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Australian Standard®

Electrical installations—Selection of cables

Part 1: Cables for alternating voltages up to and including 0.6/1 kV

STANDARDS AUSTRALIA

This Australian Standard was prepared by Committee EL/1, Wiring Rules. It was approved on behalf of the Council of Standards Australia on 18 May 1989 and published on 15 September 1989.

The following interests are represented on Committee EL/1:

Association of Consulting Engineers, Australia

Australian Consumers Association

Australian Electrical and Electronic Manufacturers Association

Confederation of Australian Industry

Department of Housing and Construction

Electrical Contractors Associations of Australia

Electrical regulatory authorities

Electrical Trades Union of Australia

Electricity Supply Association of Australia

Institute of Electrical Inspectors

Institution of Engineers, Australia

Insurance Council of Australia

Telecom Australia

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PREFACE

This Standard was prepared by the Standards Australia Committee on Wiring Rules to supersede AS 3008.1—1984. It is Part 1 of a two-part Standard, this part dealing with cables for use with alternating voltages up to and including 0.6/1kV. Part 2 (in course of preparation) will deal with cables for use with alternating voltages over 1 kV.

The preparation of this edition was undertaken to incorporate into the Standard Amendment No 1 to AS 3008.1—1984 and to effect the following changes to that edition—

(a) Table 1 deleted. Therefore the numbers of all tables have been altered accordingly. (including those referenced below).

(b) Clauses 3.4 and 3.5 and Tables 3 to 10 with regard to installation of cables partially or completely surrounded by thermal insulation.

(c) Tables 11 and 12 amended to delete reference to number and diameter of wires and a reference to AS 1125 inserted.

(d) Tables 18 and 19 have been extended to include current capacities for neutral screened cables. Values for XLPE insulated aluminium cables have been added to Table 19.

(e) Table 57 has been amended and extended to provide values down to a temperature of 25 °C.

(f) Other changes include definitions for ladder support and perforated tray and a number of explanatory notes.

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FOREWORD

This Standard gives the sustained or continuous constant current which is sufficient to produce the maximum permissible cable temperature under specified ambient conditions. The time taken to reach this steady state temperature will vary depending on the type of cable and installation conditions. There will be many cable installations where, because of cable selection practices or demand patterns, the current is not sustained at the maximum specified in this Standard. Under these conditions care should be taken in the application of the correction factors included in Tables 20 to 24; it may be possible to derive other appropriate correction factors for these installations.

The contents of the Standard are a development of the limited provision of Appendix B to AS 3000 and it is expected that over subsequent revisions of AS 3000, Appendix B will be modified and reduced in size and reference made to this Standard.

STANDARDS AUSTRALIA

Australian Standard
Electrical installations—Selection of cables

Part 1: Cables for alternating voltages up to and including 0.6/1kV

1. SCOPE AND GENERAL

1.1 SCOPE. This Standard sets out a method for cable selection for those types of electrical cables and methods of installation which are in common use at working voltages up to and including 0.6/1 kV a.c.

Three criteria are given for cable selection as follows:

(a) Current-carrying capacity.

(b) Voltage-drop.

(c) Short-circuit temperature rise.

This Standard provides sustained current-carrying capacities and voltage drop values for those types of electrical cable and installation practices in common use in Australia. A significant amount of explanatory material is also provided on the application of rating factors which arise from the particular installation conditions of a single circuit or groups of circuits. Also provided in Clause 5 is information on cable selection based on short-circuit temperature limits.

NOTE: A number of worked examples on cable selection are included in Appendix B.

This Standard does not take into account the effects that may occur owing to temperature rise at the terminals of equipment and reference is necessary to AS 3000 and the individual equipment Standards.

1.2 ALTERNATIVE SPECIFICATIONS. AS 3000 gives current-carrying capacities for a limited number of cable installation conditions. These conditions are included in this Standard but, in some cases where recalculations have been performed, the tabulated values differ slightly between the Standards. Where this occurs the current-carrying capacity given in this Standard is considered to be more accurate but either value is acceptable for the application of any appropriate requirements of AS 3000, e.g. maximum current rating of a circuit-protective device.

Where the type of cable or method of installation is not specifically covered in the tables of this Standard, current-carrying capacities obtained from alternative specifications such as ERA Report 69-30, may be employed.

ERA Report 69-30, particularly Part III, gives information on the following areas which are not covered by this Standard:

(a) The d.c. current-carrying capacities of two single-core cables and one two-core cable.

(b) The current-carrying capacity of armoured single-core cables.

(c) Group rating factors for underground cables laid in tier formation.

Current-carrying capacities may also be determined by calculation using IEC 287 and appropriate cable data.

The subject of assigning a current-carrying capacity to a cyclically or intermittently loaded cable is not covered in this Standard. However reference may be made to ERA Report F/T I86 for information on the determination of such cable ratings by calculation.

1.3 REFERENCED AND RELATED DOCUMENTS.

1.3.1 Referenced documents. The following documents are referred to in this Standard:

STANDARDS

AS

I125 Conductors in insulated cables and flexible cords (metric units)

3000 SAA Wiring Rules

IEC

287 Calculation of the continuous current ratings of cables (100 percent load factor)

APPROVAL AND TEST SPECIFICATIONS

AS

3100 Definitions and general requirements for electrical materials and equipment

3191 Electric flexible cords

3300 General requirements for household and similar electrical appliances

ERA REPORTS*

69-30 Current rating standards for distribution cables

- Part I Sustained current ratings for paper-insulated lead-sheathed cables
- Part II Sustained current ratings for paper-insulated cables with aluminium sheath/neutral conductor and three shaped solid aluminium phase conductors
- Part III Sustained current ratings for PVC-insulated cables
- Part V Sustained current ratings for armoured cables with thermosetting insulation

F/T I86 Methods for the calculation of cyclic rating factors and emergency loading for cables laid direct in the ground or in ducts

1.3.2 Related documents. The following documents are related to this Standard:

APPROVAL AND TEST SPECIFICATIONS

AS

3116 Elastomer insulated electric cables and flexible cables for working voltages of 0.6/1 kV

3147 PVC insulated electric cables and flexible cables for working voltages of 0.6/1 kV

* ERA = Reports from ERA Technology Ltd (UK).