

AS 2264—1995

IEC 466:1987

IEC 466:1987 Amendment 1:1994

Australian Standard[®]

**A.C. insulation-enclosed switchgear
and controlgear for rated voltages
above 1 kV and up to and including
38 kV**

This Australian Standard was prepared by Committee EL/7, Power Switchgear. It was approved on behalf of the Council of Standards Australia on 7 April 1995 and published on 5 August 1995.

The following interests are represented on Committee EL/2:

Australian-British Chamber of Commerce
Australian Electrical and Electronic Manufacturers Association
Electricity Supply Association of Australia
Institution of Engineers, Australia
Railways of Australia Committee
Testing Authorities (Australia)
WorkCover Authority of N.S.W.

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, 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 94266.

Australian Standard[®]

**A.C. insulation-enclosed switchgear
and controlgear for rated voltages
above 1 kV and up to and including
38 kV**

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL/7 on Power Switchgear to supersede AS 2264—1985, *High voltage a.c. switchgear and controlgear—Insulation-enclosed for rated voltages above 1 kV and up to and including 36 kV*.

This Standard is the result of a consensus among representatives on the Joint Committee to produce it as an Australian Standard.

With the exception of Appendix ZZ, this Standard is equivalent in technical content but does not fully correspond in presentation to IEC 466 (1987), *A.C. insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kV*, including Amendment 1.

Appendix ZZ lists the Australian variations between this Standard and IEC 466. For the purposes of this Standard, the IEC text is amended, supplemented or replaced as set out in Appendix ZZ. These changes are indicated by a marginal bar against each clause, table, figure or part thereof affected. The changes required by Amendment 1 are indicated by double marginal bars against each clause, table, figure or part thereof.

The purpose of this edition is to bring it more into line with IEC 466. It is intended to be read in conjunction with AS 2650, *High-voltage a.c. switchgear and controlgear—Common requirements*, which is applicable unless otherwise specified in this Standard. In order to simplify the indication of corresponding requirements, the same numbering of clauses and subclauses is used in AS 2650. Amendments to these clauses and sub-clauses are given under the same references, whilst additional sub-clauses are numbered from 101. Additional annexes are lettered from AA.

As this Standard is reproduced from an International Standard, the following applies:

- (a) The AS number is shown only on the cover and title page, while the international Standard number appears only on the cover.
- (b) In the source text ‘this International Standard’ should read ‘this Australian Standard’.
- (c) A full point substitutes for a comma when referring to a decimal marker.

The term ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

References to international Standards should be replaced by equivalent Australian Standards, as follows:

<i>References to International Standard</i>		<i>Australian Standard</i>	
IEC		AS	
50	International Electrotechnical Vocabulary (IEV)	1852	International Electrotechnical Vocabulary
50(151)	Chapter 151: Electrical and magnetic devices	1852.151	Part 151: Electric and magnetic devices
50(441)	Chapter 441: Switchgear, controlgear and fuses	1852.441	Part 441: Switchgear, controlgear and fuses
56	High-voltage alternating current circuit breakers	2006	High voltage a.c. switchgear and controlgear—Circuit breakers for rated voltages above 1000 V
60	High-voltage test techniques	1931	High voltage testing techniques
60-1	Part 1: General definitions and test requirements	1931.1	Part 1: General definitions, test requirements, test procedures and measuring devices

IEC		AS	
129	Alternating-current disconnectors and earthing switches	1306	High voltage a.c. switchgear and controlgear—Disconnectors (isolators) and earthing switches
243	Recommended methods of test for electric strength of solid insulating materials at power frequencies	1255	Methods of test for electrical characteristics of solid plastics insulating materials
		1255.3	Part 3: Determination of electric strength at power frequencies
270	Partial discharge measurements	1018	Partial discharge measurements
298	A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 72.5 kV	2086	High-voltage a.c. switchgear and controlgear—Metal-enclosed—Rated voltages above 1 kV up to and including 72.5 kV
529	Degrees of protection provided by enclosures (IP Code)	1939	Degrees of protection provided by enclosures for electrical equipment (IP Code)
621	Electrical installations for outdoor sites under heavy conditions (including opencast mines and quarries)	3007	Electrical installations—Surface mines and associated processing plant
621-1	Part 1: Scope and definitions	3007.1	Part 1: Scope and definitions
694	Common clauses for high-voltage switchgear and controlgear standards	2650	High voltage a.c. switchgear and controlgear—Common requirements

Referenced document listed in Appendix ZZ:

AS

2650 High voltage a.c. switchgear and controlgear—Common requirements

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

Clause	Page
1. Scope	1
2. Normal and special service conditions	1
3. Definitions	1
4. Rating	4
4.1 Rated voltage	5
4.2 Rated insulation level	5
4.3 Rated frequency	5
4.4 Rated normal current and temperature rise	5
4.5 Rated short-time withstand current	5
4.6 Rated peak withstand current	6
4.7 Rated duration of short-circuit	6
4.8 Rated supply voltage of closing and opening devices and auxiliary circuits	6
4.9 Rated supply frequency of operating devices and auxiliary circuits	6
4.10 Rated pressure of compressed gas supply for operation	6
5. Design and construction	6
5.1 Requirements for liquids in switchgear and controlgear	6
5.2 Requirements for gases in switchgear and controlgear	7
5.3 Earthing	7
5.4 Auxiliary equipment	7
5.5 Dependent power closing	7
5.6 Stored energy closing	7
5.7 Operation of releases	7
5.8 Low and high pressure interlocking devices	7
5.9 Nameplates	8
5.101 Degree of protection	8
5.102 Internal fault	9
5.103 Insulation enclosure	9
5.104 Shutters	11
5.105 Disconnectors and earthing switches	12
5.106 Interlocks	12
5.107 Provisions for dielectric tests on cables	13
6. Type tests	13
6.1 Dielectric tests	14
6.2 Radio interference voltage (RIV) tests	21
6.3 Temperature-rise tests	21
6.4 Measurement of the resistance of the main circuit	21
6.5 Short-time and peak withstand current tests	21
6.101 Verification of making and breaking capacities	22
6.102 Mechanical operation tests	22
6.103 Verification of the degree of protection	23

Clause	Page
6.104 Measurement of leakage currents	23
6.105 Mechanical strength test	24
6.106 Test under conditions of arcing due to internal fault	25
6.107 Thermal stability test	25
6.108 Humidity test	25
6.109 Ageing tests	25
7. Routine tests 25	
7.1 Power-frequency voltage tests on the main circuit	26
7.2 Dielectric tests on auxiliary and control circuits	26
7.3 Measurement of the resistance of the main circuit	26
7.101 Mechanical operation tests	26
7.102 Tests of auxiliary electrical, pneumatic and hydraulic devices	27
7.103 Verification of the correct wiring	27
7.104 Partial discharge measurement	27
8. Guide to the selection of switchgear and controlgear for service	27
9. Information to be given with enquiries, tenders and orders	28
9.101 Information to be given with enquiries and orders	28
9.102 Information to be given with tenders	29
10. Rules for transport, storage, erection and maintenance	29
10.1 Conditions during transport, storage and erection	29
10.2 Erection	29
10.3 Maintenance	29
APPENDIX AA - Internal fault	31
Method for testing the enclosed switchgear and controlgear under conditions of arcing due to internal fault	32
APPENDIX BB - Humidity test	38
APPENDIX CC - Rated insulation level for Series II	42
APPENDIX DD - Guide for dielectric tests after erection on site	42
APPENDIX ZZ - List of variations between this Standard and IEC 466	43
APPENDIX ZA - Items subject to agreement between manufacturer and user	44

<p>Originated as AS 2264—1979. Third edition 1995.</p>
--

AUSTRALIAN STANDARD

**A.C. INSULATION-ENCLOSED SWITCHGEAR AND CONTROLGEAR
FOR RATED VOLTAGES
ABOVE 1 kV AND UP TO AND INCLUDING 38 kV**

1. Scope

This standard specifies requirements for factory-assembled insulation-enclosed switchgear and controlgear for alternating current of rated voltages above 1 kV and up to and including 38 kV for indoor installation, and for service frequencies up to and including 60 Hz.

Note. - In some countries the highest voltage for equipment is 40.5 kV.

Insulation-enclosed switchgear and controlgear for special use, for example in flammable atmospheres, in mines or in ships, may be subject to additional requirements.

This standard does not deal with components contained in insulation-enclosed switchgear and controlgear for which individual specifications exist.

Notes 1. - Switchgear and controlgear assemblies having a metal enclosure are covered by IEC Publication 298:A.C. Metal-enclosed Switchgear and Controlgear for Rated Voltages above 1 kV and up to and including 72.5 kV.

2. - While this standard also covers insulation-enclosed switchgear and controlgear the insulation of which is an insulating fluid other than air at atmospheric pressure, additional requirements for such equipment may apply depending on its design.

For the purpose of this standard, when the term “switchgear” is used alone, it corresponds to “insulation-enclosed switchgear and controlgear”.

2. Normal and special service conditions

Unless otherwise specified, the insulation-enclosed switchgear and controlgear is designed to be used under normal indoor service conditions.

Refer to Sub-clause 2.1.1 of IEC Publication 694: Common Clauses for High-voltage Switchgear and Controlgear Standards. In all other cases the manufacturer should be consulted.

3. Definitions

For the definitions of general terms used in this standard, reference is made to IEC Publication 50(441): International Electrotechnical Vocabulary (IEV), Chapter 441: Switchgear, Controlgear and Fuses, and IEC Publication 50(151): Chapter 151: Electrical and Magnetic Devices. The following definitions apply for the purpose of this standard.

3.101 *Switchgear and controlgear*

A general term covering switching devices and their combination with associated control, measuring, protective and regulating equipment, also assemblies of such devices and equipment with associated interconnections, accessories, enclosures and supporting structures (IEV 441-11-01).