To be revised (see memo inside)

See also POWERPAC

AS 3008.1—1984
UDC 621.315.3:696.6

1989 ED.

Amdt 1.

Australian Standard 3008.1—1984

ELECTRICAL INSTALLATIONS—SELECTION OF CABLES

Part 1—CABLES FOR ALTERNATING VOLTAGES UP TO AND INCLUDING 0.6/1 kV

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

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This Australian standard was prepared by Committee EL/1, Wiring Rules. It was approved on behalf of the Council of the Standards Association of Australia on 18 April 1984 and published on 3 August 1984.

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

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Suggestions for improvements to Australian standards, addressed to the head office of the Association, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This standard was issued in draft form for comment as DR 83085.

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

AMENDMENT No 1
to
AS 3008.1—1984
ELECTRICAL INSTALLATIONS—SELECTION OF CABLES
Part 1—CABLES FOR ALTERNATING VOLTAGES UP TO AND INCLUDING 0.6/1 kV

CORRECTION

SUMMARY: The following sections of the standard are covered by this amendment: Clauses 2.4, 2.5, Tables 22.23, Fig. [illegible] Tables 44, and Appendix B.

Published on 5 October 1984.

AMDT No 1 OCT. 1984

Page 7. Clause 2.4(e).

Third line *delete* 'Tables 40 to 58' and *substitute* 'Tables 40 to 57'.

AMDT No 1 OCT. 1984

Page 8. Clause 2.5(b).

Last line *delete* 'Table 59' and *substitute* 'Table 58'.

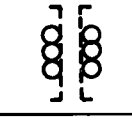
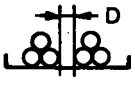
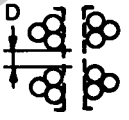
AMDT No 1 OCT. 1984

Page 35. Table 22.

Delete existing table and *substitute*:

TABLE 22

DERATING FACTORS FOR CIRCUITS OF SINGLE-CORE CABLES INSTALLED ON TRAYS, RACKS, CLEATS, OR OTHER SUPPORTS IN AIR

1	2	3	4	5	6	7
Installation		Number of tiers or rows of cable supports	Arrangement of cables in a circuit *a*	Derating factors *b,c,d,h* Number of circuits		
				1	2	3
Unperforated trays	 *e*	1	2 or 3 cables in horizontal formation	0.95	0.8[illegible]	[illegible]85
		2		0.92	0.83	0.[illegible]
		3		0.91	0.[illegible]	[illegible].76
Perforated trays	 *e,g*	1	2 or 3 cables in horizontal formation	0.9[illegible]	[illegible]89	0.87
		2		0.94	0.8[illegible]	0.81
		3		0.93	[illegible].84	0.79
Ladder supports, racks and cleats	 *e*	1	2 or 3 cables in horizontal formation	[illegible].0	0.95	0.94
		2		[illegible]5	0.90	0.88
		3		0.[illegible]	0.89	0.85
Vertical perforated trays	 *f,g*	1	[illegible] cables in vertical formation	0.94	0.85	—
		2		0.92	0.83	—
Unperforated trays	 *e*	[illegible]	2 or 3 cables in trefoil formation	0.98	0.96	0.94
		[illegible]		0.95	0.91	0.87
		[illegible]		0.94	0.90	0.85
Perforated trays	 *e,g*	1	2 or 3 cables in trefoil formation	1.0	0.98	0.96
		2		0.97	0.93	0.89
		3		0.96	0.92	0.86
Ladder supports	 *e*	1	2 or 3 cables in trefoil formation	1.0	1.0	1.0
		2		0.97	0.95	0.93
		3		0.97	0.94	0.90
Vertical perforated trays	 *f,g*	1	2 or 3 cables in trefoil formation	1.0	0.91	0.89
		2		1.0	0.90	0.86

a Earthing conductors, lightly loaded neutral conductors of three-phase circuits and conductors subject only to momentary loading, such as control wiring, shall not be taken into account when considering the number of circuits.

b These derating factors are to be applied to groups of two, three or four single-core cables for which the current-carrying capacity for a single circuit is obtained from columns 4 and 5 of Tables 4 to 7, and Tables 12 to 17. The factors are also applicable to groups of single-core cables making up parallel circuits in accordance with Clause 3.5.2.7.

c These factors are based on uniform groups of cables, equally loaded. In accordance with Clause 3.5.6 the factors for circuits subject to intermittent or varying loads may be higher.

d These factors are applicable to single layers of cables or trefoil groups, as shown in column 2. Where there is more than one layer on the same tray or ladder support, Table 21 may be used.

e The vertical spacing of horizontal trays and ladder supports shall be not less than 300 mm.

f The horizontal spacing of vertical trays mounted back-to-back shall be not less than 230 mm.

g A perforated tray is a tray having not less than 30 percent of its surface area removed by the perforation.

h No derating factor is applicable for the minimum spacings specified in Clause 3.5.2.2(c) and Fig. 1(a).

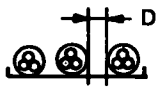
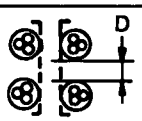
AMDT No 1 OCT. 1984

Page 36. Table 23.

Delete existing table and *substitute*:

TABLE 23

DERATING FACTORS FOR CIRCUITS OF MULTICORE CABLES INSTALLED ON TRAYS, RACKS, CLEATS OR OTHER SUPPORTS IN AIR

1	2	3	4	5	6	7	8	9
Installation		Number of tiers or rows of cable supports	Derating factors *a,b,c,d,h* Number of cables					
			1	2	3	4	6	9
Unperforated trays	 Touching *e*	1	0.97	0.85	0.78	0.75	0.71	0.68
		2	0.97	0.84	0.76	0.73	0.68	0.63
		3	0.97	0.83	0.75	0.72	0.66	0.61
	 Spaced *e*	1	0.97	0.96	0.94	0.93	0.90	—
		2	0.97	0.95	0.92	0.90	0.86	—
		3	0.97	0.94	0.91	0.89	0.84	—
Perforated trays	 Touching *e,g*	1	1.0	0.88	0.82	0.77	0.73	0.73
		2	1.0	0.87	0.80	0.76	0.72	0.68
		3	1.0	0.86	0.79	0.75	0.71	0.66
	 Spaced *e,g*	1	1.0	1.0	0.98	0.95	0.91	—
		2	1.0	0.97	0.96	0.92	0.87	—
		3	1.0	0.96	0.95	0.91	0.85	—
Ladder supports racks and cleats	 Touching	1	1.0	0.87	0.82	0.80	0.79	0.78
		2	1.0	0.86	0.80	0.78	0.76	0.73
		3	1.0	0.85	0.79	0.76	0.73	0.70
	 Spaced *e,g*	1	1.0	1.0	1.0	1.0	1.0	—
		2	1.0	0.99	0.98	0.97	0.96	—
		3	1.0	0.98	0.97	0.96	0.93	—
Vertically perforated trays	 Touching *f,g*	1	1.0	0.88	0.82	0.77	0.73	0.72
		2	1.0	0.88	0.81	0.76	0.72	0.70
	 Spaced *f,g*	1	1.0	0.91	0.89	0.88	0.87	—
		2	1.0	0.91	0.88	0.87	0.86	—

a Earthing conductors, lightly loaded neutral conductors of three-phase circuits and conductors subject only to momentary loading, such as control wiring, shall not be taken into account when considering the number of circuits.

b These derating factors are to be applied to groups of multicore cables for which the current-carrying capacity for a single circuit is obtained from columns 2 and 3 of Tables 8 to 11, Tables 12 to 16 and Table 18. The factors are also applicable to groups of multicore cables making up parallel circuits in accordance with Clause 3.5.2.7.

c These factors are based on uniform groups of cables, equally loaded. In accordance with Clause 3.5.6 the factors for circuits subject to intermittent or varying loads may be higher.

d These factors are applicable to single layers of cables as shown in column 2. Where there is more than one layer on the same tray or ladder support, Table 21 may be used.

e The vertical spacing of horizontal trays and ladder supports shall be not less than 300 mm.

f The horizontal spacing of vertical trays mounted back-to-back shall be not less than 230 mm.

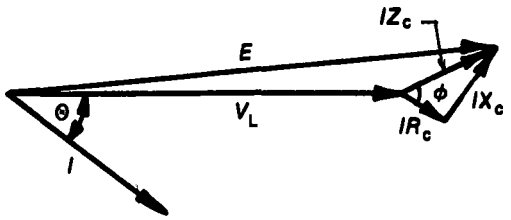
g A perforated tray is a tray having not less than 30 percent of its surface area removed by the perforation.

h No derating factor is applicable for the minimum spacings specified in Clause 3.5.2.2(c) and Fig. 1(b).

AMDT No 1 OCT. 1984

Page 42. Fig. 2(a).

Delete existing Fig. 2(a) and *substitute*:



(a) cos Θ = 0.8 lagging

AMDT No 1 OCT. 1984

Page 50. Table 42.

Delete existing table and *substitute*:

TABLE 42

THREE-PHASE VOLTAGE DROP AT 50 Hz OF MULTICORE CABLE WITH CIRCULAR COPPER CONDUCTORS

Conductor size	Three-phase voltage drop at 50 Hz, mV/A/m							
	Conductor temperature °C							
	45		60		75		90	
mm²	Max	0.8 p.f.	Max	0.8 p.f.	Max	0.8 p.f.	Max	0.8 p.f.
1.0	34.5		36.2		38.1		40.0	
1.5	23.4		24.2		25.5		26.7	
2.5	13.8		14.7		15.3		16.1	
4	8.76		9.23		9.72		10.2	
6	5.85		6.17		6.50		6.81	
10	3.48		3.66		3.86		4.04	
16	2.18		2.30		2.42		2.55	
25	1.29		1.36		1.42		1.49	
35	1.01		1.06		1.11		1.17	
50	0.750		0.790		0.830		0.866	
70	0.528		0.554		0.582		0.608	
95	0.404		0.421		0.440		0.461	
120	0.322		0.336		0.350		0.365	
150	0.272		0.282		0.294		0.305	
185	0.23[illegible]		0.241		0.251		0.258	
240	0.19[illegible]	0.194	0.199	0.199	0.206	0.206	0.211	0.211
300	0.[illegible]75	0.172	0.178	0.177	0.184	0.182	0.187	0.187
400	0.1[illegible]	0.153	0.163	0.157	0.166	0.161	0.169	0.164
500	0.145	0.135	0.146	0.138	0.149	0.141	0.151	0.144
630	0.135	0.123	0.139	0.126	0.140	0.128	0.141	0.130

AMDT No 1 OCT. 1984

Page 51. Table 44.

Delete existing table and *substitute*:

TABLE 44

THREE-PHASE VOLTAGE DROP AT 50 Hz OF SINGLE-CORE INSULATED AND SHEATHED TINNED COPPER CONDUCTOR, LAID FLAT TOUCHING

Conductor size	Three-phase voltage drop at 50 Hz, mV/A.m							
	Conductor temperature, °C							
	45		60		75		90	
mm²	Max	0.8 p.f.	Max	0.8 p.f.	Max	0.8 p.f.	Max	0.8 p.f.
1.0	33.9		35.9		37.6		39.5	
1.5	22.9		24.1		25.3		26.7	
2.5	13.7		14.4		15.2		15.9	
4	8.68		9.14		9.62		10.1	
6	5.80		6.11		6.42		6.7	
10	3.43		3.64		3.83		4.00	
16	2.18		2.30		2.41		2.53	
25	1.29		1.35		1.42		1.49	
35	1.01		1.06		1.11		1.16	
50	0.755		0.793		0.831		0.868	
70	0.542		0.566		0.592		0.614	
95	0.424		0.443		0.461		0.478	
120	0.342		0.357		0.3		0.383	
150	0.301		0.317		0.320		0.333	
185	0.262	0.260	0.268	0.267	0.275	0.275	0.284	0.284
240	0.232	0.224	0.236	0.231	0.241	0.237	0.246	0.243
300	0.215	0.202	0.218	0.208	0.222	0.212	0.225	0.217
400	0.201	0.183	0.204	0.187	0.206	0.197	0.208	0.194
500	0.192	0.169	0.194	0.17	0.196	0.175	0.197	0.178
630	0.183	0.156	0.184	0.1	0.185	0.160	0.189	0.166

AMDT No 1 OCT. 1984

Page 62. Clause B1.1(a).

Delete '(a) All cables in one circuit or duct' and *substitute* '(a) All cables in one conduit or duct.'

Please circulate AP, HB, CR / SF, BL, CG, MC

STANDARDS ASSOCIATION OF AUSTRALIA

Date.................................... File No....................................

Memo. by Anne .... To. All ....

Re Letter.................................... of date....................................

AS 3008.1 – 1984

this is going to be revised next year to put it in line with AS 3000 – 1986. It will be at least 6 months from now. Information from Jim Tinsley 56 1[illegible].

Anne

A31

AUSTRALIAN STANDARD

ELECTRICAL INSTALLATIONS—SELECTION OF CABLES

Part 1
CABLES FOR ALTERNATING VOLTAGES UP TO AND INCLUDING 0.6/1 kv

AS 3008.1—1984

First published 1984

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 3490 7

PREFACE

This standard was prepared by a specialist subcommittee of the Association's Wiring Rules Committee. Its preparation was undertaken to provide a comprehensive standard on cable selection for use in conjunction with AS 3000, SAA Wiring Rules. It is Part 1 of a two-part standard, this part dealing with cables for use with alternating voltages up to and including 0.6/1 kV. Part 2 in course of preparation will deal with cables for use with alternating voltages over 1 kV.

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. Also provided in Clause 5 is information on cable selection based on short-circuit temperature limits.

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. In this regard, special provisions are being evaluated for inclusion in the 1986 edition of AS 3000.

The contents of the standard are a development of the limited provision of Appendix B to AS 3000 and it is expected that at the next revision of AS 3000, Appendix B will be modified and reduced in size and reference made to this standard.

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. Furthermore a number of worked examples on cable selection are included in Appendix B.

CONTENTS

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
ELECTRICAL INSTALLATIONS—SELECTION OF CABLES

PART 1—CABLES FOR ALTERNATING VOLTAGES UP TO AND INCLUDING 0.6/1 kV

1. SCOPE AND APPLICATION

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.

1.2 APPLICATION AND 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.

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 21 to 25; it may be possible to derive other appropriate correction factors for these installations.

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 186 for information on the determination of such cable ratings by calculation.

1.3 REFERENCED DOCUMENTS.

1.3.1 Standards. The following standards are referred to in this standard:

AS 1125	Conductors in Insulated Cables and Flexible Cords (metric units)
AS 3000	SAA Wiring Rules
AS 3191	Approval and Test Specification for Electric Flexible Cords
AS 3300	Approval and Test Specification for General Requirements for Household and Similar Electrical Appliances.

1.3.2 ERA Reports. The following ERA Technology Ltd (UK) Reports are referred to in this standard. available from Syd. 23.8.9

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 IV	(Not yet allocated)
Part V	Sustained Current Ratings for Armoured Cables with Thermosetting Insulation
F/T 186	Methods for the Calculation of Cyclic Rating Factors and Emergency Loading for Cables Laid Direct in the Ground or in Ducts.

NOTE: For related Australian standard approval and test specification and IEC standards see Appendix C.

1.4 DEFINITIONS. For the purpose of this standard, the definitions of AS 3000 apply in addition to, and except as varied by the following definitions:

1.4.1 Ambient temperature—the temperature of the medium in the immediate neighbourhood of the installed cable—

(a) including any increase in temperature due to materials or equipment to which the cables are connected, or are to be connected; but

(b) excluding any increase in temperature which may be due to the heat arising from the cables at that point.

1.4.2 Continuous loading—under consideration.

1.4.3 Cyclic loading—under consideration.

1.4.4 Route length—the distance measured along a run of wiring from the origin of the circuit to the point of consideration, e.g. the distance measured between a switchboard and a motor.