

South Australia

Electricity (General) Regulations 1997

under the *Electricity Act 1996*

Contents

Part 1—Preliminary

- 1 Short title
- 4 Interpretation
- 4A Interpretation—definition of annual electricity consumption level
- 4B Interpretation—definition of small customer
- 5 Interpretation—definition of retailing
- 5AB Interpretation—definition of electricity supply industry
- 5AC Compliance with standards that are varied or substituted

Part 1A—Administration

- 5C Functions and powers of Commission
- 5D Application of *Public Corporations Act 1993* to Electricity Supply Industry Planning Council
- 5E Functions of Electricity Supply Industry Planning Council

Part 2—Licensing of electricity entities

- 6 Exemptions from requirement to be licensed
- 7 Licence fees and returns
- 7A Consideration of application for licence
- 7AB Prescribed class of customers for purposes of section 24(2)(b) of Act
- 7ABA Prescribed date for purposes of section 24(2)(d) of Act
- 7ABB Prescribed information in small customer accounts for purposes of section 24(2)(da) of Act
- 7AC Ombudsman scheme

Part 2A—System controller

- 7B Functions and powers of system controller

Part 2B—Standard terms and conditions for sale or supply

- 7C Prescribed classes of customers

Part 2C—Special provisions relating to small customers

- 7D Interpretation
- 7E Exemption from standing contract condition
- 7F Provisions relating to default contracts

Part 3—Electricity entities' powers and duties

- 8 Carrying out certain work on public land

Part 3A—Undergrounding of powerlines

8A Prescribed amount for undergrounding work

Part 4—Safety and technical issues

Division 1—Safety and technical requirements

- 9 Purpose of Division
- 10 Quality of electricity supply
- 11 General requirements for electricity infrastructure
- 12 Aerial lines
- 13 Underground lines
- 14 Powerlines other than aerial or underground lines
- 15 Substations
- 16 Earthing and electrical protection systems
- 17 Electrical installations

Division 2—Certain electrical installation work

18 Certain electrical installation work and certificates of compliance

Division 3—Safeguarding persons working with conductors or electrical equipment

Subdivision 1—General

- 19 Basic safety principle
- 20 Compliance with provisions of Division

Subdivision 2—Work on or near live electric conductors or electrical equipment

- 21 Application of Subdivision
- 22 Safe work practices
- 23 Work involving danger of direct contact with live conductors etc
- 23A Work in proximity to exposed conductors etc

Subdivision 3—Work on or near exposed high voltage conductors or electrical equipment

- 24 Work above exposed high voltage conductors etc
- 26 Work by direct contact with exposed high voltage conductors etc
- 28 Live high voltage line work

Subdivision 4—Miscellaneous

- 29 Rescue and resuscitation training
- 30 Suitability of testing instruments

Division 4—Reporting and investigation of accidents

- 31 Reporting of accidents
- 31A Investigation of accidents

Division 5—Safety, reliability, maintenance and technical management plans and reports

- 31B Application of Division
- 31C Safety, reliability, maintenance and technical management plans
- 31D Safety, reliability, maintenance and technical management reports

Part 5—Cathodic protection systems

- 32 Application of Part
- 33 Tests before operating cathodic protection system

Part 6—Miscellaneous

- 35 Register of underground lines
- 36 Protection of underground lines
- 37 Entangled objects
- 38 Altering ground levels near infrastructure
- 39 Erection of buildings in proximity to aerial lines
- 39A Erection of buildings in proximity to underground lines
- 40 Prohibition of certain activities in proximity to aerial lines and other cable systems
- 41 Placement of materials near supporting structures etc
- 42 Placement of materials in proximity to substations
- 43 Prohibition of burning in proximity to infrastructure
- 44 Transportation
- 45 Interference and obstruction
- 46 Form for warrants
- 47 General penalty
- 48 Fees for reinspection etc

Schedule 2—Requirements for aerial lines

- 1 Interpretation
- 2 Design
- 3 Materials
- 4 Thermal ratings
- 5 Short circuit ratings
- 6 Mechanical loading conditions
- 7 Conductor tensions
- 8 Structures and footings
- 9 Facade mounted cables
- 10 Safety clearances
- 11 Installation of aerial lines
- 12 Maintenance of aerial lines
- 13 Tables

Schedule 3—Requirements for underground lines and certain other powerlines

- 1 Interpretation
- 2 Design—General
- 3 Cables and accessories
- 4 Cable ratings
- 5 Short circuit rating of conductors and cable screens
- 6 Installation—General
- 7 Installation of underground lines
- 8 Part of underground line installed on or above ground
- 9 Shared trenches
- 10 Maintenance

Schedule 4—Requirements for substations

- 1 Interpretation

2	Design
3	Plant and equipment
4	Clearances to live equipment and lines
5	Containment of insulating liquids
6	Security of substation buildings and enclosures
7	Kiosk padmount type substations
8	Ground type substations
9	Pole mounted substations
10	Installation
11	Maintenance

Schedule 5—Requirements for earthing and electrical protection systems

1	Interpretation
2	Design—general
3	Protection equipment
4	Earthing equipment and ancillaries
5	Earthing of low voltage electrical supply networks
6	Earthing of substations
7	Protection systems for low voltage aerial lines and underground lines
8	Step and touch potentials and earth potential rise
9	Installation of earthing and protection systems—general
10	Connections and joints of earthing systems
11	Mechanical strength and protection of earthing systems
12	Maintenance—general
13	Inspection and testing of earthing systems
14	Inspection and test results of earthing systems
15	Inspection and testing of protection systems
16	Inspection and test results of protection systems

Schedule 6—Clearance from aerial lines

Schedule 7—Forms for warrants

Legislative history

Part 1—Preliminary

1—Short title

These regulations may be cited as the *Electricity (General) Regulations 1997*.

4—Interpretation

- (1) In these regulations, unless the contrary intention appears—

Act means the *Electricity Act 1996*;

active, in relation to a conductor, means—

- (a) any one of the conductors of a power system which is maintained at a difference of potential from—

- (i) the neutral conductor; or

- (ii) an earthed conductor; or
- (b) if a power system does not include a neutral or earthed conductor—all conductors;

aerial line means a powerline placed above the ground and in the open air, but does not include bus bars or any direct current conductors used as traction trolley wires;

AS or **Australian Standard**, followed by a number, or **AS/NZS** or **Australian/New Zealand Standard** followed by a number, is a reference to the standard published by Standards Australia as in force from time to time;

centre-line, in relation to an aerial line, means a notional vertical plane extending upwards from any point on the ground and running through, and connecting, the centre of each structure that supports the aerial line;

circuit means any number of conductors connected together for the purpose of carrying current;

conductor means a wire, or other form of conducting material suitable for carrying current, other than wires, cables or other metallic parts directly used in converting electrical energy into another form of energy;

connection point means a connection point to a transmission or distribution network;

facade mounted line means an aerial line attached to a building;

high voltage or **HV**, in relation to electricity, means electricity at a voltage exceeding 1 000 volts alternating current (**ac**) or 1 500 volts direct current (**dc**);

insulated means contained within a material or medium (including air) in order to limit the flow of current between conductors at different potentials;

insulated conductor means a conductor that—

- (a) is wholly covered with insulating material in accordance with the appropriate requirements of the relevant Approval and Test specification of an Australian Standard; or
- (b) is of a type approved by the Technical Regulator;

live—a term applied to an object when a difference of potential exists or would exist between it and earth under normal conditions of operation, including all metal connected to the neutral conductor of the supply system even if such neutral is earthed at the source of supply; but the following are not to be taken to be live:

- (a) earthing conductors; and
- (b) copper sheaths of Mineral Insulated Metal Sheathed (**MIMS**) cables used in Earthed Sheathed Return (**ESR**) systems; and
- (c) neutral busbars or links in installations where the multiple earthed neutral system is employed;

low voltage or **LV** has the same meaning as in AS/NZS 3000;

multiple earthed neutral system or **MEN system** means a system of earthing in which the parts of an electrical installation required by AS/NZS 3000 to be earthed—

- (a) are connected to the general mass of earth; and

- (b) are connected within the installation to the neutral conductor of the supply system;

nominal system voltage means the voltage by which a system of supply is designated and to which certain operating characteristics of that system of supply are referred in accordance with AS 2926;

operator, in relation to a transmission or distribution network, any electricity infrastructure or any electrical installation, means the person who operates, owns or controls the network, infrastructure or installation;

other cable system means—

- (a) telecommunication and control cables; or
- (b) aerial earthed cables; or
- (c) electrolysis drainage cables,

attached to, or in the vicinity of, structures supporting cables under the control of an electricity entity;

retail contract means a contract between an electricity entity and a customer for the sale and purchase of electricity;

service line means the terminating span of a powerline—

- (a) constructed or designed or ordinarily used for the supply of electricity at low voltage; and
- (b) through which electricity is or is intended to be supplied by an electricity entity to a customer from the transmission or distribution network of the entity;

substation means any premises or place (including a switchyard) in which high voltage supply is converted, controlled or transformed;

U, in relation to voltage of electricity, means nominal system voltage;

underground line means a powerline which is placed under the ground, including those portions which are erected above the ground.

- (3) A provision contained in a standard, code, guide or other document that is required to be complied with under these regulations is not, despite that requirement, to be taken to be a mandatory provision for the purposes of these regulations unless it is expressed in mandatory terms.
- (4) In subregulation (3), a reference to a standard, code, guide or other document includes a reference to a part of a standard, code, guide or other document.

4A—Interpretation—definition of annual electricity consumption level

- (1) For the purposes of the definition of **annual electricity consumption level** in section 4 of the Act, the following provisions apply to the determination of a customer's annual electricity consumption level:
 - (a) the customer's annual electricity consumption level is to be determined for each metered connection point through which the customer has or seeks electricity supply under a retail contract;

- (b) if the customer has been entitled under a retail contract to electricity supply through the connection point for the 12 months immediately preceding the relevant day, the customer's annual electricity consumption level for the connection point is—
 - (i) the actual volume of the electricity supply, expressed in MW.h, through the connection point for that 12 months period as measured by the meter at the connection point; or
 - (ii) if the measurement of the volume of electricity by the meter has been significantly affected by inaccuracies during that 12 months period—the estimated volume of the electricity supply, expressed in MW.h, through the connection point for the 12 months immediately following the relevant day;
 - (c) if the customer has not been entitled under a retail contract to electricity supply through the connection point for the 12 months immediately preceding the relevant day, the customer's annual electricity consumption level for the connection point is the estimated volume of the electricity supply, expressed in MW.h, through the connection point for the 12 months immediately following the relevant day;
 - (d) an estimate is to be made for the purposes of paragraph (b) or (c) taking into account relevant past electricity consumption levels, the electricity consumption level of plant and equipment to be powered through the connection point, the operations for which electricity is required to be supplied through the connection point and other relevant factors;
 - (e) the determination of the actual or estimated volume of electricity supply through the connection point may be by agreement between the customer and the electricity entity or, failing such agreement, will be a matter for the decision of the Commission on application to the Commission by the customer or the entity;
 - (f) a determination under this regulation of the customer's annual electricity consumption level for the connection point continues in operation from the relevant day until—
 - (i) the customer ceases to be entitled to electricity supply through the connection point under a retail contract with the electricity entity; or
 - (ii) a subsequent determination is made under this regulation of the customer's annual electricity consumption level for the connection point,whichever first occurs;
 - (g) at least 12 months must elapse from the relevant day before a subsequent determination is made under this regulation of the customer's annual electricity consumption level for the connection point.
- (2) In this regulation—
- the relevant day***, in relation to the determination of the customer's annual electricity consumption level for the connection point, means—
- (a) the day on which the determination is made; or

- (b) if some earlier or later day is agreed to by the customer and the electricity entity, or is decided on by the Commission, as the relevant day for the purposes of the determination—that day.

4B—Interpretation—definition of small customer

For the purposes of the definition of *small customer* in section 4 of the Act, each customer whose annual electricity consumption level for a connection point is less than 160 MW.h is classified as a small customer in relation to electricity supply to the customer through the connection point.

5—Interpretation—definition of retailing

For the purposes of the definition of the term in section 4 of the Act, *retailing* of electricity does not include the following activities:

- (b) a customer charging for the supply of electricity if the charge forms an unspecified part of rent or charges for the occupation or use of premises;
- (c) a holder of a licence authorising the operation of an electricity generating plant charging a fee for supplying electricity to another person who is the holder of a licence authorising the operation of a transmission or distribution network.

5AB—Interpretation—definition of electricity supply industry

- (1) For the purposes of the definition of *electricity supply industry* in section 4 of the Act, the following are operations of a prescribed kind:
 - (a) the provision, operation or maintenance of poles, equipment, fittings or wiring associated with the provision of lighting in a street or other place;
 - (b) operations conducted in relation to the Leigh Creek township, railway or mine by—
 - (i) Flinders Power Pty Ltd (ACN 082 988 270); or
 - (ii) NRGenerating Holdings (No. 2) GmbH (ARBN 094 284 723), Flinders Labuan (No. 1) Ltd (ARBN 094 284 812) and Flinders Labuan (No. 2) Ltd (ARBN 094 284 769), or a body related to any of those bodies.
- (2) Bodies are related for the purposes of this regulation if—
 - (a) one takes over or otherwise acquires the business or part of the business of the other; or
 - (b) they are related bodies corporate within the meaning of the *Corporations Law*; or
 - (c) a series of relationships can be traced between them under paragraph (a) or (b).

5AC—Compliance with standards that are varied or substituted

- (1) Despite a requirement of these regulations for work to be carried out in accordance with a standard as in force from time to time, where the standard is varied or substituted, work for the installation, commissioning or modification of electricity infrastructure or an electrical installation may be carried out in accordance with the old standard—
 - (a) if—
 - (i) design work for that installation, commissioning or modification had been completed before (but not more than 1 month before) the publication of the new standard; or
 - (ii) the work (disregarding design or other preparatory work) had commenced before the publication of the new standard; or
 - (iii) the work commenced after the publication of the new standard and is to be completed within 6 months after that publication; or
 - (iv) the work is connected with the construction of premises and construction work had commenced before the publication of the new standard; or
 - (b) in any other case—with the approval of the Technical Regulator, on terms and conditions the Technical Regulator considers appropriate.
- (2) If—
 - (a) pursuant to subregulation (1) work is purportedly carried out in accordance with an old standard; and
 - (b) the work complies with that old standard,an approval or certification that the work complies with the standard may be given for the purposes of these regulations.
- (3) In this regulation—
 - (a) a reference to a **standard** includes a reference to—
 - (i) a code, guide or other document; and
 - (ii) a part of a standard, code, guide or other document; and
 - (b) a standard as in force following the variation or substitution of the standard is referred to as the **new standard**; and
 - (c) a standard as in force immediately prior to the variation or substitution of the standard is referred to as the **old standard**; and
 - (d) a reference to **work** includes a reference to examinations and tests related to the work.
- (4) This regulation does not apply in relation to the National Electricity Code or a code made by the Commission under the *Essential Services Commission Act 2002*.

Part 1A—Administration

5C—Functions and powers of Commission

- (1) Pursuant to section 6A of the Act, the Commission has (in addition to the Commission's functions and powers under the Act and the *Essential Services Commission Act 2002*) the following functions and powers:
 - (a) to disclose, with the consent of the customer of the holder of a licence authorising the retailing of electricity, the name, address and other contact details from time to time of the customer to the holders of other licences authorising the retailing of electricity;
 - (b) if the Commission has agreed in writing to determine matters under a contract between two or more electricity entities at the expense of one or more of the entities—to determine those matters in accordance with the terms of the contract;
 - (ba) if a sale/lease agreement (within the meaning of the *Electricity Corporations (Restructuring and Disposal) Act 1999*) contemplates that the Commission will determine certain matters—to determine those matters in accordance with the terms of the agreement;
 - (c) subject to subregulation (2), functions and powers conferred on the Jurisdictional Regulator under the National Electricity Code to the extent that those functions and powers are not authorised by the State, pursuant to the National Electricity Code, to be exclusively performed or exercised by some other body or bodies.
- (2) The Commission must only approve a distribution loss factor that has been calculated for the purposes of the National Electricity Code by the holder of a licence authorising the operation of a distribution network if the distribution loss factor—
 - (a) has been calculated on a State-wide basis by reference to voltage level and proximity of a customer's metering point to a transformer; and
 - (b) is not related to the relative length of a distribution line involved in supplying electricity to the customer.
- (3) Terms defined in an electricity pricing order under Division 2A of Part 3 of the Act have the same meaning when used in subregulation (2).

5D—Application of *Public Corporations Act 1993* to Electricity Supply Industry Planning Council

Pursuant to section 6D of the Act, the *Public Corporations Act 1993* applies to the Electricity Supply Industry Planning Council subject to the following exclusions and modifications:

- (a) section 13 of that Act does not apply;
- (b) section 19 of that Act is modified in its application to a director appointed after consultation under section 6G(5) of the Act with licensees of a particular class so that—

- (i) nothing in the section is to be taken to prevent the director from representing the interests of licensees of that class and participating in meetings or discussions and voting accordingly; and
- (ii) a general disclosure of an interest that the director has by reason of his or her relationship with a licensee of that class will be sufficient disclosure of the interest for the purposes of the section if made in advance in a general form.

5E—Functions of Electricity Supply Industry Planning Council

Pursuant to section 6E of the Act, the Electricity Supply Industry Planning Council has the following functions:

- (a) to monitor and investigate major interruptions to the electricity supply in this State and to advise the Minister in respect of—
 - (i) the causes or likely causes of such interruptions;
 - (ii) the nature and extent of such interruptions;
 - (iii) the actual and likely effects and duration of such interruptions;
 - (iv) the steps taken by electricity entities and others to manage such interruptions and to restore and maintain electricity supply;
 - (v) the adequacy, appropriateness and timeliness of those steps;
 - (vi) the action that should be taken by electricity entities and others to minimise the likelihood of future such interruptions;
 - (vii) any other matter relating to such interruptions that the Planning Council considers appropriate;
- (b) if an officer or employee of the Planning Council is nominated as a person responsible for fulfilling obligations under a protocol agreed by the jurisdictions participating in the National Electricity Market (*ie* the market regulated by the *National Electricity Law*) relating to the use of emergency powers that may affect the operation of that market—to facilitate the fulfilment of those obligations.

Part 2—Licensing of electricity entities

6—Exemptions from requirement to be licensed

- (1) A person who carries on operations in the electricity supply industry (the *operator*) is exempt from the requirement to hold a licence under the Act authorising the operations if the electricity in relation to which the operations are carried on is only for the consumption of one or more of the following:
 - (a) the operator;
 - (b) a designated body;
 - (c) a person at premises occupied or used by the person as a tenant or licensee (whether directly or indirectly) of the operator or a designated body where that person is not charged for the supply of electricity except by an electricity entity or as an unspecified part of rent or charges for the occupation or use of the premises.

- (2) A person who carries on the generation of electricity is exempt from the requirement to hold a licence under the Act authorising the operations if—
- (a) the generating plant has a rated nameplate output of 100 kVA or less; or
 - (b) the person does not supply electricity for reward to or by means of a transmission or distribution network.
- (3) A person who carries on operations as an inset network operator or inset network retailer is exempt from the requirement to hold a licence under the Act authorising the operations subject to the following conditions:
- (e) a transitional inset customer may only be charged for—
 - (i) electricity supplied through the inset network on or after 1 January 2003; or
 - (ii) services or things provided on or after that date in connection with that supply of electricity,
an amount not exceeding the applicable amount (if any) according to the scale of charges fixed by the Commission under subregulation (4);
 - (f) an inset customer must be kept informed of—
 - (i) the nature of any arrangements for the purchase of electricity for the inset network made between the inset network operator or retailer and a licensed retailer for any period for which the customer purchases electricity from the inset network retailer; and
 - (ii) if the customer is to make a payment for or contribution towards the cost of electricity consumed in common areas, or for shared facilities, at the premises served by the inset network—
 - (A) the total amount of electricity so consumed; and
 - (B) the amount paid by the inset network operator or retailer for that electricity;
 - (g) an inset customer (other than a transitional inset customer) must have an effective right of access to a licensed retailer of the customer's choice;
 - (h) the inset network operator or retailer must follow processes of a kind approved by the Commission to resolve disputes with inset customers about the sale or supply of electricity.
- (4) The Commission must fix a scale of charges for classes of inset customers for the purposes of subregulation (3)(e) that the Commission considers fair and reasonable having regard to the prices that such classes of customers could obtain from licensed retailers.
- (5) An exemption under this regulation is (in addition to any other condition to which it is expressed to be subject under this regulation) subject to the condition that the person comply with any requirement imposed by or under the Act, these regulations, the National Electricity Code or a code made by the Commission under the *Essential Services Commission Act 2002* as if the person were an electricity entity authorised by a licence to carry on the operations to which the exemption relates.

- (6) An exemption from subregulation (5), or from specified requirements referred to in that subregulation, may be granted by—
- (a) in relation to Part 6 of the Act or Parts 4, 5 and 6 of these regulations or any safety requirement—the Technical Regulator, on terms and conditions the Technical Regulator considers appropriate; or
 - (b) in any other case—the Commission, on terms and conditions the Commission considers appropriate.
- (8) For the purposes of this regulation, an inset customer has ***an effective right of access to a licensed retailer of the customer's choice*** only if the customer may—
- (a) have access to and use the inset network for the purpose of consuming electricity purchased by the customer from a licensed retailer of the customer's choice; and
 - (b) install, maintain and use meters and other equipment necessary for that purpose,

without any charge being payable by the customer (other than to the licensed retailer) or by the licensed retailer.

- (9) In this regulation—

community or strata title premises means premises the subject of the same community plan under the *Community Titles Act 1996* or the same strata plan under the *Strata Titles Act 1988*;

designated body means a body or group of persons designated by the Minister by notice in the Gazette;

inset customer, in relation to an inset network, means a person (other than the inset network operator or the inset network retailer) who has or seeks a supply of electricity from the inset network;

inset network means a transmission or distribution network that serves only a group of premises in the same ownership or community or strata title premises;

inset network operator means a person who operates an inset network;

inset network retailer means a person (other than an electricity entity) who retails electricity supplied through an inset network;

licensed retailer means an electricity entity licensed to retail electricity;

premises includes part of premises;

transitional inset customer means—

- (a) an inset customer who occupies or uses part of a group of premises in the same ownership under a lease or licence granted before 1 January 2003,

but does not include an inset customer if—

- (c) the premises served by the inset network resulted from or were affected by building work commenced on or after the commencement of this regulation; and

- (d) there were no inset customers residing or carrying on business at the premises served by the network during all or part of the period over which the building work was carried out.
- (10) The Minister may—
- (a) by notice in the Gazette, designate a body or group of persons for the purposes of the definition of *designated body*; and
 - (b) by subsequent notice in the Gazette, vary or revoke a notice under this subregulation.

7—Licence fees and returns

- (1) For the purposes of section 20(2) of the Act, the licence fee, or the first instalment of the licence fee, (as the case may require) must be paid before the anniversary in each year of the day on which the licence was issued.
- (2) For the purposes of section 20(2) of the Act, an annual return must be lodged before 31 August in each year.
- (3) For the purposes of section 20(5) of the Act, the penalty for default—
 - (a) for failing to pay a licence fee, or an instalment of a licence fee, is 10% per annum of the outstanding amount calculated daily on a cumulative basis;
 - (b) for failing to lodge an annual return is \$500.
- (4) The following costs are prescribed for the purposes of paragraph (d) of the definition of *administrative costs* in section 20(7) of the Act:
 - (a) the costs of any committee established for the purpose of advising the Minister in relation to the preparation of programs for the undergrounding of powerlines under section 58A of the Act;
 - (b) the costs of administration of the *Electrical Products Act 2000*.

7A—Consideration of application for licence

Pursuant to section 17(3)(d) of the Act, the following are prescribed as matters that the Commission may consider in deciding whether an applicant is a suitable person to hold a licence authorising the retailing of electricity:

- (a) whether the applicant holds or has held such a licence;
- (b) if the applicant holds such a licence—the duration of contracts for the retailing of electricity entered into by the applicant;
- (c) if the applicant holds or has held such a licence—whether the applicant has been guilty of a contravention of a condition of the licence or any other contravention of a requirement imposed by or under the Act in connection with the operations authorised by the licence.

7AB—Prescribed class of customers for purposes of section 24(2)(b) of Act

For the purposes of section 24(2)(b) of the Act, each small customer is a customer of a prescribed class.

7ABA—Prescribed date for purposes of section 24(2)(d) of Act

For the purposes of section 24(2)(d) of the Act, 1 July 2004 is the prescribed date.

7ABB—Prescribed information in small customer accounts for purposes of section 24(2)(da) of Act

For the purposes of section 24(2)(da) of the Act, the following provisions apply:

- (a) the electricity entity must include in each account for electricity charges sent to a small customer for electricity supply through a particular metered connection point the following information:
 - (i) the customer's average daily consumption level, expressed in kW.h, of electricity supplied through the connection point for the period to which the account relates;
 - (ii) the customer's average daily consumption level, expressed in kW.h, of electricity supplied through the connection point for each period during the preceding 12 months in respect of which the customer was sent by the entity an account for electricity supply through the connection point;
 - (iii) the average daily cost to the customer of electricity supplied to the customer through the connection point during the period to which the account relates;
 - (iv) the amount of greenhouse gas emissions associated with the customer's consumption of electricity supplied through the connection point for the period to which the account relates;
 - (v) the amount of greenhouse gas emissions associated with the customer's consumption of electricity supplied through the connection point for each period during the preceding 12 months in respect of which the customer was sent by the entity an account for electricity supply through the connection point;
- (b) the information referred to in paragraphs (a)(ii) and (a)(v) must be presented in graphical form;
- (c) the amounts of the greenhouse gas emissions referred to in paragraphs (a)(iv) and (a)(v) must be calculated, in a manner approved by the Commission, by reference to material about emissions coefficients published by the Australian Greenhouse Office of the Department of the Environment and Heritage of the Australian Government;
- (d) the information referred to in paragraph (a) must be accompanied by explanatory material of a kind approved by the Commission;
- (e) the information and explanatory material referred to in paragraphs (a) and (d) must be presented in a print size and format approved by the Commission;
- (f) the electricity entity must also include in each account for electricity charges sent to a small customer the following statement:

For more information about energy efficiency and to compare energy retail prices, visit www.escosa.sa.gov.au or call
[telephone number as specified by the Commission by written notice to the entity];
- (g) the statement referred to in paragraph (f) must be presented in the first page of each account in 9 point bold font.

7AC—Ombudsman scheme

For the purposes of sections 23(1)(k) and 24(2)(l) of the Act, the gas supply industry is prescribed.

Part 2A—System controller

7B—Functions and powers of system controller

- (1) Pursuant to section 31 of the Act, the functions of a system controller for a power system operated in the National Electricity Market are limited to the following:
 - (a) when required to do so under the *National Electricity (South Australia) Law* or any Act, giving appropriate directions to electricity entities that are engaged in the operation of the power system, or contribute electricity to, or take electricity from, the system, for the purposes of maintaining the system in, or restoring it to, a safe and reliable state of operation;
 - (b) functions or powers performed or exercised as an agent employed by, or pursuant to a contractual arrangement with, NEMMCO under Chapter 4 of the National Electricity Code;
 - (c) when required to do so under the National Electricity Code, under an agency or contractual arrangement of a kind referred to in paragraph (b) or under any other agreement—
 - (i) undertaking action to protect such parts of the transmission network as are necessary to maintain the security of the power system;
 - (ii) managing the interruption of, and coordinating the restoration of, loads placed on the power system;
 - (iii) taking specified steps to restore the power system to a safe and reliable state of operation;
 - (iv) monitoring the operation of the power system with a view to ensuring that the system operates safely and reliably;
 - (v) maintaining voltage control throughout the power system;
 - (vi) shedding loads placed on the power system to the extent necessary during emergency situations.
- (2) A system controller for a power system operated in the National Electricity Market has all powers necessary for, or incidental to, the proper performance of the functions set out in subregulation (1).
- (3) In this regulation—

National Electricity Market means the market regulated by the *National Electricity Law*;

NEMMCO means National Electricity Market Management Company Limited ACN 072 010 327.

Part 2B—Standard terms and conditions for sale or supply

7C—Prescribed classes of customers

For the purposes of sections 23(1)(n)(iv) and 36(1) of the Act—

- (a) each customer whose annual electricity consumption level for a metered connection point equals or exceeds 160 MW.h is a customer of a prescribed class in relation to electricity supply to the customer through the connection point;
- (b) each customer whose annual electricity consumption level for a metered connection point equals or exceeds 30 MW.h but is less than 160 MW.h is a customer of a prescribed class in relation to electricity supply to the customer through the connection point;
- (c) each customer whose annual electricity consumption level for a metered connection point is less than 30 MW.h is a customer of a prescribed class in relation to electricity supply to the customer through the connection point;
- (d) each customer to whom electricity must be supplied under a retailer of last resort requirement (see section 23(1)(n)(ix)) is a customer of a prescribed class in relation to electricity supply to the customer in accordance with the requirement.

Part 2C—Special provisions relating to small customers

7D—Interpretation

In this Part—

business day means a day other than a Saturday or a Sunday or other public holiday;

default contract means a retail contract under which an electricity entity to which section 36AB of the Act applies sells electricity at the entity's default contract price and subject to the entity's default contract terms and conditions;

default contract price and ***default contract terms and conditions*** have the same respective meanings as in section 36AB of the Act;

excluded area means an area—

- (a) that is not served by the same continuous network for the transmission and distribution of electricity that serves Adelaide; or
- (b) that is for the time being determined by the Minister to be an excluded area;

market contract means a retail contract other than a standing contract or default contract;

standing contract means a retail contract under which an electricity entity to which section 36AA of the Act applies sells electricity at the entity's standing contract price and subject to the entity's standing contract terms and conditions;

standing contract price and ***standing contract terms and conditions*** have the same respective meanings as in section 36AA of the Act.

7E—Exemption from standing contract condition

An electricity entity to which section 36AA of the Act applies is exempt from the application of subsection (2) of that section in relation to the sale of electricity to be supplied through a particular connection point if—

- (a) the connection point is situated within an excluded area; or
- (b) the customer is bound to receive electricity supply through the connection point under a market contract.

7F—Provisions relating to default contracts

- (1) If a person receives electricity supply through a connection point otherwise than under a retail contract—

- (a) that person; and
- (b) the electricity entity that was last a party to a retail contract in relation to that connection point,

become parties to a default contract in relation to that connection point for the purposes of section 36AB(2) of the Act.

- (2) Subregulation (1) does not apply in relation to a connection point situated within an excluded area.
- (3) The default contract continues until—
- (a) the customer becomes a party to a market contract or standing contract (whether with the same entity or some other electricity entity) in relation to the connection point; or
 - (b) some other person becomes a party to a retail contract in relation to the connection point.
- (4) On the electricity entity becoming aware that it has become a party to the default contract, the entity must, within 5 business days, give the customer a written notice setting out the terms and conditions of the default contract and describing, in general terms, the other contractual options that may be available to the customer for the purchase of electricity.
- (5) The electricity entity must, in giving notice under subregulation (4), comply with any requirements imposed by a code made by the Commission under the *Essential Services Commission Act 2002*, relating to the contents of the notice or the manner in which the notice is to be given.
- (6) For the purposes of the definition of **default contract price** in section 36AB(3) of the Act, the prescribed period is—
- (a) before 1 January 2003—90 days;
 - (b) on or after 1 January 2003—28 days.

Part 3—Electricity entities' powers and duties

8—Carrying out certain work on public land

- (1) For the purposes of section 47(5) of the Act, prior notice and agreement are not required under section 47(3) of the Act for—
 - (a) work in an emergency; or
 - (b) maintenance or repairs of existing electricity infrastructure, including any necessary excavation or removal of obstructions.
- (2) For the purposes of section 47(6) of the Act, agreement is not required under section 47(3) of the Act for—
 - (a) erection of pad-mount transformers and switching cubicles in connection with the installation of underground lines; or
 - (b) installation or relocation of electricity infrastructure as a part of road reconstruction; or
 - (c) alterations or additions to existing electricity infrastructure not involving any significant enlargement of the area of public land occupied by the infrastructure or any significant change in appearance; or
 - (d) relocation of a pole or supporting structure in an existing electricity cable system.

Part 3A—Undergrounding of powerlines

8A—Prescribed amount for undergrounding work

For the purposes of section 58A(3) of the Act, the amount is—

- (a) for the financial year 1999/2000—\$4.2 million;
- (b) for the financial year 2000/2001—the amount determined by the Minister in accordance with the following formula:

$$A = \$4.4 \text{ million} \times \frac{CPI_x}{CPI_1}$$

where—

CPI_x is the Consumer Price Index, All Groups Index Number (All Cities) published by the Australian Bureau of Statistics, for the March quarter 2000;

CPI_1 is the Consumer Price Index, All Groups Index Number (All Cities) published by the Australian Bureau of Statistics, for the March quarter 1999;

- (c) for each subsequent financial year—the amount determined by the Minister in accordance with the following formula:

$$A = \left[\$4.2 \text{ million} \times \frac{CPI_x}{CPI_1} \right] + \left[\frac{A_x}{TC_x} \times GST_x \right]$$

where—

CPI_x is the Consumer Price Index, All Groups Index Number (All Cities) published by the Australian Bureau of Statistics, for the March quarter preceding the financial year concerned;

CPI_1 is the Consumer Price Index, All Groups Index Number (All Cities) published by the Australian Bureau of Statistics, for the March quarter 1999;

A_x is the amount (in dollars) determined by the Minister under this regulation for the purposes of section 58A(3) of the Act for the previous financial year;

TC_x is the total cost (in dollars) of the undergrounding work undertaken in the previous financial year in accordance with programs prepared under section 58A of the Act;

GST_x is the amount (in dollars) determined by the Minister as being the total GST (within the meaning of the *A New Tax System (Goods and Services Tax) Act 1999* of the Commonwealth, as amended from time to time) paid in respect of all undergrounding work undertaken in the previous financial year in accordance with programs prepared under section 58A of the Act.

Part 4—Safety and technical issues

Division 1—Safety and technical requirements

9—Purpose of Division

The requirements contained in this Division and related Schedules are safety or technical requirements for the purposes of sections 59 and 60 of the Act.

10—Quality of electricity supply

Electricity infrastructure must be designed, installed, operated and maintained so that—

- (a) the voltage at a customer's point of supply is generally as set out in AS 2926 and the voltage fluctuations that occur at a customer's point of supply are generally contained within the limits set out in AS 2279.

11—General requirements for electricity infrastructure

- (1) No circuit in electricity infrastructure may be allowed to remain in service unless every part of the circuit functions in a safe manner.
- (2) Each active conductor of a high voltage powerline or other high voltage equipment must be protected by an automatic disconnecting device.
- (3) Metal components of electricity infrastructure not normally conducting electricity that may become energised must be connected to earth.
- (4) Electricity infrastructure must be adequately protected against earth faults.

12—Aerial lines

- (1) Aerial lines (including service lines) must be designed, installed, operated and maintained to be safe for the electrical service conditions and the physical environment in which they will operate.
- (2) Without limiting the effect of subregulation (1), line construction in a bushfire risk area must be suitable for the levels of hazard in the area.
- (3) Schedule 2 applies in relation to aerial lines (including service lines) installed after 1 July 1997.

13—Underground lines

- (1) Underground lines (including service lines) must be designed, installed, operated and maintained to be safe for the electrical service conditions and the physical environment in which they will operate.
- (2) Schedule 3 applies in relation to underground lines (including service lines) installed after 1 July 1997.

14—Powerlines other than aerial or underground lines

- (1) Powerlines, other than aerial lines or underground lines, must be designed, installed, operated and maintained to be safe for the electrical service conditions and the physical environment in which they will operate.
- (2) Schedule 3 (other than clauses 6, 7 and 9) applies in relation to such powerlines installed after 1 July 1997 in the same way as to underground lines.

15—Substations

- (1) Substations must be designed, installed, operated and maintained to be safe for the electrical service conditions and the physical environment in which they will operate.
- (2) Schedule 4 applies in relation to substations installed after 1 July 1997.

16—Earthing and electrical protection systems

- (1) Earthing and electrical protection systems must be designed, installed, operated and maintained to safely manage abnormal electricity network conditions likely to significantly increase the risk of personal injury or significant property damage.
- (2) Schedule 5 applies in relation to earthing and electrical protection systems installed after 1 July 1997.

17—Electrical installations

- (1) Electrical installations must comply with AS/NZS 3000 and any other Australian Standard or Australian/New Zealand Standard called up by AS/NZS 3000.
- (2) Despite any other regulation—
 - (a) aerial lines, underground lines or other powerlines; and
 - (b) earthing and electrical protection systems,that form part of an electrical installation and that comply with AS/NZS 3000 and any other Australian Standard or Australian/New Zealand Standard called up by AS/NZS 3000, will be taken to comply with these regulations.

Division 2—Certain electrical installation work

18—Certain electrical installation work and certificates of compliance

- (1) The following provisions apply for the purposes of section 61(1) of the Act:
- (a) work on an electrical installation or proposed electrical installation that is work of any kind referred to in AS/NZS 3000 or another Australian Standard or Australian/New Zealand Standard called up by AS/NZS 3000 must be carried out, and the installation must be examined and tested—
 - (i) in accordance with AS/NZS 3000 and any Australian Standard or Australian/New Zealand Standard called up by or under AS/NZS 3000 and so that the installation complies with any other technical and safety requirements under these regulations; and
 - (ii) in accordance with any requirements specified by the operator of the transmission or distribution network to which the installation is or is to be connected;
 - (b) the registered electrical worker personally carrying out the examinations and tests must, when satisfied that the work has been carried out in accordance with the standards and requirements referred to in paragraph (a) and before the installation is made available for energisation, complete and sign a certificate of compliance to that effect;
 - (ba) the certificate of compliance must be completed using only an official form published or produced under the authority of the Technical Regulator;
 - (c) if the worker signing the certificate was employed or engaged to carry out the examinations and tests (whether or not together with other work on the installation) by a licensed electrical contractor or licensed building work contractor, that contractor, or a person who has or had a supervisory role in relation to the worker and who is acting as a duly authorised agent of the contractor, must, being satisfied that the standards and requirements referred to in paragraph (a) have been complied with in relation to the work, also complete and sign the certificate in accordance with the directions contained in it;
 - (d) if the work is associated with the making of a connection to a transmission or distribution network, a copy of the certificate (completed and signed in accordance with paragraphs (b) and (c)) must be furnished to the operator of the network before the energisation of the work or a part of the work;
 - (e) if the work was carried out on behalf of the owner or occupier of the premises concerned (whether under a contract or arrangement made directly between the owner or occupier and the person to whom section 61 of the Act applies, under a subcontract or otherwise), a copy of the certificate (completed and signed in accordance with paragraphs (b) and (c)) must be furnished to the owner or occupier within 30 days after the installation was made available for energisation;

- (f) a copy of the certificate (completed and signed in accordance with paragraphs (b) and (c)) must be kept at the business premises of the person to whom section 61 of the Act applies or, if that person does not have business premises, at that person's residence for at least five years after the installation was made available for energisation.
- (2) A certificate of compliance may not be relied on by an owner or operator of an electrical installation under section 60(2) of the Act if the certificate has been issued in relation to the installation by a registered electrical worker who is an employee of the owner or occupier.
- (3) The provisions of this regulation relating to certificates of compliance do not apply in relation to work on an electrical installation or proposed electrical installation in specified premises if the Technical Regulator has given an exemption under this regulation in respect of the premises and the conditions of the exemption are complied with.
- (4) The Technical Regulator may, on application or on the Technical Regulator's own initiative, give an exemption as referred to in subregulation (3) subject to such conditions as the Technical Regulator thinks fit, including conditions as to the keeping of records relating to electrical work in the premises.

Division 3—Safeguarding persons working with conductors or electrical equipment

Subdivision 1—General

19—Basic safety principle

Persons engaging or preparing to engage in work on or near electricity infrastructure or an electrical installation must treat exposed conductors as live until they are—

- (a) isolated from all sources of electricity supply and proved to be de-energised; and
- (b) if they are high voltage conductors—earthed.

20—Compliance with provisions of Division

- (1) Persons carrying out work on or near electricity infrastructure or an electrical installation must comply with the provisions of this Division.
- (2) Electricity infrastructure operators, electrical installation operators and employers must ensure compliance with the provisions of this Division with respect to their employees and contractors.

Subdivision 2—Work on or near live electric conductors or electrical equipment

21—Application of Subdivision

This Subdivision applies to work carried out—

- (a) in proximity to exposed live high or low voltage conductors or exposed live parts of high or low voltage electrical equipment; or

- (b) by direct contact with exposed live high or low voltage conductors or exposed live parts of high or low voltage electrical equipment; or
- (c) on de-energised exposed conductors or exposed parts of electrical equipment if there is a possibility of the conductors or parts becoming live,

unless the work is necessary to avoid a possible danger to life or serious personal injury.

22—Safe work practices

All reasonable steps must be taken to ensure safety in work to which this Subdivision applies through—

- (a) the provision of suitable protection from adjacent live electrical conductors or adjacent live parts of electrical equipment; and
- (b) the use of insulated tools and equipment; and
- (c) the use of equipment and plant designed and made in accordance with recognised electricity industry practice; and
- (d) the use of safe work practices.

23—Work involving danger of direct contact with live conductors etc

In the case of work involving a danger of accidental direct contact with exposed live conductors or exposed live parts of electrical equipment—

- (a) the work must only be carried out by a person who is competent and qualified to carry out the work; and
- (b) except where the contrary is shown by reference to generally accepted industry practices or the particular circumstances of the case, it will be presumed that safe work practices require the person to carry out the work with a competent assistant suitably trained in the work and—
 - (i) in resuscitation; and
 - (ii) in releasing persons from live electrical apparatus; and
 - (iii) if appropriate, in rescuing persons from poles, structures, elevated work platforms or confined spaces.

23A—Work in proximity to exposed conductors etc

- (1) Work must not be carried out in proximity to exposed conductors or exposed parts of electrical equipment unless—
 - (a) it is carried out—
 - (i) by a person who is suitably trained and qualified for such work beyond the approach limits set out in this regulation for such persons; or
 - (ii) by a person who has been instructed in the identification of high and low voltage overhead conductors and the safety aspects of work near live powerlines beyond the approach limits set out in this regulation for such persons; and

- (b) it is carried out beyond the approach limits set out in this regulation that are applicable in the circumstances.
- (2) However, a person may work within the approach limits if—
- (a) the work can be carried out safely in any of the following circumstances:
- (i) there are installed suitable barriers or earthed metal shields between the person carrying out the work and the conductors or electrical equipment;
 - (ii) the work to be carried out is testing of equipment and the equipment is designed such that the approach limits cannot be complied with;
 - (iii) the work to be carried out is earthing of the conductors or equipment and is carried out after the exposed conductors have been isolated and proved to be de-energised; and
- (b) written instructions have been given, either generally or in a particular case, about the work and the precautions to be taken.
- (3) For the purposes of this regulation, the approach limits for a person, including an article of clothing worn by a person, or a conductive object held or carried by the person, are set out below—

Voltage of conductor or equipment	Approach limit A	Approach limit B	Approach limit C	
	(Distance in metres)			
	(i)	(ii)		
Not more than 1000V	0	0.3	3.0	1.0
More than 1000V but not more than 11kV	0.3	0.6	3.0	2.0
More than 11kV but not more than 33kV	0.45	0.9	3.0	3.0
66kV	0.7	1.4	4.0	4.0
132kV	1.2	2.4	5.0	5.0
275kV	2.0	4.0	6.0	6.0

where—

- (a) approach limit A applies to a person suitably qualified and trained to work in proximity to exposed high and low voltage conductors or exposed parts of high and low voltage electrical equipment;
- (b) approach limit B applies to a person who has been instructed in the identification of high and low voltage overhead conductors and the safety aspects of work near live powerlines;
- (c) approach limit C(i) applies to a person using power operated tools;
- (d) approach limit C(ii) applies to a person using manually operated tools.

Subdivision 3—Work on or near exposed high voltage conductors or electrical equipment

24—Work above exposed high voltage conductors etc

Work must not be carried out and equipment must not be positioned above exposed high voltage conductors or exposed parts of high voltage electrical equipment unless the work or positioning of the equipment is authorised in writing by the operator of the electricity infrastructure or electrical installation concerned.

26—Work by direct contact with exposed high voltage conductors etc

- (1) Work must not be carried out by direct contact with exposed high voltage conductors or exposed parts of high voltage electrical equipment unless the exposed high voltage conductors or exposed parts of high voltage electrical equipment are—
 - (a) isolated, and shown by testing to be isolated, from all sources of electricity supply; and
 - (b) earthed.
- (2) If any such conductor or equipment cannot be directly contacted to prove isolation from all sources of electricity supply, it is sufficient if—
 - (a) written instructions have been given for the isolation of the conductor or equipment from all sources of electricity supply; and
 - (b) the conductor or equipment is earthed by a lockable earthing switch designed to be safely operated if the high voltage conductor or equipment has not been isolated from all sources of supply.

28—Live high voltage line work

- (1) Electrical work on exposed live high voltage conductors or exposed live parts of high voltage electrical equipment (*live line work*) must not be carried out unless authorised in writing by the operator of the electricity infrastructure or electrical installation on which the work will be carried out.
- (2) An electricity infrastructure operator or electrical installation operator may authorise a person to carry out live line work if satisfied the person—
 - (a) has successfully finished a course of training approved by the Technical Regulator and provided by a training provider approved by the Technical Regulator; and
 - (b) has been assessed by the training provider as competent to carry out the work.
- (3) The voltage of the powerlines on which live line work is carried out must be as stated by the relevant operator in the authorisation.
- (4) The relevant operator must take reasonable steps to satisfy itself as to the continuing competency of a person authorised by the operator to carry out live line work.

Subdivision 4—Miscellaneous

29—Rescue and resuscitation training

Persons required to carry out, or help in carrying out, electrical work must be suitably trained in rescue and resuscitation in accordance with recognised practices in the electricity industry.

30—Suitability of testing instruments

If tests are required to be performed on electricity infrastructure, an electrical installation or safety equipment under the Act—

- (a) the testing instruments used must be designed for and capable of correctly performing the required tests; and
- (b) each testing instrument must be tested and calibrated to ensure it is in proper working order; and
- (c) the records of tests performed on testing instruments must be kept for at least 2 years.

Division 4—Reporting and investigation of accidents

31—Reporting of accidents

- (1) For the purposes of section 63 of the Act, if an accident happens that involves electric shock caused by the operation or condition of electricity infrastructure or an electrical installation, a report must be made to the Technical Regulator of the details of the accident—
 - (a) in the case of a death resulting from the accident—immediately by telephone;
 - (b) in the case of a person requiring medical assistance resulting from the accident—within 1 working day of the accident;
 - (c) in any other case—within 10 working days of the accident.
- (2) An electricity entity or person who is required to report an accident in accordance with section 63 of the Act must provide the Technical Regulator with such further details of the accident as the Technical Regulator reasonably requires.

31A—Investigation of accidents

- (1) An electricity entity that operates a transmission or distribution network must promptly investigate any accident that involves electric shock that may have been caused by the operation or condition of the transmission or distribution network or an electrical installation connected to the network and report the results of the investigation to the Technical Regulator in the form, and containing the details, required by the Technical Regulator.
- (2) If in the course of an investigation under subregulation (1) it is determined that the electric shock was caused by an electrical installation connected to the network, the electricity entity must report that result to the Technical Regulator and need not proceed further with the investigation.

Division 5—Safety, reliability, maintenance and technical management plans and reports

31B—Application of Division

- (1) This Division applies to a licensee holding a licence authorising the generation of electricity or the operation of a transmission or distribution network or a person exempted from the requirement to hold such a licence.
- (2) However, the Technical Regulator may grant an exemption from this Division, or specified provisions of this Division, on terms and conditions the Technical Regulator considers appropriate.

31C—Safety, reliability, maintenance and technical management plans

- (1) A person to whom this Division applies who is exempted from the requirement to hold a licence must, if so required by the Technical Regulator by notice in writing—
 - (a) prepare and periodically revise a safety, reliability, maintenance and technical management plan dealing with matters prescribed by subregulation (2);
 - (b) obtain the approval of the Technical Regulator to the plan and any revision;
 - (c) comply with the plan as approved from time to time;
 - (d) audit from time to time the person's compliance with the plan and report the results of those audits to the Technical Regulator.
- (2) For the purposes of sections 22(1)(c) and 23(1)(c) of the Act and subregulation (1), the following are matters that must be dealt with by a safety, reliability, maintenance and technical management plan:
 - (a) the safe design, installation, commissioning, operation, maintenance and decommissioning of electricity infrastructure owned or operated by the person;
 - (b) the maintenance of a supply of electricity of the quality required to be maintained by or under the Act, these regulations, the person's licence or the conditions of any exemption granted to the person;
 - (c) the implementation and conduct of safety measures and training programs for the purpose of—
 - (i) reducing the risk of death or injury, or damage to property, arising out of the operation of electricity infrastructure owned or operated by the person;
 - (ii) ensuring that employees performing work in respect of electricity infrastructure owned or operated by the person are competent and properly trained, perform their work safely and are provided with a safe system of work;
 - (d) ensuring that contractors performing work in respect of electricity infrastructure owned or operated by the person have processes and procedures for ensuring that the persons personally performing the work are competent and properly trained, perform their work safely and are provided with a safe system of work;

- (e) the manner in which accidents and unsafe situations are to be dealt with, reported and investigated;
 - (f) monitoring compliance with safety and technical requirements imposed by or under the Act, these regulations, the person's licence or the conditions of any exemption granted to the person;
 - (g) monitoring electricity infrastructure owned or operated by the person for the purposes of identifying infrastructure that is unsafe or at risk of failing or malfunctioning;
 - (h) in the case of a person who operates a transmission or distribution network—
 - (i) monitoring compliance with requirements for vegetation clearance;
 - (ii) the communication of information to the public for the purpose of reducing the risk of death or injury, or damage to property, arising out of the operation of electricity infrastructure owned or operated by the person;
 - (iii) the communication of information to existing and potential customers about the facilities that customers must provide for connection to the network and procedures that customers must follow in order to prevent damage to or interference with the network.
- (3) A person to whom this Division applies must, at the request of the Technical Regulator, provide the Technical Regulator with such information and access to such officers, employees and contractors as the Technical Regulator reasonably requires for the purposes of determining whether a safety, reliability, maintenance and technical management plan prepared by the person is operating effectively and whether that person is complying with the plan.

31D—Safety, reliability, maintenance and technical management reports

- (1) A person to whom this Division applies who operates a transmission or distribution network must, within 21 working days after the end of each month, lodge with the Technical Regulator a report—
- (a) stating in relation to each unplanned interruption to the supply of electricity during that month that—
 - (i) affected the supply of electricity to customers such that the aggregate of the periods for which the customers' supply was affected exceeded 120 000 minutes; or
 - (ii) affected for 30 minutes or more the supply of electricity to one or more customers with a demand of greater than 1 MVA,
- the following:
- (iii) the date, time and cause of the interruption;
 - (iv) the number of customers affected by the interruption;
 - (v) the time taken to restore supply to all of the customers affected;
 - (vi) the time taken to restore supply to the majority of the customers affected;

- (b) stating in relation to all unplanned interruptions to the supply of electricity during that month and in relation to each region as defined by the Technical Regulator—
 - (i) the aggregate of the periods for which customers' supply was affected by the interruptions; and
 - (ii) the average time taken to restore supply to all of the customers affected.
- (2) Subregulation (1) does not apply in relation to—
 - (a) an interruption to the supply of electricity to a customer if the interruption was in accordance with an interruptible or curtailable supply contract with the customer; or
 - (b) an interruption to the supply of electricity to a customer that occurred at the request of the customer or that was caused by the customer; or
 - (c) an interruption that was rectified by an automatic supply restoration operation.
- (3) A person to whom this Division applies must, on or before 31 August in each year, lodge with the Technical Regulator a report relating to the previous financial year containing the following information:
 - (a) a general description of the circumstances in which electricity infrastructure owned or operated by the person has failed or malfunctioned or been found to be unsafe and of the action taken to rectify, or to prevent or minimise the risk or recurrence of, the failure, malfunction or unsafe situation;
 - (b) the total costs actually incurred to maintain, repair and replace electricity infrastructure owned or operated by the person, together with an estimate of the total costs likely to be incurred for those purposes in the financial year following that to which the report relates;
 - (c) whether the person has been able to comply with all aspects of the person's safety, reliability, maintenance and technical management plan and whether the person considers the plan to have been operating effectively.
- (4) However, this regulation only applies to a person who is exempted from the requirement to hold a licence to the extent specified by the Technical Regulator by notice in writing to the person.

Part 5—Cathodic protection systems

32—Application of Part

This Part does not apply to a cathodic protection system—

- (a) installed on any floating mobile structure, fishing equipment, fixed off shore structure (not connected with land above sea level) or internal surface of any apparatus, equipment or structure; or
- (b) using only galvanic anodes.

33—Tests before operating cathodic protection system

- (1) The person who owns or operates a cathodic protection system must ensure that it does not adversely affect the integrity or safety of any electricity infrastructure or supply system through corrosion.
- (2) The person who owns or operates a cathodic protection system that has an anode immersed in water or a marine environment must, within 90 days before starting to operate the system, perform tests to ensure that the potential difference between any 2 accessible points spaced 1 metre apart in the water or marine environment is not more than 3V when the system is energised.

Part 6—Miscellaneous

35—Register of underground lines

- (1) An electricity entity authorised to operate a transmission or distribution network must keep and maintain a register describing the nature and location of each line installed underground that is under the control of the entity.
- (2) The transmission or distribution network operator in an area must be notified by any other electricity entity of the nature and location of any line installed underground in the area by that other entity and that information must be recorded in the register kept by the network operator under subregulation (1).
- (3) Information contained in the register must be made available on request by a member of the public during normal business hours.

36—Protection of underground lines

A person must not—

- (a) place or maintain, or cause to be placed or maintained, any corrosive, abrasive, heavy or deleterious material or substance above any underground line; or
- (b) make any opening in the ground surface that may endanger any underground line; or
- (c) remove, tamper with or cover any underground line marker,

without the written authority of the operator of the electricity infrastructure of which the line forms part.

Maximum penalty: \$2 500.

Expiation fee: \$210.

37—Entangled objects

A person must not, without the authority of the operator of the electricity infrastructure or electrical installation, pull or interfere with any object resting on or entangled in electricity infrastructure or the electrical installation unless the action is reasonably necessary to prevent or reduce injury to a person or property.

Maximum penalty: \$2 500.

Expiation fee: \$210.

38—Altering ground levels near infrastructure

- (1) A person must not, without the written authority of the electricity infrastructure operator—
- (a) cut away, excavate or remove, or cause to be cut away, excavated or removed, earth or material supporting electricity infrastructure so as to endanger the stability of the infrastructure; or
 - (b) make an excavation deeper than 0.3 m within 3 m of—
 - (i) a pole structure or stand, not being a tower or tower structure supporting electricity infrastructure; or
 - (ii) any pole or bed log to which is affixed a staywire used to support electricity infrastructure; or
 - (c) make an excavation deeper than 0.5 m within 10 m of any tower or tower structure supporting electricity infrastructure; or
 - (d) make an excavation deeper than 0.3 m within 0.6 m of any wall, fence or foundation of a substation; or
 - (e) place any material or construct any artificial surface above ground level—
 - (i) below an electric line or within the vertical projection of any points to which a conductor of the electric line may sway; or
 - (ii) adjacent to electricity infrastructure,in a manner that may alter the level of the ground at any place so as to infringe any permissible clearance distance under these regulations.

Maximum penalty: \$2 500.

Expiation fee: \$210.

- (2) The allowable depth of an excavation under subregulation (1) is, if the ground level unaffected by previous works is known, to be determined by reference to that level, but is otherwise to be determined by reference to the current ground level.

39—Erection of buildings in proximity to aerial lines

- (1) For the purposes of section 86 of the Act, a person must not, except as approved by the Technical Regulator, erect a building or structure in proximity to an aerial line as follows:
- (a) in the case of an aerial line (other than a facade mounted line) constructed to operate at a voltage of more than 66kV—
 - (i) under the aerial line; or
 - (ii) so that the horizontal distance from any part of the building or structure to the centre-line of any such aerial line is less than the relevant distance as set out in Table 1 in Schedule 2;

- (b) in the case of an aerial line (other than a facade mounted line) or other cable system constructed to operate at a voltage of 66kV or less—so that the vertical or horizontal distance from any part of the building or structure to any position to which a conductor in the aerial line or other cable system may sag at maximum design temperature, or move as a result of normal prevailing wind pressures, is less than the relevant distance as set out in Table 1 in Schedule 2.

Note—

The figures following Table 1 are to be used to assist in understanding the information contained in the Table.

- (1a) Despite regulation 12(3), for the purposes of subregulation (1) the distances set out in Table 1 in Schedule 2 apply in relation to aerial lines whether installed before, on or after 1 July 1997.
- (2) The Technical Regulator may not approve the erection of a building or structure in proximity to an aerial line that is not situated on a public road and is constructed to operate at a voltage of more than 66kV unless the building or structure will constitute or house electricity infrastructure.
- (3) The requirements of this regulation do not apply in relation to—
 - (a) a fence that is less than 2.0 m in height; or
 - (b) a service line installed specifically to supply electricity to the building or structure by the operator of the transmission or distribution network from which the electricity is being supplied.

39A—Erection of buildings in proximity to underground lines

- (1) For the purposes of section 86 of the Act, a person must not, except as approved by the Technical Regulator, erect a building or structure—
 - (a) above or below an underground powerline; or
 - (b) within the prescribed distance of an underground powerline measured from vertical planes extending above and below each outer edge of the conductor comprising the powerline or, in the case of a powerline that consists of more than one conductor, each outer edge of each outer conductor.
- (2) Before giving approval under subregulation (1), the Technical Regulator must consult with the electricity entity operating the underground powerline.
- (3) In this regulation—

prescribed distance means—

 - (a) in relation to an underground powerline designed to operate at a voltage of 33kV or less—2 metres;
 - (b) in any other case—3 metres.

40—Prohibition of certain activities in proximity to aerial lines and other cable systems

A person must not, without the written authority of the electricity infrastructure operator—

- (a) place or maintain any material closer than the relevant distance set out in Table 1 in Schedule 6 to any point to which an aerial line (including a service line) or other cable system may swing or sag; or
- (b) operate a machine, vehicle or vessel equipped with an elevating component or shear legs so that any part of the machine, vehicle, vessel or its load comes within the relevant distance set out in Table 2 in Schedule 6 to any point to which an aerial line (including a service line) or other cable system may swing or sag; or
- (c) attach or keep attached to electricity infrastructure any conductors of circuits or other cable system; or
- (d) erect or maintain conductors of circuits, or other cable system, so as to cross the circuit of an aerial line, or other cable system, unless clearances in excess of the relevant distance set out in Table 3 in Schedule 6 can be maintained; or
- (e) erect a circuit or other cable system unless the clearance in any direction from the circuit or system to any structure forming part of electricity infrastructure (other than a structure supporting the circuit or system) is greater than the relevant distance set out in Table 4 in Schedule 6.

41—Placement of materials near supporting structures etc

A person must not, without the written authority of the electricity infrastructure operator, place or maintain any material closer than the relevant distance set out in Table 1 in Schedule 6 to electricity infrastructure consisting of supporting or protective structure or equipment for aerial lines.

42—Placement of materials in proximity to substations

A person must not, without the written authority of the electricity infrastructure operator—

- (a) place or maintain any timber or inflammable material within 3 metres in any direction of a wall or fence surrounding a substation; or
- (b) impede access to any door, gate or entrance of a substation or interfere in any way with the free flow of air through any openings or fittings used for ventilation in the walls of a substation; or
- (c) —
 - (i) place or maintain any material adjacent to a wall or fence of a substation; or
 - (ii) plant or nurture vegetation near or adjacent to a wall or fence of a substation,

so as to enable unauthorised access to the substation.

Maximum penalty: \$2 500.

Expiation fee: \$210.

43—Prohibition of burning in proximity to infrastructure

A person must not, without the written authority of the electricity infrastructure operator, burn any material in proximity to electricity infrastructure such that there is a risk of damage to the infrastructure or outages or flashovers.

44—Transportation

- (1) A person who drives a vehicle carrying a load or equipment on the vehicle or on any trailer attached to the vehicle that exceeds the height limit established under Part 4 of the *Road Traffic Act 1961* must ensure—
 - (a) that the distance between the load being transported and any aerial line along the route taken is greater than the relevant distance set out in Table 5 in Schedule 6; and
 - (b) that arrangements approved by the operator of the electricity infrastructure of which the aerial line is part have been made before, and are observed during, transportation.

Maximum penalty: \$2 500.

Expiation fee: \$210.

- (2) The person must give written notice of the proposal to transport the load to the electricity infrastructure operator at least 3 clear business days before the commencement of the transportation with the notice clearly stating—
 - (a) the nature of the vehicle and the load; and
 - (b) the height and width of the load; and
 - (c) the date and the time of the proposed transportation; and
 - (d) the starting point and finishing point of the transportation; and
 - (e) the proposed route; and
 - (f) the name and contact address of the person; and
 - (g) that the person agrees to pay the reasonable costs that are incurred by the operator in considering the proposal, approving the transportation arrangements or facilitating the transportation; and
 - (h) any other particulars that the operator may in the circumstances require.

Maximum penalty: \$2 500.

Expiation fee: \$210.

- (3) The electricity infrastructure operator may charge in advance or bring proceedings in a court of competent jurisdiction to recover as a debt the reasonable costs referred to in subregulation (2)(g).

45—Interference and obstruction

- (1) A person must not obstruct any road under the control of an electricity infrastructure operator or otherwise do anything to prevent or impede access to the electricity infrastructure.

Maximum penalty: \$2 500.

Expiation fee: \$210.

- (2) A person must not interfere with or damage the surface of a road made by an electricity infrastructure operator that is used for the purposes of works.
Maximum penalty: \$2 500.
Expiation fee: \$210.
- (3) An electricity infrastructure operator may, without notice to the owner, remove anything which causes or may cause a danger to people or property using or on the road.

46—Form for warrants

A warrant under section 82 or 83 of the Act must be in the appropriate form set out in Schedule 7.

47—General penalty

A person who contravenes or fails to comply with a provision of these regulations for which a specific penalty is not provided is guilty of an offence.

Maximum penalty: \$5 000.

Expiation fee: \$315.

48—Fees for reinspection etc

- (1) A person to whom a direction has been given under section 62, 70 or 72 of the Act is liable to pay a fee of an amount equal to the reasonable costs of any reinspection or reattendance by an authorised officer for the purpose of ensuring compliance with the direction or approving reconnection of the electricity supply.
- (2) The Technical Regulator may recover a fee payable under subregulation (1) as a debt by action in a court of competent jurisdiction.

Schedule 2—Requirements for aerial lines

(Regulation 12)

1—Interpretation

In this Schedule—

listed standards means the standards (both national and international), codes, guides and other documents, as published from time to time, listed in the Appendix at the end of this Schedule;

maximum design temperature means the maximum temperature that conductors may reach under the influence of load current (excluding fault current), ambient temperature of the air and solar radiation.

2—Design

Aerial lines must be designed so that the lines—

- (a) have safe levels of electrical insulation; and
- (b) will carry the electrical load currents for which they are designed without failure; and

- (c) will allow the passage of electrical short circuit currents which will enable the correct operation of protective devices; and
- (d) are structurally secure for the environmental and service conditions for which they are designed; and
- (e) maintain safe clearances,

and so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

3—Materials

Aerial line structures, their components, conductors, cables and accessories must, so as to ensure safe operational performance, conform to the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

4—Thermal ratings

- (1) The thermal capacity of a conductor must be sufficient to pass the electrical load for which it is designed without losing any mechanical properties that would affect the safety of the line.
- (2) Thermal ratings of conductors must be determined in accordance with the guidelines set out in the listed standards.

5—Short circuit ratings

- (1) The conductors of aerial lines must be of sufficient size to pass short circuit currents so as to enable the correct operation of protective devices without losing any mechanical properties that would affect the safety of the line.
- (2) Short circuit capacity of conductors must be determined in accordance with the guidelines set out in the listed standards.

6—Mechanical loading conditions

- (1) The mechanical loads used for the design of aerial lines must be based on the local environment and electrical service conditions.
- (2) In determining electrical service conditions and the physical environment under which the line will operate, due care must be given to the consideration of extremes that may occur, the likelihood of their occurrence and the associated risks.
- (3) Mechanical loading conditions must be determined in accordance with the guidelines set out in the listed standards.

7—Conductor tensions

- (1) The conductors for use with aerial lines must be designed to withstand the mechanical loads determined for their operation over the designed operational life of the line.
- (2) Conductors for lines must be designed so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

8—Structures and footings

- (1) The structures and footings for use with aerial lines must be designed to withstand the mechanical loads determined for their operation over the designed operational life of the line.
- (2) Structures and footings for lines must be designed so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

9—Facade mounted cables

- (1) Cables and accessories designed for facade mounting must be constructed with suitable insulated conductors and be manufactured to be durable for the environment and service conditions for which they are designed.
- (2) In determining electrical service conditions and the physical environment under which the line will operate, due care must be given to the consideration of extremes that may occur, the likelihood of their occurrence and the associated risks.
- (3) Mechanical loading conditions must be determined in accordance with the guidelines set out in the listed standards.

10—Safety clearances

- (1) Aerial lines must be designed to maintain safety clearances to the ground and other buildings or structures under the environmental and electrical service conditions determined for the line.
- (2) In determining circuit arrangement, electrical service conditions and the physical environment under which the line will operate, due care must be given to the consideration of extremes that may occur, the likelihood of their occurrence and the associated risks.
- (3) The environmental and electrical conditions for the determination of clearances to lines must be determined in accordance with the listed standards.
- (4) Aerial lines must be designed so that safety clearances are as follows:
 - (a) for an aerial line (other than a facade mounted line) constructed to operate at a voltage of 66kV or less—so that the vertical or horizontal distance from any building or structure (other than a support to which the aerial line is attached or a support of another overhead line which crosses the aerial line) to any position to which a conductor in the aerial line may sag at maximum design temperature, or move as a result of normal prevailing wind pressures, is not less than the relevant distance as set out in Table 1;

Note—

The figures following Table 1 are to be used to assist in understanding the information contained in the Table.

- (ab) for an aerial line (other than a facade mounted line) constructed to operate at a voltage of more than 66kV—so that the horizontal distance from any building or structure (other than a support to which the aerial line is attached or a support of another overhead line which crosses the aerial line) to the centre-line of the aerial line is not less than the relevant distance as set out in Table 1;

Note—

The figures following Table 1 are to be used to assist in understanding the information contained in the Table.

- (b) for an aerial line (other than a service line, other cable system or aerial line within a substation)—so that the distance to the ground in any direction from a position to which any part of the aerial line may sag at maximum design temperature, or move as a result of normal prevailing wind pressures, is not less than the relevant distance as set out in Table 2;
 - (c) for a service line or other cable system—so that the distance to the ground in any direction from a position to which any part of the service line or cable system may sag at maximum design temperature, or move as a result of normal prevailing wind pressures, is not less than the relevant distance as set out in Table 3;
 - (d) for a facade mounted line—
 - (i) so that the distance from any part of the facade of the building which supports a line to any position to which the line may sag at maximum design temperature is not less than the relevant distance set out in Table 4;
 - (ii) where it is designed so the line is more than 0.3 m from the facade of the building supporting it—so that the requirements of paragraphs (a) and (c) are complied with.
- (5) The arrangement of and clearances between circuits, either attached to a common structure, unattached, in shared spans or crossing, must be designed to be safe for the environmental and electrical service conditions for which they are designed and so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.
- (6) Aerial lines operating at a voltage greater than 66kV must not be installed above any building or structure.

11—Installation of aerial lines

Aerial lines must be installed in accordance with the guidelines set out in the listed standards.

12—Maintenance of aerial lines

- (1) Aerial lines, their structures and components must be maintained to be in a safe operating condition.
- (2) A system of maintenance must be instituted for aerial lines, their structures and their components, including—
 - (a) predetermined processes to confirm the safe state of components;
 - (b) managed replacement programs for components approaching the end of their serviceable life.
- (3) Maintenance programs must be carried out in accordance with the listed standards.

13—Tables

TABLE 1: Clearance distances between aerial lines (other than facade mounted lines) and buildings or structures

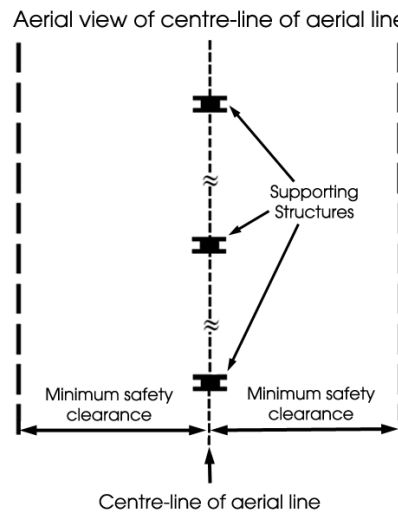
Direction	Distance measured from nearest conductor (in metres)							Distance measured from centre-line of aerial line (in metres)				
	U≤1000V			U>1000V		U>1000V U≤33kV	U>33kV U≤66kV	U>66kV U≤132kV	U>132kV U≤275kV	U>275kV U≤330kV	U>330kV U≤500kV	
	Insulated	Bare		Insulated		Bare or covered	Bare	Bare	Bare	Bare	Bare	
	neutral	active	with earthed screen	without earthed screen			single pole	other				
Vertically above those parts of a building or structure normally accessible to persons (A)	2.7	2.7	3.7	2.7	3.7	5.5	6.7	N/A	N/A	N/A	N/A	N/A
Vertically above those parts of a building or structure not normally accessible to persons but on which a person can stand (B)	0.1	2.7	2.7	0.1	2.7	4.7	5.5	N/A	N/A	N/A	N/A	N/A
Horizontally from those parts of a building or structure normally accessible to persons or that is not normally accessible to persons but on which a person can stand (C)	0.1	0.9	1.5	0.1	1.5	3.1	5.5	15.0	20.0	25.0	30.0	38.0
Horizontally from those parts of a building or structure not normally accessible to persons (D)	0.1*	0.3*	0.6*	0.1	0.6	2.5	4.5	15.0	20.0	25.0	30.0	38.0
In any direction from ground	Refer to Table 2 or 3				Refer to Table 2							

* This clearance can be further reduced to allow for termination at the point of attachment.

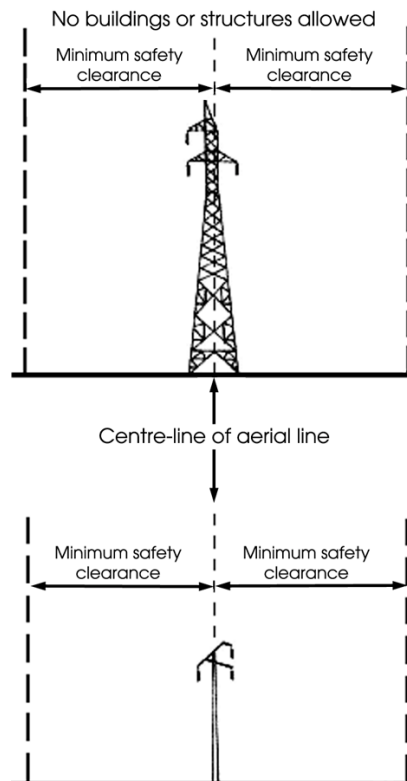
Table 1 figures—

- 1 Figures (a) and (b) will assist in understanding the required minimum safety clearance for aerial lines constructed to operate at a voltage of more than 66kV.
- 2 Figure (c) will assist in understanding the required minimum safety clearance for aerial lines constructed to operate at a voltage of 66kV or less (that is, minimum safety clearance from nearest conductor (maximum swing and sag)).

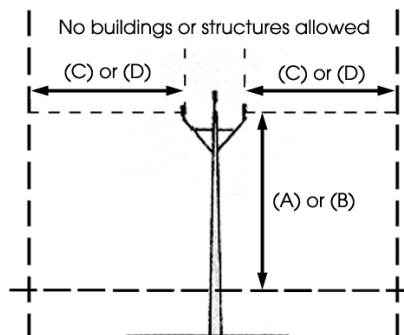
(a)



(b)



(c)



Vertical dimension (A) applies for example to:

- Balconies
- Terraces
- Walkways
- Bridges
- Scaffolds

Horizontal dimension (C) applies to the same as (A) and (B)

Vertical dimension (B) applies in relation to things such as:

- Roofs with a slope of less than 45°
- Parapets wider than 0.1 metre
- Pergolas
- Carports

Horizontal dimension (D) applies in relation to things such as:

- Roofs with a slope of 45° or more
- Flag Poles
- Light Poles

TABLE 2: Clearance distance for aerial lines (excluding service lines, other cable systems and aerial lines within substations)

Nominal System Voltage (U)	Clearance Distance (in metres)		
	Over carriageway of road	Over land other than carriageway of road	Over land not traversable by vehicles
Bare or insulated conductor $U \leq 1\text{kV}$	5.5	5.5	4.5
Insulated conductor with earthed screen $U > 1\text{kV}$	5.5	5.5	4.5
Insulated conductor without earthed screen $U > 1\text{kV}$	6.0	5.5	4.5
Bare or covered conductor $1\text{kV} < U \leq 33\text{kV}$	6.7	6.0	4.5
$33\text{kV} < U \leq 132\text{kV}$	6.7	6.7	5.5
$132\text{kV} < U \leq 275\text{kV}$	7.5	7.5	6.0
$275\text{kV} < U \leq 330\text{kV}$	8.0	8.0	6.7
$330\text{kV} < U \leq 500\text{kV}$	9.0	9.0	7.5

TABLE 3: Clearance distances for aerial service lines and other cable systems

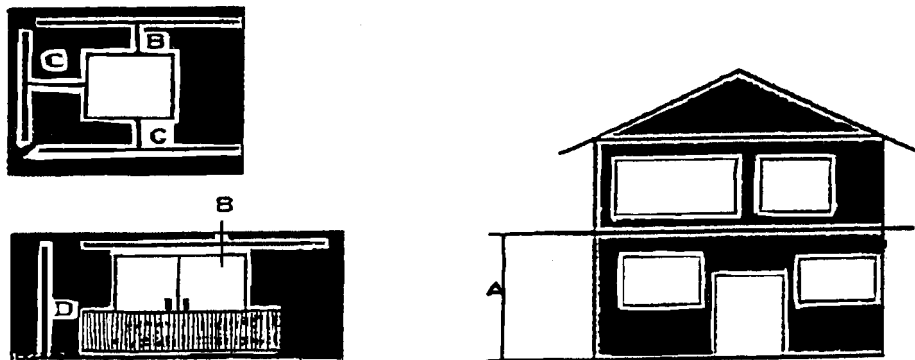
Location of Line	Clearance Distance (in metres)
Over a road or part of a road specified by the Technical Regulator as being a preferred route for vehicles with loads exceeding the height restrictions under Part 4 of the <i>Road Traffic Act 1961</i>	6.5
Over any part of a main road within the meaning of the <i>Highways Act 1926</i>	5.5
Over the centre of each carriageway of a public road	5.5
Over any other part of a road	4.6
Over any part of a driveway	3.0
Elsewhere	2.7

TABLE 4: Facade mounted lines

	Facade Situation	Clearance Distances (in metres)
A	Clearance vertically from ground at footway level	2.5*
B	Above windows and doors	0.3*
C	Each side and below windows	0.5*
D	Each side of doors and balconies	1.0*
E	From metallic parts of buildings, eg downpipes	0.05*
* This clearance may be reduced based on a proper risk assessment in any case where additional mechanical protection is provided to the cable.		

Table 4 figures—

The following figures will assist in understanding the information in Table 4.



Appendix—Standards, codes, guides and other documents relating to aerial lines

In this Appendix—

ESAA means Electricity Supply Association of Australia.

Conductors

Conductor - Bare overhead - Hard - drawn copper	AS 1746
Conductor - Bare overhead - Aluminium and aluminium alloy.....	AS 1531
Conductor - Bare overhead, aluminium and aluminium alloy - Steel reinforced.....	AS 3607
Steel conductors and stays - Bare overhead - Galvanised (SC/GZ)	AS 1222
Steel conductors and stays - Bare overhead - Aluminium clad (SC/AC).....	AS 1222
Galvanised steel wire strand	AS 2841

Insulated cables

Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1(1.2)kV.....	AS/NZS 5000
Electric cables - Polymeric insulated - For distribution and service applications.....	AS/NZS 4961
Electric cables - Cross-linked polyethylene insulated - Aerial bundled - For working voltages up to and including 0.6/1(1.2)kV ..	AS/NZS 3560
Mechanical fittings for low voltage aerial bundled cable	AS 3766
Electric cables - Aerial bundled - Polymeric insulated - Voltages 6.35/11(12)kV and 12.7/22(24)kV - Metallic screened	AS/NZS 3599
Electric cables - Aerial bundled - Polymeric insulated - Voltages 6.35/11(12)kV and 12.7/22(24)kV - Non-metallic screened	AS/NZS 3599
Conductors - Covered overhead - For working voltages 6.35/11(12)kV up to and including 19/33(36)kV	AS/NZS 3675

Insulators

Insulators - Ceramic or glass - Station post for indoor and outdoor use - Voltages greater than 1000V ac.....	AS 4398
Insulators - Porcelain and glass for overhead powerlines - Voltages greater than 1000V ac - Test methods - Insulator units	AS/NZS 2947
Insulators - Porcelain and glass for overhead powerlines - Voltages greater than 1000V ac.....	AS/NZS 2947
Insulators - Porcelain and glass for overhead powerlines - Voltages greater than 1000V ac - Couplings	AS 2947
Insulators - Porcelain and glass for overhead powerlines - Voltages greater than 1000V ac - Test methods - Insulator strings and insulator sets.....	AS/NZS 2947
Insulators - Porcelain and glass, pin and shackle type - Voltages not exceeding 1000V ac.....	AS 3608
Insulators - Porcelain stay type - Voltages greater than 1000V ac ..	AS 3609
Guidelines for the design and maintenance of overhead distribution and transmission lines—	
Selection.....	ESAA C(b)1

Insulator and conductor fittings

Insulator and conductor fittings for overhead powerlines -
Performance, material, general requirements and dimensions AS 1154

Insulator and conductor fittings for overhead powerlines -
Performance and general requirements for helical fittings..... AS 1154

Thermal limits

Guidelines for the design and maintenance of overhead
distribution and transmission lines—

 Thermal limits ESAA C(b)1

Current rating of bare overhead line conductors ESAA D(b)5

Short circuit capacity

Guidelines for the design and maintenance of overhead
distribution and transmission lines—

 Fault ratings..... ESAA C(b)1

Mechanical loading conditions

Guidelines for the design and maintenance of overhead
distribution and transmission lines—

 Mechanical loading conditions..... ESAA C(b)1

Structural design actions - General principles..... AS/NZS 1170

Structural design actions - Permanent, imposed and other actions.. AS/NZS 1170

Structural design actions - Wind actions AS/NZS 1170

Minimum design loads on structures (known as the SAA
Loading Code) - Earthquake loads AS 1170

Conductor tensions

Guidelines for the design and maintenance of overhead
distribution and transmission lines—

 General ESAA C(b)1

 Calculations..... ESAA C(b)1

Structures and footings

Guidelines for the design and maintenance of overhead
distribution and transmission lines—

 General ESAA C(b)1

Methods of testing soils for engineering purposes AS 1289 Series

Piling - Design and installation AS 2159

Design of steel lattice towers and masts..... AS 3995

Steel structures AS 4100

Concrete structures AS 3600

Clearances from ground

Guidelines for the design and maintenance of overhead
distribution and transmission lines—

 Environmental and loading conditions ESAA C(b)1

Clearances from structures

Guidelines for the design and maintenance of overhead distribution and transmission lines—

Environmental and loading conditions..... ESAA C(b)1

Spacing of conductors

Guidelines for the design and maintenance of overhead distribution and transmission lines—

Clearances..... ESAA C(b)1

Environmental and loading conditions..... ESAA C(b)1

Maintenance

Guidelines for the design and maintenance of overhead distribution and transmission lines—

Maintenance and inspection procedures ESAA C(b)1

Schedule 3—Requirements for underground lines and certain other powerlines

(Regulations 13 and 14)

1—Interpretation

In this Schedule—

listed standards means the standards (both national and international), codes, guides and other documents listed in the Appendix at the end of this Schedule as published as referred to in the Appendix or, if no such reference is included in the Appendix, as published from time to time.

2—Design—General

- (1) Underground lines must be designed so that—
 - (a) cables have safe levels of electrical insulation; and
 - (b) cables will carry load currents for which they are designed without failure; and
 - (c) cables will pass short circuit current which will enable the correct operation of protective devices; and
 - (d) the required clearances between a building or structure and an underground powerline as prescribed by regulation 39A are maintained,and so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.
- (2) In determining electrical service conditions and the physical environment under which the line will operate, due care must be given to the consideration of extremes that may occur, the likelihood of their occurrence and the associated risks.

3—Cables and accessories

Cables and their accessories must, so as to ensure safe operational performance, conform to the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

4—Cable ratings

- (1) The rating of a cable must be sufficient to pass the electrical load for which it is designed without failure or excessive heating.
- (2) Rating of cables must be determined in accordance with the listed standards.

5—Short circuit rating of conductors and cable screens

- (1) The cable conductors and cable screens must be of sufficient size to pass short circuit currents without overheating for the time taken for the operation of the protective device.
- (2) The short circuit capacity of cable must be determined in accordance with the listed standards.

6—Installation—General

Underground lines must be installed in a safe manner in accordance with this Schedule and the listed standards or so as to achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

7—Installation of underground lines

- (1) An underground line must be installed in accordance with Table 1 below and, subject to this clause, at the depth fixed for the designated voltage and cable type.
- (2) For the mechanical cover and enclosures referred to in Table 1 below, one of the following must be used:
 - (a) a layer of concrete at least 50 mm thick with a characteristic strength defined by AS 3600 and AS 1012 and determined to be not less than 15 MPa at 28 days placed not less than 50 mm and not more than 150 mm above the cable and overlapping the cable by at least 40 mm on each side; or
 - (b) concrete slabs of at least 40 mm thickness with a characteristic strength defined as AS 3600 and AS 1012 and determined to be not less than 15MPa at 28 days with—
 - (i) each slab touching the next so that there are no spaces left between slabs; and
 - (ii) the slabs being placed not less than 50 mm and not more than 150 mm above the cable and overlapping the cable by at least 40 mm on each side of the cable; or
 - (c) a plastic or composite material that offers comparable protection (depending on depth of installation).
- (3) The enclosure referred to in the last column of Table 1 must be a medium or heavy galvanised steel tube conforming to AS 1074 or a non-metallic heavy duty conduit conforming to AS/NZS 2053 (depending on depth of installation).

- (4) If it is impractical to lay an underground line at a depth which complies with Table 1 then they may be laid at a lesser depth provided that additional covers or enclosures are installed to provide equivalent protection to that prescribed.
- (5) The underground line, from where it enters the ground to a position where it complies with the requirements of depth and protection in Table 1, must be protected by a cover or enclosure described above.
- (6) **Table**

TABLE 1: Minimum depth of burial from surface of ground to top of cable or enclosure

Nominal System Voltage (U)	Method of Burial and Burial Depth (in metres)		
	Direct Buried	Direct Buried and Covered by Mechanical Cover	Enclosed in Conduit or Pipe
U ≤ 1kV			
Single core type	(a) For a single insulated single core type—1;	0.6	0.45
Multi core type	(b) For a double insulated single core type—0.75; For a double insulated multi core type—0.75	0.45	0.45
1kV < U ≤ 22kV Both cable types	0.75	0.6	0.6
22kV < U ≤ 66kV Both cable types	1	0.75	0.75

8—Part of underground line installed on or above ground

- (1) If an underground line is located on the surface of the ground or attached above the surface of the ground, it must be mechanically protected to a height of 2.4 m from any surface on which a person can stand to the point where it enters the ground.
- (2) The mechanical protection must be provided—
 - (a) by a cable guard made of mild steel of 2.5 mm thickness for HV cables and 1.6 mm thickness for LV cables, galvanised to AS/NZS 4680, AS/NZS 4791 or AS/NZS 4792; or
 - (b) a galvanised steel tube conforming to AS 1074; or
 - (c) some other material giving equivalent mechanical protection.
- (3) If the attachment of the underground line is more than 2.4 m from a surface on which a person can stand, the cable need not be mechanically protected provided that—
 - (a) the cable is beyond reach (determined in accordance with AS 2067 Appendix G) from windows or other accessible parts of the building; or
 - (b) the cable is less than or equal to 1000 volts; or

- (c) the cable is more than 1000 volts but is metallic screened; or
 - (d) the cable is within a substation.
- (4) If the cable is high voltage, it must be enclosed in metallic piping or casing which is earthed in accordance with these regulations.

9—Shared trenches

Separation between cables and service lines of other utilities laid parallel must comply with the listed standards.

10—Maintenance

- (1) Underground lines must be maintained to be in a safe operating condition.
- (2) A system of maintenance must be instituted for underground lines and their components, including—
 - (a) predetermined processes to confirm the safe state of components;
 - (b) managed replacement programs for components approaching the end of their serviceable life.
- (3) Maintenance programs must be carried out in accordance with the listed standards.

Appendix—Standards, codes, guides and other documents relating to underground lines

In this Appendix—

ANSI means American National Standards Institute;

ESAA means Electricity Supply Association of Australia;

IEC means International Electrotechnical Commission;

IEEE means Institute of Electrical and Electronic Engineers.

High voltage cables

Electric cables - Polymeric insulated - For working voltages
1.9/3.3(3.6)kV up to and including 19/33(36)kV AS/NZS 1429

Electric cables - Impregnated paper insulated - For working
voltages up to and including 19/33(36)kV AS/NZS 1026

Electric cables - For underground residential distribution
systems AS/NZS 4026

Power cables with extruded insulation and their accessories
for rated voltages from 1kV up to 30kV IEC 60502

Power cables with extruded insulation and their accessories
for rated voltages above 30kV up to 150kV - Test methods
and requirements IEC 60840

Low voltage cables

Electric cables - Impregnated paper insulated - For working
voltages up to and including 19/33(36)kV AS/NZS 1026

Conductors in insulated electric cables and flexible cords AS/NZS 1125

Electric cables - Polymeric insulated - For distribution and service applications.....	AS/NZS 4961
Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1(1.2)kV.....	AS/NZS 5000
Electric cables - For underground residential distribution systems.....	AS/NZS 4026
High voltage cable accessories	
High Voltage Cable Terminations	ANSI/IEEE 48
High Voltage Cable Joints	ANSI/IEEE 404
Separable insulated connectors for power distribution systems above 1kV.....	AS 2629
Continuous cable ratings	
Electric cables - Calculation of the current rating.....	IEC 60287
Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1kV	AS/NZS 3008
Short circuit currents	
Calculation of short circuit currents.....	IEC 60949
Installation	
ESAA <i>Guide to the Installation of Cables Underground</i>	C(b)2
ESAA <i>Guide to the Use of Separable Connectors</i>	D(b)30
<i>Services in Streets—A Code for the Placement of Infrastructure Services in New and Existing Streets</i> (prepared for PUACC and published September 1997)	
Maintenance	
ESAA <i>Guide for the Maintenance of High Voltage Paper/Oil Insulated Cables and Accessories</i>	D(b)31

Schedule 4—Requirements for substations

(Regulation 15)

1—Interpretation

In this Schedule—

Building Code of Australia means the *Building Code of Australia* as published from time to time;

ground type substation means a substation that is a semi-enclosed, free-standing substation connected to a high voltage aerial line or underground line;

kiosk padmount type substation means a substation that is a totally enclosed, free-standing, self-contained substation not designed for bodily entry, generally operated from door openings;

listed standards means the standards (both national and international), codes, guides and other documents, as published from time to time, listed in the Appendix at the end of this Schedule.

2—Design

- (1) Substations must be designed so that—
 - (a) buildings and enclosures are secure; and
 - (b) plant, equipment and lines have safe levels of electrical insulation; and
 - (c) plant, equipment and lines will carry electrical load currents for which they are designed without failure; and
 - (d) plant, equipment and lines will carry short circuit currents which will enable the correct operation of protective devices,so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.
- (2) In determining electrical service conditions and the physical environment under which the line will operate, due care must be given to the consideration of extremes that may occur, the likelihood of their occurrence and the associated risks.

3—Plant and equipment

All substation plant and equipment must conform to the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

4—Clearances to live equipment and lines

- (1) Substations must be designed to provide safe operating and working clearances from live equipment and lines.
- (2) Clearances between live equipment to structures and buildings and the provision of safe operating and working clearances must be determined in accordance with the listed standards.

5—Containment of insulating liquids

Buildings must be designed in respect of the containment of insulating liquids in an enclosure or in an area in which the equipment is housed so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

6—Security of substation buildings and enclosures

- (1) Buildings and enclosures must be secured so as to prevent entry by unauthorised persons.
- (2) Buildings and enclosures must have signs on all entrances prohibiting unauthorised entry and warnings of the danger associated with unlawful entry.
- (3) The ventilation system of buildings and enclosures must be designed so to prevent the intrusion of foreign objects into the building or enclosure likely to interfere with the safe operation of the electrical equipment.

7—Kiosk padmount type substations

The installation design of a kiosk padmount type substation must ensure that no part of the kiosk enclosure is within 1.2 m of any part of a building or wall that has a fire rating less than 3 hours as determined by the *Building Code of Australia*.

8—Ground type substations

- (1) The calculations for the design of structures supporting aerial lines in ground type substations must, in addition to allowing for the maximum loading in accordance with Schedule 2, also allow for forces under short circuit conditions.
- (2) Walls and fences enclosing a ground type substation must be designed—
 - (a) so that the minimum horizontal clearances from any building or structure (including fences or walls which are not solid) within the boundary, or forming the boundary of the ground type substation to any live and bare equipment is sufficient to ensure safe operating conditions;
 - (b) to be constructed of a substantive material (such as brick, masonry, wood, sheet metal or galvanised chain-wire mesh with an aperture dimension of not more than 0.05 m) and be a minimum height of 2.5 m.
- (4) The top 0.5 m of a wall or fence enclosing a ground type substation may consist of securely supporting barbed wire, or razor wire, with a maximum separation of the strands of 0.15 m or tiger tape flat loops.
- (5) Clearances between any building or structure within the boundary of the ground type substation and any live equipment must be determined so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

9—Pole mounted substations

Pole mounted substations must be designed so that—

- (a) the calculations for the design of structures supporting aerial lines and busbars in substations, in addition to allowing for the maximum loading in accordance with Schedule 2, also allow for forces under short circuit conditions;
- (b) all parts of supporting platforms and equipment which are mounted on or attached to the pole or cross arms, except for conductors, are at height not less than that set out in Table 1;
- (c) any equipment mounted at a height less than that prescribed in paragraph (b), is less than 0.2 m from the surface of the pole and at least 0.5 m from the vertical projection of the kerb line of any road.

TABLE 1: Heights of supporting platforms and mounted equipment

	Outside 0.5m of the vertical projection of the kerbline (on the non road side) of any road	Elsewhere
Height above ground surface	3.6m	4.6m

10—Installation

Substations must be installed to the requirements of a design that complies with the requirements of this Schedule.

11—Maintenance

- (1) Substations, substation enclosures, associated plant, components and lines must be maintained in a safe operating condition.

- (2) A system of maintenance must be instituted for substation buildings and enclosures and associated plant, equipment and lines, including—
- (a) predetermined processes to confirm the safe state of components; and
 - (b) managed replacement programs for components approaching the end of their serviceable life.
- (3) Maintenance programs must be carried out in accordance with the listed standards.

Appendix—Standards, codes, guides and other documents relating to substations

In this Appendix—

ESAA means Electricity Supply Association of Australia;

IEC means International Electrotechnical Commission;

IP Code means International Protection Code.

Electrical design

Switchgear assemblies & ancillary equipment for alternating voltages above 1kV AS 2067

Circuit breakers and ancillary equipment

Degrees of protection provided by enclosures (IP Code)..... AS 60529

High voltage ac switchgear and controlgear - Circuit breakers for rated voltages above 1000 V AS 2006

Switchgear assemblies and ancillary equipment

High voltage switches - Switches for rated voltages above 1kV and less than 52kV AS/NZS 60265

High voltage, ac switchgear and controlgear - Switches and switch-disconnectors - For rated voltages of 52kV and above..... AS 1025

High voltage ac switchgear and controlgear - Disconnectors (isolators) and earthing switches AS 1306

High voltage ac switchgear and controlgear - Switch-fuse combinations AS 2024

Common specifications for high-voltage switchgear and controlgear standards..... AS/NZS 2650

AC metal-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 72.5kV AS 2086

AC insulation-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 38kV..... AS 2264

Switchgear assemblies and ancillary equipment for alternating voltages above 1 kV AS 2067

Degrees of protection provided by enclosures (IP Code)..... AS 60529

Insulating liquids - Specifications for unused mineral insulating oils for transformers and switchgear AS 1767

Control equipment

Low-voltage switchgear and controlgear - General rules..... AS 60947

Low-voltage switchgear and controlgear - Switches,
disconnectors, switch-disconnectors and fuse combination units AS/NZS 3947

Low-voltage switchgear and controlgear - Contactors and motor
starters: Electromechanical contactors and motor starters AS 60947

Low-voltage switchgear and controlgear - Circuit control devices
and switching elements - Electromechanical control circuit
devices AS 60947

Low-voltage switchgear and controlgear - Control circuit devices
and switching elements - Proximity switches AS 60947

Insulating panels

Sheets and boards for electrical purposes - Classification and
general requirements..... AS 1795

Sheets and boards for electrical purposes - Dimensions of
switchboard panels..... AS 1795

Power transformers

Power transformers - General AS 2374

Power transformers - Temperature rise..... AS 2374

Power transformers - Insulation levels and dielectric tests -
General requirements..... AS 2374

Power transformers - Insulation levels and dielectric tests -
External clearances in air AS 2374

Power transformers - Ability to withstand short circuit..... AS 2374

Power transformers - Determination of transformer and reactor
sound levels AS 2374

Insulating liquids - Specification for unused mineral insulating
oils for transformers and switchgear AS 1767

Bushings

Bushings for alternating voltages above 1000 V AS 1265

Surge arresters

Surge arresters (diverters) - Silicon carbide type for ac systems AS 1307

Surge arresters - Metal-oxide surge arresters without gaps for ac
systems..... AS 1307

Batteries

Stationary batteries - Lead-acid - Vented type..... AS 4029

Stationary batteries - Lead-acid - Valve-regulated type..... AS/NZS 4029

Stationary batteries - Lead-acid - Pure lead positive pasted plate
type AS 4029

Insulation coordination

Insulation coordination - Definitions, principles and rules AS 1824

Insulation coordination (phase-to-earth and phase-to-phase,
above 1 kV) - Application Guide..... AS 1824

Insulation coordination for equipment within Low Voltage
systems: Principles, requirements and tests IEC 60664

Safety clearances

Degrees of protection provided by enclosures (IP Code)..... AS 60529

Switchgear assemblies and ancillary equipment for alternating voltages above 1kV AS 2067

Buildings and enclosures

Building Code of Australia

Fixed platforms, walkways, stairways and ladders: Design construction and installation..... AS 1657

The use of ventilation and air conditioning in buildings - Ventilation design for indoor air contaminant control AS 1668

The use of ventilation and air conditioning in buildings - Fire and smoke control in multi-compartment buildings AS/NZS 1668

Degrees of protection provided by enclosures (IP Code)..... AS 60529

The storage and handling of flammable and combustible liquids ... AS 1940

Oil containment..... Environment Protection Authority

Electrical installations - Secondary batteries installed in buildings - Vented cells..... AS 3011

Electrical installations -Secondary batteries installed in buildings - Sealed cells AS 3011

Switchyard structures, footings and foundations

Structural design actions - General principles..... AS/NZS 1170

Structural design actions - Permanent, imposed and other actions.. AS/NZS 1170

Structural design actions - Wind actions AS/NZS 1170

Minimum design loads on structures (known as the SAA Loading Code) - Earthquake loads AS 1170

Design of steel lattice towers and masts..... AS 3995

Steel structures AS 4100

Concrete structures AS 3600

Maintenance

Guide to maintenance and supervision of insulating oils in service AS 1883

Maintenance of electrical switchgear AS 2467

Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings - Vented cells AS 2676

Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings - Sealed Cells AS 2676

Schedule 5—Requirements for earthing and electrical protection systems

(Regulation 16)

1—Interpretation

In this Schedule—

ESAA means Electricity Supply Association of Australia;

listed standards means the standards (both national and international), codes, guides and other documents, as published from time to time, listed in the Appendix at the end of this Schedule;

neutral conductor means a conductor or a group of conductors of a multi-wired system of supply which is maintained at an intermediate and approximate uniform electrical potential in respect of the other conductors of the same circuit, or the conductor of a two-wire system that is earthed at its origin;

protective devices or equipment means devices or equipment intended to isolate the active conductors of a circuit in the event of an electrical fault.

2—Design—general

- (1) Earthing and protection systems must be designed to ensure—
 - (a) reliable passage of fault and Single Wire Earth Return (**SWER**) load currents to earth; and
 - (b) reliable and speedy operation of circuit protection devices; and
 - (c) step, touch and transfer potentials with respect to assets associated with the circuit are safe; and
 - (d) detection and isolation of electrical conditions likely to significantly increase risk to people or cause significant damage to property,and so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.
- (2) In determining abnormal electrical service conditions, due care must be given to the consideration of extremes that may occur, the likelihood of their occurrence and the associated risks.

3—Protection equipment

All protection equipment must, to ensure safe operational performance, conform to the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better outcomes.

4—Earthing equipment and ancillaries

Earthing systems must be designed to be constructed of material that is—

- (a) copper, copper alloy, stainless steel or some other material having superior corrosion resistance; and
- (b) electrically conductive.

5—Earthing of low voltage electrical supply networks

- (1) The earthing of low voltage electrical networks of supply must be designed to be a MEN system, unless otherwise approved by the Technical Regulator.
- (2) A MEN system must be designed so that—
 - (a) a continuous neutral conductor connects all customers' premises in accordance with AS/NZS 3000; and
 - (b) the neutral conductor is connected to earth at each distribution substation or generator.
- (3) A direct earthing system must be approved by the Technical Regulator and must be designed so that—
 - (a) a continuous earthed conductor connects—
 - (i) all customers' premises in accordance with AS/NZS 3000; and
 - (ii) the neutral conductor at the distribution substation or generator; and
 - (iii) every surge diverter,
to earth at the generating station or distribution substation only; and
 - (b) the earthed conductor is formed from—
 - (i) the metallic sheath of an insulated cable providing the LV supply to the customers' premises; or
 - (ii) a separate conductor of an insulated cable providing the LV supply to the customers' premises; or
 - (iii) a separate earthing conductor affixed to structures supporting the LV supply circuit to the customers' premises; and
 - (c) the system is earthed at the substations or generating stations.

6—Earthing of substations

Substations must be designed to have an earthing system that complies with the listed standards or achieves, to the satisfaction of the Technical Regulator, the same or better outcomes.

7—Protection systems for low voltage aerial lines and underground lines

Each of the aerial and underground service lines of a transmission or distribution network must form part of a circuit that is protected by protective equipment that can isolate each of the active conductors of the lines.

8—Step and touch potentials and earth potential rise

Uninsulated metal or reinforced concrete that—

- (a) forms part of a circuit in a transmission or distribution network (excluding the current carrying conductors); and
- (b) is accessible to persons; and
- (c) may, in the event of a primary insulation failure of the circuit, experience a rise in voltage,

must be effectively earthed to comply with the requirements of the ESAA *Guidelines for Design and Maintenance of Overhead Distribution and Transmission Lines* C(b)1, as published from time to time.

9—Installation of earthing and protection systems—general

Earthing and protection systems must be installed in accordance with design requirements set out in this Schedule and to conform with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better outcomes.

10—Connections and joints of earthing systems

Terminations to earthing conductors and joints in earthing conductors must be of a type that utilises materials and techniques specifically developed for earthing electrical installations so as to comply with the listed standards or achieve, to the satisfaction of the Technical Regulator, the same or better outcomes.

11—Mechanical strength and protection of earthing systems

Earthing conductors and other components of an earthing system must be installed in a manner that provides protection against likely mechanical damage, inadvertent interference and chemical deterioration.

12—Maintenance—general

- (1) Protection and earthing systems must be maintained to be in a safe operating condition.
- (2) A system of maintenance must be instituted for protection and earthing systems and their components, including—
 - (a) predetermined processes to confirm the safe state of components; and
 - (b) managed replacement programs for components approaching the end of their serviceable life.
- (3) Maintenance programs must be carried out in accordance with the listed standards.

13—Inspection and testing of earthing systems

- (1) Earthing systems must be inspected and tested from time to time to ensure that the design requirements of—
 - (a) resistance to the general mass of earth; and
 - (b) electrical capacity; and
 - (c) step, touch and transfer potentials; and
 - (d) corrosion resistance,are being maintained.
- (2) The condition of earthing systems must be verified by instruments designed for that purpose.

14—Inspection and test results of earthing systems

The results of visual inspections and resistance readings must be recorded and audited to identify changes that would influence the frequency of inspections, tests and maintenance.

15—Inspection and testing of protection systems

- (1) Protection systems must be inspected and tested from time to time as required according to the risk of damage to, or aging of, components or changes in the network electrical parameters, to ensure that—
 - (a) detection sensitivity; and
 - (b) speed of operation; and
 - (c) discrimination of load currents; and
 - (d) co-ordination with other protection systems,of the systems are being maintained.
- (2) The performance of protection systems must be verified by instruments designed for that purpose.

16—Inspection and test results of protection systems

The results of visual inspections and performance tests must be recorded and audited to identify changes that would influence the frequency of inspections, tests, maintenance and replacements.

Appendix—Standards, codes, guides and other documents relating to earthing and electrical protection systems

In this Appendix—

ESAA means Electricity Supply Association of Australia;

IEEE means Institute of Electrical and Electronic Engineers.

Protection

All or nothing relays.....	AS 2481
Voltage transformers for measurement and protection	AS 1243
Current transformers for measurement and protection.....	AS 1675
Low voltage switchgear and controlgear - General rules	AS 60947
Low voltage switchgear and controlgear - Switches, disconnectors, switch-disconnectors and fuse-combination units ...	AS/NZS 3947
Low voltage switchgear and controlgear - Contactors and motor starters - Electromechanical contactors and motor starters	AS 60947
Low voltage switchgear and controlgear - Control circuit devices and switching elements - Electromechanical control circuit devices.....	AS 60947
Low voltage switchgear and controlgear - Control circuit devices and switching elements - Proximity switches	AS 60947

Earthing

Switchgear assemblies and ancillary equipment for alternating voltages above 1kV	AS 2067
Guide for safety in AC substation grounding.....	IEEE 80
Electrical installations	AS/NZS 3000

Relocatable premises (including caravans and tents) and their site installations	AS/NZS 3001
Guidelines for the design and maintenance of overhead distribution and transmission lines—	
Stay wires.....	ESAA C(b)1
Step and touch potentials	ESAA C(b)1
Switchgear assemblies and ancillary equipment for alternating voltages above 1kV.....	AS 2067
ESAA - <i>Earth Potential Rise</i> Code of Practice	
ESAA - <i>Earth Return High Voltage Power Lines</i> Code of Practice	
Maintenance	
Switchgear assemblies and ancillary equipment for alternating voltages above 1kV.....	AS 2067
Electrical installations.....	AS/NZS 3000
Guide to safety in AC substation grounding	IEEE 80
Guidelines for the design and maintenance of overhead distribution and transmission lines.....	ESAA C(b)1
ESAA - <i>Earth Potential Rise</i> Code of Practice	
ESAA - <i>Earth Return High Voltage Power Lines</i> Code of Practice	
Testing	
Electrical installations - Earthing.....	AS/NZS 3000
Guide for safety in AC substation grounding	IEEE 80
ESAA Guidelines for the design and maintenance of overhead distribution and transmission lines.....	ESAA C(b)1

Schedule 6—Clearance from aerial lines

(Regulations 40, 41 and 44)

TABLE 1: Clearance distance between materials and aerial lines or supporting structures

Direction of Distance	Type and Voltage of Aerial Line (clearance distance in metres)					
	Other cable systems & service lines U ≤ 1kV	U > 1kV U ≤ 33kV	U > 33kV U ≤ 132kV	U > 132kV U ≤ 275kV	U > 275kV U ≤ 330kV	U > 330kV U ≤ 500kV
Distance between any material (other than inflammable materials) and aerial lines—						
(a) horizontal distance	1.5	2.1	3.0	4.6	5.5	6.4
(b) vertical distance	3.7	4.6	4.6	6.8	8.0	9.8
Distance between inflammable materials and aerial lines—						
(a) horizontal distances	3.0	3.0	3.0	4.6	5.5	6.4
(b) vertical distances	3.7	4.6	6.8	6.8	8.0	9.8
Distance between any material and supporting structure—						
(a) horizontal distances	5.0	10.0	15.0	15.0	15.0	15.0
(b) vertical distances	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 2: Clearance distance between operation of machine, vehicle or vessel with elevating component or shear legs and aerial lines

Type and voltage or aerial line	U ≤ 1kV ABC	U ≤ 1kV Bare and covered conductor	U > 1kV U ≤ 33kV	U > 33kV U ≤ 132kV	U > 132kV U ≤ 275kV	U > 275kV U ≤ 330kV	U > 275kV U ≤ 500kV
Clearance distance in all directions in metres	0.5	1.0	1.5	3.0	4.0	6.0	8.0

TABLE 3: Clearance distance between erection of circuits or other cable systems and aerial lines

Type or Circuit and Voltage		Clearance distance (in metres)		
Upper Circuit	Lower Circuit	Attached to a common structure	Between Structures	
			No wind condition	Wind condition
LV aerial line	Private powerline (LV) and other cable systems	0.9	Not permitted	Not permitted
LV aerial line	LV aerial line	0.38	0.6	0.38
Aerial lines U > 1kV U ≤ 33kV	Private powerline (LV) and other cable systems	1.8	Not permitted	Not permitted
Aerial lines U > 1kV	LV aerial line or, Aerial lines < 11kV	1.2	1.2	0.6
Aerial lines U > 11kV U ≤ 33kV	LV aerial line or, Aerial lines < 33kV	1.2	1.2	0.75
Aerial lines U > 33kV U ≤ 66kV	Private powerline (LV) and other cable systems	2.4	Not permitted	Not permitted
Aerial lines U > 33kV U ≤ 66kV	LV aerial line or, aerial lines < 66kV	1.8	1.8	1.2
Aerial lines U > 66kV U ≤ 132kV	Aerial lines ≤ 33kV	Not permitted	Not permitted	Not permitted
Aerial lines U ≥ 132kV	Aerial lines > 33kV	Not permitted	Not permitted	Not permitted

Notes relating to Table 3—

- 1 Any combination of circuits not shown in Table 3 are not permitted.
- 2 For the purpose of Table 3—
 - (a) no wind refers to—
 - (i) undercrossing conductors at 15°C with no wind blowing; and
 - (ii) overcrossing conductors at maximum design temperature with no wind blowing; and
 - (b) wind refers to—
 - (i) undercrossing conductors at 15°C, and displaced by a 500 Pa horizontal wind at right angles to the undercrossing conductors; and

- (ii) overcrossing conductors at maximum design temperature and not displaced by wind.

TABLE 4: Clearance distance between circuits on different supporting structures crossings)

Nominal System Voltage (U)	Clearance Distance (in any direction in metres)
Other cable system or insulated conductor $U \leq 1\text{kV}$	0.1
bare conductor $U \leq 1\text{kV}$	0.6
insulated conductor $1\text{kV} < U \leq 33\text{kV}$	0.6
bare conductor $1\text{kV} < U \leq 33\text{kV}$	1.2
$33\text{kV} < U \leq 66\text{kV}$	1.8
$66\text{kV} < U \leq 132\text{kV}$	2.4
$132\text{kV} < U \leq 275\text{kV}$	2.8
$275\text{kV} < U \leq 330\text{kV}$	3.8
$330\text{kV} < U \leq 500\text{kV}$	5.2

TABLE 5: Clearance distance between load being transported and aerial lines

Nominal System Voltage (U)	Clearance distance (in metres)	
	Vertical distance	Horizontal distance
Other cable system or insulated conductor $U \leq 1\text{kV}$	0.33	0.33
$1\text{kV} < U \leq 132\text{kV}$	2.4	1.5
$132\text{kV} < U \leq 275\text{kV}$	3.2	4.6
$275\text{kV} < U \leq 330\text{kV}$	3.7	4.6
$330\text{kV} < U \leq 500\text{kV}$	4.7	5.5

Schedule 7—Forms for warrants

(Regulation 46)

Form 1—Warrant (personal application)

Electricity Act 1996
(Section 82)

1. I ,
magistrate, have received an application made personally for a warrant from
..... (insert name),
*authorised officer/electricity officer under the *Electricity Act 1996*.
2. On the application, I am satisfied that a warrant should be issued to enter
..... (insert description of place)
on the following grounds:
.....
.....

ACCORDINGLY, I AUTHORISE

- * the abovenamed authorised officer with any assistance and by any force reasonably necessary—
 - (a) to enter the place described above; and
 - (b) to do anything authorised by the *Electricity Act 1996* in that place.
- * the abovenamed electricity officer, in the company of a member of the police force and with any assistance and by any force reasonably necessary—
 - (a) to enter the place described above; and
 - (b) to do anything authorised by the *Electricity Act 1996* in that place.

This warrant may only be executed
..... (insert time or period)

This warrant ceases to have effect at
..... (insert time and date).

Signed:
at (insert time and date of signature).

**Strike out whichever is inapplicable*

Form 2—Warrant (application by telephone)

Electricity Act 1996
(Section 83)

1. I ,
magistrate, have received an application by telephone for a warrant from
..... (insert name),
*authorised officer/electricity officer under the *Electricity Act 1996*.
2. On the application, I am satisfied that a warrant should be issued urgently to enter
..... (insert description of place)
on the following grounds:
.....
.....
.....

ACCORDINGLY, I AUTHORISE

- * the abovenamed authorised officer with any assistance and by any force reasonably necessary—
 - (a) to enter the place described above; and
 - (b) to do anything authorised by the *Electricity Act 1996* in that place.
- * the abovenamed electricity officer, in the company of a member of the police force and with any assistance and by any force reasonably necessary—
 - (a) to enter the place described above; and
 - (b) to do anything authorised by the *Electricity Act 1996* in that place.

This warrant may only be executed
..... (insert time or period)

This warrant ceases to have effect at
..... (insert time and date).

Signed:
at (insert time and date of signature).

**Strike out whichever is inapplicable*

Legislative history

Notes

- Please note—References in the legislation to other legislation or instruments or to titles of bodies or offices are not automatically updated as part of the program for the revision and publication of legislation and therefore may be obsolete.
- Earlier versions of these regulations (historical versions) are listed at the end of the legislative history.
- For further information relating to the Act and subordinate legislation made under the Act see the Index of South Australian Statutes or www.legislation.sa.gov.au.

Legislation revoked by principal regulations

The *Electricity (General) Regulations 1997* revoked the following:

Electricity (General) Regulations 1996

Principal regulations and variations

New entries appear in bold.

Year	No	Reference	Commencement
1997	161	<i>Gazette 26.6.1997 p3144</i> , corrigendum <i>Gazette 17.7.1997 p154</i>	1.7.1997: r 2
1998	189	<i>Gazette 22.10.1998 p1225</i>	13.12.1998: r 2
1999	195	<i>Gazette 30.9.1999 p1370</i>	30.9.1999 except rr 3—10, 17, new rr 31B— 31D (as inserted by r 26), 27, 29 & 33— 11.10.1999: r 2
1999	228	<i>Gazette 25.11.1999 p2529</i>	25.11.1999: r 2
2000	21	<i>Gazette 23.3.2000 p1611</i>	23.3.2000: r 2
2000	228	<i>Gazette 7.9.2000 p1769</i>	7.9.2000: r 2
2000	245	<i>Gazette 12.10.2000 p2490</i>	12.10.2000: r 2
2000	256	<i>Gazette 31.10.2000 p2851</i>	31.10.2000: r 2
2000	270	<i>Gazette 23.11.2000 p3346</i>	23.11.2000: r 2
2001	219	<i>Gazette 13.9.2001 p4180</i>	13.9.2001: r 2
2002	164	<i>Gazette 29.8.2002 p3242</i>	29.8.2002: r 2
2002	188	<i>Gazette 26.9.2002 p3548</i>	26.9.2002 except rr 3(b), 6, 8(a), (e)—(g), 11 & 12—1.1.2003: r 2
2003	147	<i>Gazette 12.6.2003 p2500</i>	12.6.2003: r 2
2003	214	<i>Gazette 30.10.2003 p3926</i>	1.11.2003: r 2
2004	11	<i>Gazette 19.2.2004 p555</i>	19.2.2004: r 2
2004	252	<i>Gazette 16.12.2004 p4593</i>	16.12.2004: r 2
2005	179	<i>Gazette 18.8.2005 p3059</i>	18.8.2005: r 2
2005	261	<i>Gazette 8.12.2005 p4214</i>	1.2.2006: r 2
2006	191	<i>Gazette 20.7.2006 p2339</i>	20.7.2006: r 2

Provisions varied

New entries appear in bold.

Entries that relate to provisions that have been deleted appear in italics.

Provision	How varied	Commencement
Pt 1		
<i>rr 2 and 3</i>	<i>omitted under Legislation Revision and Publication Act 2002</i>	<i>1.11.2003</i>
r 4		
r 4(1)		
AS or Australian Standard	substituted by 252/2004 r 4(1)	16.12.2004
centre-line	inserted by 252/2004 r 4(1)	16.12.2004
connection point	inserted by 164/2002 r 3(a)	29.8.2002
facade mounted line	inserted by 252/2004 r 4(2)	16.12.2004
low voltage or LV	varied by 252/2004 r 4(3)	16.12.2004
multiple earthed neutral system or MEN system	varied by 252/2004 r 4(4)	16.12.2004
retail contract	inserted by 188/2002 r 3(a)	26.9.2002
<i>r 4(1a)</i>	<i>inserted by 164/2002 r 3(b)</i>	<i>29.8.2002</i>
	<i>deleted by 188/2002 r 3(b)</i>	<i>1.1.2003</i>
<i>r 4(2)</i>	<i>deleted by 252/2004 r 4(5)</i>	<i>16.12.2004</i>
r 4(4)	varied by 252/2004 r 4(6)	16.12.2004
rr 4A and 4B	inserted by 188/2002 r 4	26.9.2002
r 5	varied by 189/1998 r 3	13.12.1998
r 5	(a) deleted by 245/2000 r 3	12.10.2000
<i>r 5A</i>	<i>inserted by 189/1998 r 4</i>	<i>13.12.1998</i>
	<i>varied by 195/1999 r 3</i>	<i>11.10.1999</i>
	<i>varied by 219/2001 r 3</i>	<i>13.9.2001</i>
	<i>substituted by 164/2002 r 4</i>	<i>29.8.2002</i>
	<i>varied by 188/2002 r 5</i>	<i>26.9.2002</i>
	<i>deleted by 188/2002 r 6</i>	<i>1.1.2003</i>
r 5AB	inserted by 195/1999 r 4	11.10.1999
	substituted by 228/2000 r 3	7.9.2000
r 5AC	inserted by 252/2004 r 5	16.12.2004
<i>r 5B</i>	<i>inserted by 189/1998 r 4</i>	<i>13.12.1998</i>
	<i>varied by 195/1999 r 5</i>	<i>11.10.1999</i>
	<i>varied by 270/2000 r 3</i>	<i>23.11.2000</i>
	<i>substituted by 164/2002 r 5</i>	<i>29.8.2002</i>
	<i>deleted by 188/2002 r 6</i>	<i>1.1.2003</i>
Pt 1A	inserted by 195/1999 r 6	11.10.1999
r 5C		

Electricity (General) Regulations 1997—20.7.2006 to 8.11.2006

Legislative history

r 5C(1)	varied by 256/2000 r 3	31.10.2000
	varied by 188/2002 r 7(a)—(c)	26.9.2002
r 5C(2)	varied by 188/2002 r 7(a)	26.9.2002
r 5D	varied by 11/2004 r 4	19.2.2004
r 5E	inserted by 270/2000 r 4	23.11.2000
Pt 2		
r 6	varied by 195/1999 r 7	11.10.1999
	substituted by 245/2000 r 4	12.10.2000
r 6(3)	varied by 188/2002 r 8(b)	26.9.2002
	(a)—(d) deleted by 188/2002 r 8(a)	1.1.2003
r 6(4)	varied by 188/2002 r 8(b), (c)	26.9.2002
r 6(5)	varied by 188/2002 r 8(b), (d)	26.9.2002
r 6(6)	substituted by 252/2004 r 6	16.12.2004
r 6(7)	<i>deleted by 188/2002 r 8(e)</i>	<i>1.1.2003</i>
r 6(9)		
<i>contestability transition period</i>	<i>deleted by 188/2002 r 8(f)</i>	<i>1.1.2003</i>
<i>franchise retailer</i>	<i>deleted by 188/2002 r 8(f)</i>	<i>1.1.2003</i>
<i>franchise terms and conditions</i>	<i>deleted by 188/2002 r 8(f)</i>	<i>1.1.2003</i>
transitional inset customer	(b) deleted by 188/2002 r 8(g)	1.1.2003
r 7		
r 7(2)	substituted by 189/1998 r 5	13.12.1998
r 7(4)	inserted by 21/2000 r 3	23.3.2000
	varied by 188/2002 r 9	26.9.2002
r 7A	inserted by 195/1999 r 8	11.10.1999
	varied by 188/2002 r 10	26.9.2002
r 7AB	inserted by 188/2002 r 11	1.1.2003
r 7ABA	inserted by 11/2004 r 5	19.2.2004
r 7ABB	inserted by 261/2005 r 4	1.2.2006
r 7AC	inserted by 214/2003 r 4	1.11.2003
Pt 2A	inserted by 195/1999 r 9	11.10.1999
Pt 2B	inserted by 188/2002 r 12	1.1.2003
Pt 2C	inserted by 188/2002 r 12	1.1.2003
Pt 3A	inserted by 228/1999 r 3	25.11.1999
Pt 4		
Pt 4 Div 1		
r 10	(b) and (c) deleted by 195/1999 r 10	11.10.1999
r 11		
r 11(1)	varied by 195/1999 r 11	30.9.1999
r 12		
r 12(3)	varied by 195/1999 r 12	30.9.1999
r 13		

r 13(2)	varied by 195/1999 r 13	30.9.1999
r 14		
r 14(2)	varied by 195/1999 r 14	30.9.1999
r 15		
r 15(2)	varied by 195/1999 r 15	30.9.1999
r 16		
r 16(2)	varied by 195/1999 r 16	30.9.1999
r 17		
r 17(1)	r 17 varied by 252/2004 r 7(1), (2)	16.12.2004
	r 17 redesignated as r 17(1) by 252/2004 r 7(3)	16.12.2004
r 17(2)	inserted by 252/2004 r 7(3)	16.12.2004
Pt 4 Div 2		
r 18		
r 18(1)	substituted by 195/1999 r 17	11.10.1999
	varied by 252/2004 r 8(1), (2)	16.12.2004
	varied by 179/2005 r 4(1), (2)	18.8.2005
r 18(2)	substituted by 195/1999 r 17	11.10.1999
Pt 4 Div 3		
Subdiv 2		
r 23A	inserted by 195/1999 r 18	30.9.1999
Subdiv 3		
r 25	<i>deleted by 195/1999 r 19</i>	<i>30.9.1999</i>
r 26		
r 26(1)	varied by 195/1999 r 20	30.9.1999
r 27	<i>deleted by 195/1999 r 21</i>	<i>30.9.1999</i>
r 28		
r 28(1)	varied by 195/1999 r 22	30.9.1999
Subdiv 4		
r 30	varied by 195/1999 r 23	30.9.1999
Pt 4 Div 4	varied by 195/1999 r 24	30.9.1999
r 31		
r 31(1)	r 31 redesignated as r 31(1) by 195/1999 r 25	30.9.1999
r 31(2)	inserted by 195/1999 r 25	30.9.1999
r 31A	inserted by 195/1999 r 26	30.9.1999
Pt 4 Div 5	inserted by 195/1999 r 26	11.10.1999
	heading substituted by 252/2004 r 9	16.12.2004
r 31C	varied by 252/2004 r 10	16.12.2004
r 31D		
r 31D(2)	varied by 252/2004 r 11(1)	16.12.2004
r 31D(3)	varied by 252/2004 r 11(2)	16.12.2004
r 31D(4)	inserted by 252/2004 r 11(3)	16.12.2004
Pt 6		
r 34	<i>deleted by 195/1999 r 27</i>	<i>11.10.1999</i>

Electricity (General) Regulations 1997—20.7.2006 to 8.11.2006

Legislative history

r 39		
r 39(1)	substituted by 252/2004 r 12(1)	16.12.2004
	varied by 191/2006 r 4(1), (2)	20.7.2006
r 39(1a)	inserted by 195/1999 r 28	30.9.1999
	varied by 252/2004 r 12(2)	16.12.2004
r 39(2)	substituted by 189/1998 r 6	13.12.1998
	varied by 21/2000 r 4	23.3.2000
r 39A	inserted by 195/1999 r 29	11.10.1999
<i>Sch 1</i>	<i>deleted by 195/1999 r 30</i>	<i>30.9.1999</i>
Sch 2		
c 10		
cl 10(4)	varied by 195/1999 r 31(a)	30.9.1999
	varied by 252/2004 r 13(1)	16.12.2004
	varied by 191/2006 r 5(1), (2)	20.7.2006
cl 10(6)	varied by 191/2006 r 5(3)	20.7.2006
cl 13	varied by 195/1999 r 31(b), (Sch)	30.9.1999
	heading inserted by 147/2003 Sch 1	12.6.2003
	varied by 252/2004 r 13(2)—(8)	16.12.2004
	varied by 191/2006 r 5(4)	20.7.2006
Appendix	substituted by 252/2004 r 13(9)	16.12.2004
Sch 3		
cl 1		
listed standards	substituted by 195/1999 r 32(a)	30.9.1999
cl 2	varied by 252/2004 r 14(1)	16.12.2004
cl 7		
cl 7(2)	varied by 252/2004 r 14(2), (3)	16.12.2004
cl 7(3)	varied by 252/2004 r 14(4)	16.12.2004
cl 7(6)	varied by 147/2003 Sch 1	12.6.2003
cl 8		
cl 8(2)	varied by 252/2004 r 14(5)	16.12.2004
cl 8(3)	varied by 252/2004 r 14(6)	16.12.2004
Appendix	varied by 195/1999 r 32(b)	30.9.1999
	substituted by 252/2004 r 14(7)	16.12.2004
Sch 4		
cl 8		
cl 8(4)	varied by 252/2004 r 15(1), (2)	16.12.2004
Appendix	substituted by 252/2004 r 15(3)	16.12.2004
Sch 5		
cl 5		
cl 5(2) and (3)	varied by 252/2004 r 16(1)	16.12.2004
cl 8	varied by 252/2004 r 16(2)	16.12.2004
Appendix	varied by 195/1999 r 33	11.10.1999
	substituted by 252/2004 r 16(3)	16.12.2004

Historical versions

Reprint No 1—7.9.2000

Reprint No 2—12.10.2000

Reprint No 3—31.10.2000

Reprint No 4—23.11.2000

Reprint No 5—13.9.2001

Reprint No 6—29.8.2002

Reprint No 7—26.9.2002

Reprint No 8—1.1.2003

Reprint No 9—12.6.2003

1.11.2003

19.2.2004

16.12.2004

18.8.2005

1.2.2006