTION OF ELECTRICAL EQUIPMENT .....	219
4.3.1 General.....	219
4.3.2 Direct connection .....	219
4.3.3 Installation wiring connected by an installation coupler(s) .....	220
4.3.4 Socket-outlets in installation wiring .....	221
4.3.5 Other connecting devices.....	221
4.3.6 Equipment wiring .....	222
4.4 SOCKET-OUTLETS.....	223
4.4.1 Types.....	223
4.4.2 Location .....	225
4.4.3 Earthing contacts .....	226
4.4.4 Switching device .....	226
4.4.5 Polarization and phase sequence .....	228
4.5 LIGHTING EQUIPMENT AND ACCESSORIES .....	228
4.5.1 Lampholders, including lampholders incorporated in a luminaire.....	228
4.5.2 Lamps and luminaires .....	229
4.6 SMOKE ALARMS .....	243
4.7 COOKING APPLIANCES.....	243
4.7.1 Switching device .....	243
4.7.2 Connection—New Zealand only .....	244
4.7.3 Clearance from open cooking surfaces .....	244
4.8 APPLIANCES PRODUCING HOT WATER OR STEAM.....	245
4.8.1 General.....	245
4.8.2 Water heaters .....	246

	<i>Page</i>
4.9 ROOM HEATERS .....	246
4.9.1 General.....	246
4.9.2 Isolating switches.....	247
4.9.3 Functional switches.....	247
4.10 ELECTRIC HEATING CABLES FOR FLOORS AND CEILINGS AND TRACE HEATING APPLICATIONS .....	247
4.10.1 General.....	247
4.10.2 Heating cables .....	247
4.10.3 Isolating switches.....	248
4.10.4 Functional switches.....	248
4.10.5 Additional protection .....	248
4.10.6 Signs.....	249
4.11 ELECTRIC DUCT HEATERS.....	249
4.12 ELECTRICITY CONVERTERS .....	249
4.12.1 General.....	249
4.12.2 Selection and installation .....	250
4.12.3 Control.....	250
4.12.4 Isolation .....	250
4.12.5 Overcurrent protection .....	251
4.12.6 Earthing .....	252
4.12.7 Neutral continuity .....	252
4.12.8 Electrical equipment connected to output.....	252
4.13 MOTORS.....	253
4.13.1 Protection against injury from mechanical movement.....	253
4.13.2 Protection against overload.....	254
4.13.3 Protection against overtemperature .....	255
4.14 TRANSFORMERS .....	256
4.14.1 General.....	256
4.14.2 Secondary circuit .....	256
4.14.3 Low voltage transformer supply.....	257
4.14.4 Autotransformers .....	257
4.14.5 Step-up transformers .....	257
4.15 CAPACITORS.....	257
4.15.1 General.....	257
4.15.2 Electrical equipment.....	257
4.15.3 Provision for discharge and control .....	258
4.16 ELECTRICAL EQUIPMENT CONTAINING LIQUID DIELECTRICS ....	260
4.16.1 General.....	260
4.16.2 Liquid dielectrics having a flashpoint not exceeding 250°C .....	260
4.17 BATTERIES.....	260
4.18 GAS APPLIANCES AND EQUIPMENT .....	260
4.18.1 Gas appliances .....	260

	<i>Page</i>
4.18.2 Gas cylinders containing heavier-than-air gases—Outdoors .....	261
4.18.3 Gas cylinders—Indoors—New Zealand only .....	262
4.18.4 Gas relief vent terminal—Natural gas, LP Gas or Biogas .....	262
4.18.5 Reticulated lighter-than-air gas system, metering system and regulators—New Zealand only.....	263
4.19 AIRCONDITIONING AND HEAT PUMP SYSTEMS .....	264
4.20 LIFTS.....	265
4.20.1 General.....	265
4.20.2 Lift supply arrangement.....	265
4.20.3 Labelling .....	265
4.20.4 Motor-room-less lifts (MRLs).....	265
<b>SECTION 5 EARTHING ARRANGEMENTS AND EARTHING CONDUCTORS .....</b>	<b>267</b>
5.1 GENERAL.....	267
5.1.1 Application .....	267
5.1.2 Selection and installation .....	267
5.1.3 MEN earthing system.....	267
5.1.4 Other earthing systems .....	270
5.2 EARTHING FUNCTIONS.....	271
5.2.1 Protective earthing.....	271
5.2.2 Functional earthing (FE).....	271
5.2.3 Earthing for combined protective and functional purposes .....	272
5.3 EARTHING SYSTEM PARTS .....	272
5.3.1 General.....	272
5.3.2 Earthing conductor material and type.....	273
5.3.3 Earthing conductor size (cross-sectional area).....	276
5.3.4 Main earthing terminal/connection or bar .....	280
5.3.5 MEN connection.....	281
5.3.6 Earth electrodes.....	282
5.3.7 Functional earthing conductors .....	284
5.4 EARTHING OF EQUIPMENT.....	284
5.4.1 General.....	284
5.4.2 Socket-outlets .....	286
5.4.3 Lighting points.....	286
5.4.4 Luminaires .....	286
5.4.5 Conductive supports for aerial conductors .....	287
5.4.6 Structural metalwork including conductive building materials .....	287
5.4.7 Submersible pumps .....	288
5.4.8 Variable frequency devices .....	288
5.5 EARTHING ARRANGEMENTS.....	289
5.5.1 Main earthing conductor.....	289
5.5.2 Protective earthing conductors.....	290
5.5.3 Particular methods of earthing .....	292

	<i>Page</i>
5.5.4 Continuity.....	300
5.5.5 Installation .....	301
5.5.6 Connections.....	302
5.6 EQUIPOTENTIAL BONDING .....	303
5.6.1 General.....	303
5.6.2 Arrangement.....	304
5.6.3 Bonding conductors .....	311
5.7 EARTH FAULT-LOOP IMPEDANCE.....	312
5.7.1 General.....	312
5.7.2 Disconnection times.....	313
5.7.3 Earth fault-loop .....	313
5.7.4 Impedance.....	314
5.7.5 Supplementary equipotential bonding .....	314
5.8 OTHER EARTHING ARRANGEMENTS .....	315
SECTION 6 DAMP SITUATIONS.....	316
6.1 GENERAL.....	316
6.1.1 Application .....	316
6.1.2 Selection and installation .....	316
6.2 BATHS, SHOWERS AND OTHER FIXED WATER CONTAINERS .....	317
6.2.1 Scope .....	317
6.2.2 Classification of zones .....	317
6.2.3 Protection against electric shock—Prohibited measures .....	320
6.2.4 Selection and installation of electrical equipment .....	320
6.3 SWIMMING POOLS, PADDLING POOLS AND SPA POOLS OR TUBS.....	336
6.3.1 Scope .....	336
6.3.2 Classification of zones .....	337
6.3.3 Protection against electric shock.....	338
6.3.4 Selection and installation of electrical equipment .....	339
6.4 FOUNTAINS AND WATER FEATURES .....	348
6.4.1 Scope .....	348
6.4.2 Classification of zones .....	349
6.4.3 Protection against electric shock.....	349
6.4.4 Selection and installation of electrical equipment .....	350
6.5 SAUNAS .....	354
6.5.1 Scope .....	354
6.5.2 Classification of zones .....	354
6.5.3 Protection against electric shock.....	355
6.5.4 Selection and installation of electrical equipment .....	355
6.6 REFRIGERATION ROOMS .....	358
6.6.1 Scope .....	358
6.6.2 Protection against electric shock.....	358

	<i>Page</i>
6.6.3 Selection and installation of electrical equipment .....	358
6.7 SANITIZATION AND GENERAL HOSING-DOWN OPERATIONS .....	360
6.7.1 Scope .....	360
6.7.2 Classification of zone .....	360
6.7.3 Protection against electric shock.....	361
6.7.4 Selection and installation of electrical equipment .....	361
SECTION 7 SPECIAL ELECTRICAL INSTALLATIONS .....	362
7.1 GENERAL.....	362
7.1.1 Application .....	362
7.1.2 Selection and installation .....	362
7.2 SAFETY SERVICES .....	363
7.2.1 Scope and general.....	363
7.2.2 Supply systems.....	364
7.2.3 Main switchboard and switchgear .....	367
7.2.4 Main switches .....	371
7.2.5 Fire pumps and fire pump control equipment .....	373
7.2.6 Fire and smoke detection equipment and fire alarm systems .....	377
7.2.7 Air-handling systems.....	378
7.2.8 Evacuation equipment.....	379
7.2.9 Emergency lifts .....	380
7.2.10 Emergency motor-room-less lifts.....	382
7.3 ELECTRICITY GENERATION SYSTEMS.....	384
7.3.1 General.....	384
7.3.2 Selection and installation of system .....	385
7.3.3 Control .....	385
7.3.4 Isolation .....	386
7.3.5 Overcurrent protection .....	387
7.3.6 Earthing .....	388
7.3.7 Connected electrical equipment .....	388
7.3.8 Connection to electrical installation .....	389
7.4 PROTECTION BY ELECTRICAL SEPARATION (ISOLATED SUPPLY).....	397
7.4.1 General.....	397
7.4.2 Source of supply .....	397
7.4.3 Arrangement of circuits .....	398
7.4.4 Switching devices .....	398
7.4.5 Supply to single item of electrical equipment.....	398
7.4.6 Supply to multiple items of electrical equipment .....	398
7.4.7 Variable speed drive (VSD) EMI filters .....	399
7.4.8 Testing.....	399
7.5 EXTRA-LOW VOLTAGE ELECTRICAL INSTALLATIONS .....	402
7.5.1 Scope .....	402
7.5.2 Application .....	402
7.5.3 Sources of supply to SELV and PELV systems.....	402

	<i>Page</i>
7.5.4 Separation requirements for SELV and PELV circuits .....	403
7.5.5 Arrangement of SELV circuits .....	403
7.5.6 Arrangement of PELV circuits .....	404
7.5.7 Voltage drop in conductors .....	404
7.5.8 Control of an electrical installation.....	405
7.5.9 Overcurrent protection .....	405
7.5.10 Connecting devices.....	406
7.5.11 Wiring systems.....	406
7.5.12 Testing.....	406
7.6 HIGH VOLTAGE ELECTRICAL INSTALLATIONS .....	407
7.6.1 Scope .....	407
7.6.2 Application .....	407
7.6.3 Issues relevant to high voltage installations .....	408
7.7 HAZARDOUS AREAS (EXPLOSIVE GAS OR COMBUSTIBLE DUSTS) .....	408
7.7.1 Scope .....	408
7.7.2 Classification of hazardous areas .....	408
7.8 STANDARDS FOR SPECIFIC ELECTRICAL INSTALLATIONS .....	409
7.8.1 Scope .....	409
7.8.2 Standards containing requirements that are additional to, replace, or modify the general requirements of this Standard.....	410
7.8.3 Standards containing guidance .....	412
7.9 SUPPLIES FOR ELECTRIC VEHICLES (NZ ONLY).....	413
7.9.1 Scope .....	413
7.9.2 Supply (NZ only) .....	413
7.9.3 Domestic electrical installations (NZ only).....	414
7.9.4 Other electrical installations (NZ only).....	415
SECTION 8 VERIFICATION .....	416
8.1 GENERAL.....	416
8.1.1 Application .....	416
8.1.2 General requirements .....	416
8.1.3 Periodic inspection and testing.....	416
8.2 VISUAL INSPECTION .....	417
8.2.1 General.....	417
8.2.2 Checklist.....	417
8.3 TESTING .....	419
8.3.1 General.....	419
8.3.2 Test methods .....	419
8.3.3 Mandatory tests .....	420
8.3.4 Sequence of tests .....	420
8.3.5 Continuity of the earthing system .....	421
8.3.6 Insulation resistance .....	422
8.3.7 Polarity and correct circuit connections .....	423

	<i>Page</i>
8.3.8 'Text deleted'.....	424
8.3.9 Verification of earth fault-loop impedance (EFLI).....	425
8.3.10 Operation of RCDs.....	428
8.4 VERIFICATION RECORDS .....	429
APPENDICES	
A REFERENCED DOCUMENTS .....	430
B CIRCUIT PROTECTION GUIDE.....	439
C CIRCUIT ARRANGEMENTS .....	456
D MINIMUM SIZES OF POSTS, POLES AND STRUTS FOR AERIAL LINE CONDUCTORS .....	491
E ELECTRICAL INSTALLATION REQUIREMENTS IN NATIONAL CONSTRUCTION CODES .....	513
F SURGE PROTECTIVE DEVICES.....	521
G DEGREES OF PROTECTION OF ENCLOSED EQUIPMENT .....	527
H WS CLASSIFICATION OF WIRING SYSTEMS.....	532
I PROTECTIVE DEVICE RATINGS AND METRIC EQUIVALENT SIZES FOR IMPERIAL CABLES USED IN ALTERATIONS AND REPAIRS .....	540
J SYMBOLS USED IN THIS STANDARD.....	543
K SWITCHBOARD REQUIREMENT SUMMARY .....	545
L (Deleted) .....	558
M REDUCING THE IMPACT OF POWER SUPPLY OUTAGES— CONTINUITY OF SUPPLY FOR ACTIVE ASSISTED LIVING AND HOMECARE MEDICAL SITUATIONS .....	559
N ELECTRICAL CONDUITS .....	561
O INSTALLATION OF ARC FAULT DETECTION DEVICES (AFDDs) .....	565
P GUIDANCE FOR INSTALLATION AND LOCATION OF ELECTRICAL VEHICLE SOCKET-OUTLETS AND CHARGING STATIONS .....	568
Q D.C. CIRCUIT PROTECTION APPLICATION GUIDE.....	575
INDEX .....	578

## LIST OF TABLES

TABLE		Page
3.1	CABLE TYPES AND THEIR APPLICATION IN WIRING SYSTEMS .....	151
3.2	LIMITING TEMPERATURES FOR INSULATED CABLES .....	157
3.3	NOMINAL MINIMUM CROSS-SECTIONAL AREA OF CONDUCTORS .....	160
3.4	CONDUCTOR COLOURS FOR INSTALLATION WIRING.....	168
3.5	UNDERGROUND WIRING SYSTEM CATEGORIES.....	196
3.6	UNDERGROUND WIRING SYSTEMS—MINIMUM DEPTH OF COVER.....	198
3.7	MINIMUM SEPARATION OF UNDERGROUND SERVICES .....	203
3.8	MINIMUM AERIAL CONDUCTOR CLEARANCES .....	206
3.9	AERIAL CONDUCTOR MAXIMUM SPANS .....	207
3.10	SPACING BETWEEN AERIAL CONDUCTORS AT SUPPORTS .....	208
4.1	TEMPERATURE LIMITS IN NORMAL SERVICE FOR PARTS OF ELECTRICAL EQUIPMENT WITHIN ARM'S REACH.....	218
4.2	MINIMUM DISTANCE BETWEEN LAMP AND ILLUMINATED FLAMMABLE MATERIALS .....	230
4.3	GUIDE TO RECESSED LUMINAIRE CLASSIFICATION, APPLICATION AND GENERAL RESTRICTIONS ON USE .....	238
5.1	MINIMUM COPPER EARTHING CONDUCTOR SIZE .....	278
5.2	ACCEPTABLE EARTH ELECTRODES .....	283
6.1	SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT FOR BATHS, SHOWERS AND OTHER FIXED WATER CONTAINERS .....	322
6.2	SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT FOR SWIMMING POOLS, PADDLING POOLS AND SPA POOLS OR TUBS .....	343
6.3	SELECTION AND INSTALLATION OF ELECTRICAL EQUIPMENT FOR FOUNTAINS AND WATER FEATURES .....	352
8.1	MAXIMUM VALUES OF EARTH FAULT-LOOP IMPEDANCE FOR THE TOTAL CIRCUIT INCLUDING THE SUPPLY TRANSFORMER ( $Z_s$ AT 230 V) VALUES RELATING TO OPERATION OF PROTECTIVE DEVICES ON THE FINAL SUBCIRCUIT.....	427
8.2	MAXIMUM VALUES OF RESISTANCE OF FINAL SUBCIRCUITS AT 80% RATED CURRENT RELATING TO $Z_s$ IMPEDANCE VALUES IN TABLE 8.1 .....	428

TABLE	<i>Page</i>
B1	MAXIMUM ROUTE LENGTHS FOR DIFFERENT SIZES OF CONDUCTORS AND PROTECTIVE DEVICES USING APPROPRIATE MEAN TRIPPING CURRENTS ( $I_a$ )* ..... 452
B2	COMPARISON OF CIRCUIT ROUTE LENGTH BASED ON LOOP IMPEDANCE AND VARIOUS VOLTAGE DROPS ..... 454
C1	MAXIMUM DEMAND—SINGLE AND MULTIPLE DOMESTIC ELECTRICAL INSTALLATIONS ..... 458
C2	MAXIMUM DEMAND—NON-DOMESTIC ELECTRICAL INSTALLATIONS ..... 467
C3	MAXIMUM DEMAND—ENERGY DEMAND METHOD FOR NON-DOMESTIC INSTALLATIONS ..... 474
C4	UPSTREAM CIRCUIT LOADING AFTER DIVERSITY ..... 475
C5	MAXIMUM DEMAND—DOMESTIC COOKING APPLIANCES... 477
C6	SIMPLIFIED PROTECTIVE DEVICE SELECTION FOR CABLES FROM 1 mm <sup>2</sup> TO 25 mm <sup>2</sup> USED IN SINGLE-PHASE APPLICATIONS ..... 478
C7	SIMPLIFIED PROTECTIVE DEVICE SELECTION FOR CABLES FROM 1 mm <sup>2</sup> TO 25 mm <sup>2</sup> USED IN THREE-PHASE APPLICATIONS ..... 479
C8	VOLTAGE DROP—SIMPLIFIED METHOD ..... 481
C9	GUIDANCE ON THE LOADING OF POINTS PER FINAL SUBCIRCUIT ..... 483
C10	GUIDE TO THE MAXIMUM NUMBER OF SINGLE-CORE SHEATHED CABLES INSTALLED IN CONDUIT ..... 488
C11	GUIDE TO THE MAXIMUM NUMBER OF TWO-CORE AND EARTH CABLES INSTALLED IN CONDUIT ..... 489
C12	GUIDE TO THE MAXIMUM NUMBER OF FOUR-CORE AND EARTH CABLES INSTALLED IN CONDUIT ..... 490
D1	SINKING OF POSTS/POLES IN GROUND ..... 498
D2	FORCE EXERTED BY AERIAL LINE CONDUCTORS ..... 499
D3	SQUARE HARDWOOD POST (100 MPa TIMBER TO AS 2209) STRENGTH RATINGS ..... 500
D4	SQUARE HARDWOOD STRUTS (100 MPa TIMBER TO AS 2209) STRENGTH RATINGS ..... 501
D5	ROUND HARDWOOD POLE (100 MPa TIMBER TO AS 2209) STRENGTH RATINGS—HEIGHT REDUCED FROM BASE ..... 501
D6	ROUND HARDWOOD POLE (100 MPa TIMBER TO AS 2209) STRENGTH RATINGS—HEIGHT REDUCED FROM TOP ..... 502
D7	ANGLE IRON STRUTS GRADE 250 STRENGTH RATINGS (CROSS-SECTION DIMENSIONS × THICKNESS, mm) ..... 503
D8	ANGLE IRON STRUTS GRADE 300 STRENGTH RATINGS (CROSS-SECTION DIMENSIONS × THICKNESS, mm) ..... 504

TABLE	<i>Page</i>
D9	FABRICATED RIVERTON OCTAGONAL STEEL POLE STRENGTH RATINGS ..... 504
D10	GRADE 250 STEEL-PIPE (DIAMETER × THICKNESS, mm) STRENGTH RATINGS ..... 505
D11	GRADE 350 STEEL-PIPE (DIAMETER × THICKNESS, mm) STRENGTH RATINGS ..... 506
D12(A)	GRADE 350 STEEL SQUARE SECTION (WIDTH × THICKNESS, mm) STRENGTH RATINGS..... 507
D12(B)	GRADE 350 STEEL SQUARE SECTION (WIDTH × THICKNESS, mm) STRENGTH RATINGS..... 508
D13(A)	GRADE 450 STEEL SQUARE SECTION (WIDTH × THICKNESS, mm) STRENGTH RATINGS..... 510
D13(B)	GRADE 450 STEEL SQUARE SECTION (WIDTH × THICKNESS, mm) STRENGTH RATINGS..... 511
H1	DEGREE OF PROTECTION INDICATED BY THE FIRST CHARACTERISTIC NUMERAL ..... 533
H2	DEGREE OF PROTECTION INDICATED BY THE SECOND CHARACTERISTIC NUMERAL ..... 534
I1	PROTECTIVE DEVICE RATINGS ..... 541
I2	SIZES OF IMPERIAL AND METRIC CABLES FOR CONNECTION IN PARALLEL ..... 542
K1	CORRESPONDING PROVISIONS BETWEEN AS/NZS 3000 AND THE AS/NZS 61439 SERIES ..... 548
K2	MINIMUM REQUIREMENTS FOR INTERNAL SEPARATION.... 550
N1	FIRST AND SECOND NUMERALS IN COMPARISON WITH DUTY RATINGS IN AS/NZS 2053 SERIES AND AS/NZS 61386 SERIES ..... 563
N2	THIRD AND FOURTH NUMERALS FOR TEMPERATURE RATINGS COMPARISON BETWEEN AS/NZS 2053 SERIES AND AS/NZS 61386 SERIES ..... 564

## LIST OF FIGURES

FIGURE		<i>Page</i>
1.1	ZONE OF ARM'S REACH .....	36
1.2	DIRECT CONTACT .....	39
1.3	INDIRECT CONTACT .....	39
2.1	TYPICAL EXAMPLES OF UNPROTECTED AND PROTECTED CONSUMER MAINS .....	95
2.2(A)	GENERAL PROTECTION AGAINST OVERLOAD (OL) AND SHORT-CIRCUIT (SC) FOR SUBMAINS AND FINAL SUBCIRCUITS .....	102
2.2(B)	PROTECTIVE DEVICE OF LOW BREAKING CAPACITY WITH A DEVICE OF REQUIRED BREAKING CAPACITY INSTALLED ON THE SUPPLY SIDE .....	102
2.3	MANDATORY OMISSION OF OVERLOAD AND/OR SHORT-CIRCUIT PROTECTION .....	103
2.4	ALTERNATIVE POSITION OF OVERLOAD PROTECTION ....	103
2.5	ALTERNATIVE POSITION OF OVERLOAD PROTECTION ....	104
2.6	OMISSION OF OVERLOAD PROTECTION .....	104
2.7	OMISSION OF OVERLOAD PROTECTION .....	105
2.8	ALTERNATIVE POSITION OF SHORT-CIRCUIT PROTECTIVE DEVICE .....	106
2.9	CONDUCTORS CONNECTING SOURCES OF SUPPLY TO THEIR ASSOCIATED SWITCHBOARD .....	107
2.10	REQUIRED LOCATIONS AND ALTERNATIVE LOCATIONS OF OVERLOAD AND SHORT-CIRCUIT PROTECTION .....	108
2.11	PARTS OF FUNCTIONAL UNITS .....	110
2.12	DISCRIMINATION/SELECTIVITY BETWEEN PROTECTIVE DEVICES—GENERAL .....	113
2.13	CIRCUIT-BREAKER CURVES—GENERAL EXPLANATION, SETTINGS AND ZONES .....	116
2.14	CIRCUIT-BREAKER CURVES WITH DISCRIMINATION REQUIREMENTS BETWEEN CIRCUIT-BREAKERS RATED GREATER THAN OR EQUAL TO 800 A .....	117
2.15	CIRCUIT-BREAKER CURVES WITH DISCRIMINATION REQUIREMENTS BETWEEN CIRCUIT-BREAKERS RATED GREATER THAN OR EQUAL TO 250 A AND UP TO 800 A ...	117
2.16	CIRCUIT-BREAKER CURVES WITH DISCRIMINATION REQUIREMENTS BETWEEN CIRCUIT-BREAKERS RATED LESS THAN 250 A .....	118
2.17	FUSE CURVES WITH DISCRIMINATION REQUIREMENTS ..	118

FIGURE	<i>Page</i>
2.18 FUSE AND CIRCUIT-BREAKER CURVES WITH DISCRIMINATION REQUIREMENTS .....	119
2.19 ACCESS TO SWITCHBOARDS—FREESTANDING SWITCHBOARD WITH SWITCHGEAR RACKED OUT .....	137
2.20 ACCESS TO SWITCHBOARDS—SWITCHBOARD IN CORNER POSITION .....	137
2.21 ACCESS TO SWITCHBOARDS—SWITCHBOARD WITH ONE END AGAINST WALL .....	138
2.22 ACCESS TO SWITCHBOARDS—SWITCHBOARD DOORS THAT OPEN INTO ACCESS WAYS OR NARROW PASSAGE WAYS.....	138
2.23 ACCESS TO SWITCHBOARDS—FACING SWITCHBOARDS .....	139
2.24 EXAMPLE OF EXCEPTION TO CLAUSE 2.10.2.2(iii) WHERE ONLY ONE EXIT PATH NEEDS TO BE PROVIDED .	139
3.1 SINGLE-PHASE CABLES .....	171
3.2 MULTIPHASE CABLES.....	171
3.3 PROTECTION OF WIRING SYSTEMS WITHIN SOLID OR FRAMED WALLS .....	174
3.4 PROTECTION OF WIRING SYSTEMS WITHIN CEILINGS, FLOORS AND WALL SPACES .....	175
3.5 PROTECTION OF WIRING SYSTEMS WITHIN CONCRETE ROOFS, CEILINGS OR FLOORS.....	175
3.6 PROHIBITED WIRING SYSTEM LOCATION—ROOF OR WALL-LINING MATERIALS .....	176
3.7 PROTECTION OF WIRING SYSTEM BELOW ROOFING MATERIAL .....	176
3.8 SEPARATION OF LOW VOLTAGE CABLES FROM TELECOMMUNICATIONS CABLES ON SURFACES OR CONCEALED IN WALLS, FLOORS OR CEILINGS.....	184
3.9 SEPARATION OF LOW VOLTAGE CABLES FROM TELECOMMUNICATIONS CABLES IN UNDERGROUND TRENCHES.....	184
3.10 EXAMPLE OF A CATEGORY A WIRING SYSTEM WITH CABLE LOCATED BELOW Poured CONCRETE OF 75 mm MINIMUM THICKNESS.....	198
3.11 EXAMPLE OF A CATEGORY A UNDERGROUND WIRING SYSTEM WITH CABLE LOCATED BELOW NATURAL GROUND .....	199
3.12 EXAMPLE OF A CATEGORY A UNDERGROUND WIRING SYSTEM WITH CABLE LOCATED DIRECTLY BELOW POURED CONCRETE OF 75 mm MINIMUM THICKNESS WITHIN THE CONFINES OF A BUILDING.....	199

FIGURE	<i>Page</i>
3.13	EXAMPLE OF A CATEGORY B UNDERGROUND WIRING SYSTEM WITH CABLE LOCATED BELOW POURED CONCRETE OF 75 mm MINIMUM THICKNESS ..... 200
3.14	EXAMPLE OF A CATEGORY B UNDERGROUND WIRING SYSTEM WITH CABLE LOCATED BELOW NATURAL GROUND ..... 200
3.15	EXAMPLE OF A CATEGORY B UNDERGROUND WIRING SYSTEM WITH CABLE LOCATED DIRECTLY BELOW POURED CONCRETE OF 75 mm MINIMUM THICKNESS WITHIN THE CONFINES OF A BUILDING..... 201
3.16	EXAMPLE OF A CATEGORY C UNDERGROUND WIRING SYSTEM ..... 201
3.17	EXAMPLE OF AN UNDERGROUND WIRING SYSTEM IN SLOPING GROUND ..... 202
4.1	AREA UNDER AN OVERHANG REQUIRING ACCESSORIES TO BE A MINIMUM OF IP33 (SIDE VIEW)..... 215
4.2	AREA UNDER AN OVERHANG REQUIRING ACCESSORIES TO BE A MINIMUM OF IP33 (FRONT VIEW)... 215
4.3	DIRECT CONNECTION ..... 219
4.4	DIRECT CONNECTION BY INSTALLATION COUPLER ..... 220
4.5	DIRECT CONNECTION BY INSTALLATION COUPLER—EXCEPTION..... 220
4.6	CONNECTION BY SOCKET-OUTLET ..... 221
4.7	CONNECTION BY OTHER CONNECTING DEVICES..... 222
4.8	EQUIPMENT WIRING—EXCEPTION FOR PENDANT SOCKET-OUTLET ..... 222
4.9	DEFAULT MINIMUM CLEARANCES FOR RECESSED LUMINAIRES ..... 231
4.10	WORDING FOR WARNING SIGN TO BE INSTALLED IN ACCESSIBLE ROOF SPACES CONTAINING RECESSED LUMINAIRES ..... 232
4.11	NON-IC SYMBOL..... 235
4.12	DO-NOT-COVER SYMBOL..... 235
4.13	CA90 SYMBOL ..... 235
4.14	CA135 SYMBOL..... 236
4.15	IC SYMBOL..... 236
4.16	IC-4 SYMBOL..... 237
4.17	PROHIBITED LOCATION FOR SOCKET-OUTLETS AND SWITCHES INSTALLED NEAR OPEN COOKING SURFACES (GAS OR ELECTRIC)..... 245
4.18	HAZARDOUS AREA PRESENTED BY A GAS CYLINDER OUTDOORS FOR HEAVIER-THAN-AIR GASES ..... 262

FIGURE	<i>Page</i>
4.19	EXCLUSION ZONES PRESENTED BY A GAS RELIEF VENTING TERMINAL..... 263
4.20	HAZARDOUS AREA FOR RETICULATED GAS SUPPLY REGULATORS..... 264
5.1	MULTIPLE EARTHED NEUTRAL (MEN) SYSTEM OF EARTHING—GENERAL ARRANGEMENT PEN DISTRIBUTION TN-C-S ..... 269
5.2	ALTERNATIVE EARTHING ARRANGEMENT IN AN OWNER OR USER OPERATED SUPPLY SUBSTATION INSTALLATION ..... 270
5.3	EXAMPLES OF EARTHING ARRANGEMENTS..... 292
5.4	EXAMPLE OF EARTHING OF AN INDIVIDUAL OUTBUILDING..... 294
5.5	EXAMPLE OF EARTHING OF COMBINED OUTBUILDINGS..... 295
5.6(A)	EARTHING ARRANGEMENT FOR CONDUCTIVE SWITCHBOARD ENCLOSURES ASSOCIATED WITH UNPROTECTED CONSUMER MAINS..... 298
5.6(B)	EARTHING ARRANGEMENT FOR CONDUCTIVE SWITCHBOARD ENCLOSURES ASSOCIATED WITH UNPROTECTED CONSUMER MAINS..... 299
5.6(C)	EARTHING ARRANGEMENT FOR CONDUCTIVE SWITCHBOARD ENCLOSURES ASSOCIATED WITH UNPROTECTED CONSUMER MAINS..... 300
5.7	EXAMPLES OF EQUIPOTENTIAL BONDING OF CONDUCTIVE WATER PIPING ..... 305
5.8	EXAMPLES OF EQUIPOTENTIAL BONDING OF CONDUCTIVE WATER PIPING (WITH EXCEPTION)..... 306
5.9	EXAMPLE OF BONDING ARRANGEMENT FOR POOLS AND SPAS ..... 310
6.1	ZONE DIMENSIONS (PLAN)—BATH WITHOUT SHOWER OR FIXED BARRIER..... 323
6.2	ZONE DIMENSIONS (ELEVATION)—BATH WITHOUT SHOWER OR FIXED BARRIER..... 324
6.3	ZONE DIMENSIONS (PLAN)—SHOWER WITH FIXED PLUMBING CONNECTION ON WALL AND BASE WITHOUT BARRIERS ..... 325
6.4	ZONE DIMENSIONS (ELEVATION)—SHOWER WITH FIXED PLUMBING CONNECTION ON WALL AND BASE WITHOUT BARRIERS ..... 326
6.5	BATHS AND SHOWERS, ZONE DIMENSIONS (PLAN)—SHOWER WITH FIXED PLUMBING CONNECTION ON CEILING AND WITHOUT BARRIERS ..... 327

FIGURE	<i>Page</i>
6.6	BATHS AND SHOWERS, ZONE DIMENSIONS (ELEVATION)—SHOWER WITH FIXED PLUMBING CONNECTION ON CEILING AND WITHOUT BARRIERS..... 328
6.7	ZONE DIMENSIONS (PLAN)—BATH WITHOUT SHOWER WITH FIXED BARRIER ..... 329
6.8	ZONE DIMENSIONS (PLAN)—ENCLOSED SHOWER WITH HINGED DOOR..... 330
6.9	ZONE DIMENSIONS (PLAN)—BATH WITH SHOWER WITHOUT BARRIER ..... 331
6.10	ZONE DIMENSIONS (PLAN)—ENCLOSED SHOWER WITH FIXED PLUMBING CONNECTION ON CEILING OR WALL AND A BARRIER..... 332
6.11	ZONE DIMENSIONS (ELEVATION)—SHOWER WITH FIXED PLUMBING CONNECTION ON CEILING OR WALL AND A BARRIER ..... 333
6.12	ZONE DIMENSIONS (PLAN)—PARTIALLY ENCLOSED SHOWER WITH FIXED PLUMBING CONNECTION ON WALL . 334
6.13	ZONE DIMENSIONS FOR OTHER FIXED WATER CONTAINERS WITH FIXED WATER OUTLETS WHERE NO CONTAINER HAS A CAPACITY EXCEEDING 40 L ..... 335
6.14	ZONE DIMENSIONS FOR OTHER FIXED WATER CONTAINERS WITH A FLEXIBLE WATER OUTLET OR WITH A CAPACITY EXCEEDING 40 L ..... 336
6.15	ZONE DIMENSIONS OF IN-GROUND SWIMMING POOLS ..... 344
6.16	ZONE DIMENSIONS OF ABOVE-GROUND SWIMMING POOLS ..... 345
6.17	ZONE DIMENSIONS OF SWIMMING POOLS WITH FIXED BARRIERS (MINIMUM 1.8 m HIGH) ..... 346
6.18	ZONE DIMENSIONS OF IN-GROUND SPA POOLS AND TUBS WITH WATER CAPACITY NOT EXCEEDING 5000 L ..... 347
6.19	ZONE DIMENSIONS OF ABOVE-GROUND SPA POOLS AND TUBS WITH WATER CAPACITY NOT EXCEEDING 5000 L ..... 348
6.20	EXAMPLE FOR DETERMINATION OF THE ZONES OF A FOUNTAIN (PLAN) ..... 353
6.21	EXAMPLE FOR DETERMINATION OF THE ZONES OF A FOUNTAIN (ELEVATION)..... 354
6.22	CLASSIFIED ZONES FOR SAUNA HEATERS..... 357
7.1	WIRING SYSTEM (WS) CLASSIFICATION REQUIRED FOR LIFT CIRCUITS ..... 365
7.2(A)	TYPICAL ARRANGEMENT OF MAIN SWITCHBOARD WITH ONE NORMAL SUPPLY..... 369
7.2(B)	TYPICAL ARRANGEMENT OF MAIN SWITCHBOARD WITH TWO NORMAL SUPPLIES..... 370

FIGURE	<i>Page</i>
7.3	TYPICAL EXAMPLE OF CONNECTION OF A THREE PHASE ALTERNATIVE SUPPLY TO A SWITCHBOARD WITH A LOCAL MEN CONNECTION (THREE POLE/THREE POLE CHANGEOVER)..... 391
7.4	TYPICAL EXAMPLE OF CONNECTION OF A STAND-ALONE SYSTEM TO A SWITCHBOARD WITH A LOCAL MEN CONNECTION ..... 392
7.5	TYPICAL EXAMPLE OF CONNECTION OF A SINGLE PHASE ALTERNATIVE SUPPLY TO A SWITCHBOARD WITH A LOCAL MEN CONNECTION BY MEANS OF A PLUG AND SOCKET .... 393
7.6	TYPICAL EXAMPLE OF CONNECTION OF A THREE PHASE ALTERNATIVE SUPPLY TO A SWITCHBOARD WITH A LOCAL MEN CONNECTION BY MEANS OF A PLUG AND SOCKET .... 394
7.7	TYPICAL MAIN SWITCHBOARD CONECTION OF AN INVERTER ENERGY SYSTEM ..... 396
7.8	SEPARATED (ISOLATED) SUPPLIES ..... 401
8.1	TESTING SEQUENCE ..... 421
B1	EXAMPLE OF CIRCUIT ARRANGEMENTS FOR AN ELECTRICAL INSTALLATION (TO THREE LEVELS) ..... 440
B2	TYPICAL OVERCURRENT PROTECTION OF CONDUCTORS. 441
B3	COORDINATION OF THE CHARACTERISTICS OF CONDUCTORS AND PROTECTIVE DEVICES ..... 442
B4	MAXIMUM DURATION OF PROSPECTIVE 50 Hz TOUCH VOLTAGE ..... 445
B5	MEN SYSTEM (SIMPLIFIED)—SHOWING FAULT CURRENT ( $I_A$ ) PATH (EARTH FAULT-LOOP) ..... 448
B6	TYPICAL TIME/CURRENT CURVES FOR CIRCUIT-BREAKERS AND FUSES ..... 449
D1	GUIDE TO SELECTION OF POLES/POSTS..... 494
D2	GUIDE TO SELECTION OF STRUTS ..... 495
F1	TYPICAL PRIMARY SPD AT MAIN SWITCHBOARD ..... 523
F2	TYPICAL SECONDARY SPD AT DISTRIBUTION BOARD ..... 523
F3	EXAMPLE OF HOW A TRANSIENT DEVELOPS A HAZARDOUS VOLTAGE DIFFERENCE IN A BUILDING ..... 525
F4	PREFERRED METHOD OF BONDING THE PRIMARY TELECOMMUNICATIONS PROTECTOR TO THE MAIN EARTH ..... 526
G1	IP CODES ..... 528 to 530
G2	EXAMPLE OF 'IP' RATING ..... 531
H1	WSX1 PROTECTION BY LOCATION..... 538
J1	SYMBOLS USED IN THIS STANDARD..... 544
O1	TYPES OF ARC FAULT ..... 566

FIGURE		<i>Page</i>
P1	CASE A CONNECTION .....	573
P2	CASE B CONNECTION .....	573
P3	CASE C CONNECTION .....	573

## 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.standards.org.au/getmedia/90b494d3-e2a6-4107-a5c9-9afd33fffa91/Wiring-Rules-FAQs.pdf.aspx](http://www.standards.org.au/getmedia/90b494d3-e2a6-4107-a5c9-9afd33fffa91/Wiring-Rules-FAQs.pdf.aspx).

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

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**Australian/New Zealand Standard**

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

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**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.