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Australian Standard 2067–1980

SWITCHGEAR ASSEMBLIES AND ANCILLARY EQUIPMENT

FOR ALTERNATING VOLTAGES ABOVE 1 kV

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS were officially represented on the committee entrusted with the preparation of this standard:

Australian-British Trade Association

Australian Electrical Manufacturers Association

Confederation of Australian Industry

Electricity Supply Association of Australia

Institution of Engineers, Australia

Railways of Australia Committee

Testing Authorities

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AUSTRALIAN STANDARD

SWITCHGEAR ASSEMBLIES AND ANCILLARY EQUIPMENT

FOR ALTERNATING VOLTAGES ABOVE 1 kV

AS 2067–198[illegible]

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PREFACE

This standard has been prepared by the Association's Committee on Power Switchgear as a new edition of AS 2067. Revision of the 1977 edition was necessary due to the publication of AS 2395, Terminals for Switchgear Assemblies for Alternating Voltages Above 1 kV. Appendix C of this standard has been amended and reference is made to AS 2395, which provides recommendations for the design and preparation of bolted joints.

Owing to the withdrawal of BS 2725, the Note to Clause 4.3.1 in the 1977 edition has been deleted. Temperature-rise tests are covered by the type test requirements of appropriate Australian standards (refer to Section 11). These standards are listed in Appendix J.

D.C. test voltages have been covered by reference to AS 1026 and AS 1429 in Clause 11.4.3.

In the preparation of the standard, consideration was given to the following IEC and CIGRE documents and acknowledgment is made of the assistance received therefrom:

IEC (Standard) 445	Identification of Apparatus Terminals and General Rules for a Uniform System of Terminal Marking, Using an Alpha-numeric Notation
IEC (Standard) 446	Identification of Insulated and Bare Conductors in Installations by Colours
IEC (Draft) 14 (Central Office)26	Terminal and Tapping Markings for Power Transformers
IEC (Draft) 28(Central Office)42	Supplement to IEC Publication 71 — Recommendations for Insulation Coordination - Application Guide
IEC (Standard) 391	Marking of Insulated Conductors
CIGRE No 23 23–71 (GT 06) 02 DT1 September 1971	Report of Working Group 06 on The Effect of Safety Regulations and the Design of Substations

This standard coordinates the requirements for indoor and outdoor switchgear assemblies for alternating voltages above 1 kV, such as are employed in connection with the generation, transmission and distribution of electric power. It also applies to the ancillary equipment used in conjunction with the switchgear.

In particular it specifies requirements in regard to electrical clearances, the safety of personnel during normal operation and maintenance of the equipment, the earthing of main circuits, substations and fences. Basic requirements are specified for busbars, marking and identification of conductors and terminals, colours of indicator lights and electrical and compressed air auxiliary systems. The appendices include recommendations for jointing of busbars and connections, design of earthing systems and notes on the provision of safety clearances.

For a list of standards to which reference may be required or which are relevant to this standard see Appendix J.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
SWITCHGEAR ASSEMBLIES AND ANCILLARY EQUIPMENT FOR ALTERNATING VOLTAGES ABOVE 1 kV

SECTION 1. SCOPE AND SERVICE CONDITIONS

1.1 SCOPE. This standard coordinates the requirements for indoor and outdoor switchgear assemblies for alternating voltages above 1 kV such as are employed in connection with the generation, transmission and distribution of electric power. It also applies to the ancillary equipment used in conjunction with the switchgear.

It is not intended to cover the requirements for specific apparatus for which separate Australian standards may exist (see Section 4), nor the additional requirements for switchgear for use in mines and explosive atmospheres.

It does not give any recommendations for environmental requirements, but these should be taken into consideration in the siting of the installation.

1.2 SERVICE CONDITIONS.

1.2.1 Normal Service Conditions. This standard applies to switchgear and ancillary equipment which is designed for use under the following conditions:

(a) The ambient air temperature does not exceed 40°C and its average value measured over a period of 24 h does not exceed 35°C.

NOTE: Sudden drops of temperature of up to 20°C in a period of 20 min may occur.

(b) The ambient air temperature is not less than −5°C for indoor installations and −10°C for outdoor installations.

(c) The maximum temperature due to sunlight does not exceed an equivalent black body temperature of 80°C.

NOTE: For practical purposes this is equivalent to 1.1 kW/m².

(d) The altitude does not exceed 1000 m.

Where switchgear having insulation in free air is required for use at altitudes above 1000 m, one or other of the following procedures shall be adopted:

(i) The test voltages for such insulation shall be determined by multiplying the standard test voltages given in Tables 11.1 and 11.2 by the appropriate factor given in column 2 of Table 1.1, as well as by the correction factor given in AS 1931, Part 1.

(ii) The switchgear may be selected with rated voltage which when multiplied by the appropriate correction factor given in column 3 of Table 1.1 is not lower than the highest voltage of the system.

TABLE 1.1

ALTITUDE CORRECTION FACTOR

1	2	3
Maximum altitude m	Correction factor for test voltages referred to sea level	Correction factor for rated voltages
1000	1·0	1·0
1500	1·05	0·95
3000	1·25	0·80

NOTE: For altitudes between 1000 m and 1500 m, and between 1500 m and 3000 m, the correction factors may be obtained by linear interpolation.

(e) The ambient air is not materially polluted by dust, smoke, corrosive or flammable gases and vapours, or salt. (See Appendix B.)

(f) The wind pressure does not exceed the design wind pressure (see Note 1).

NOTES:

1. Reference should be made to AS 1170, Part 2, to establish design wind pressures for the climate and other conditions which apply to the installation.
2. Agreement should be reached between the purchaser and the manufacturer in cases where earth tremors can be expected. Reference should be made to the paper 'Design of HV Power System Plant and Equipment in Areas of Low Seismic Activity' by McRae and White, IE Australia Transactions, EE9 (1 and 2), 1973.
3. For indoor installations in pressurized or air-conditioned rooms, condensation is not normally a problem. In other installations, heaters may be required (see Appendix B).
4. Installation and maintenance are carried out to the manufacturer's nominated instructions.

1.2.2 Non-standard Service Conditions. If switchgear and ancillary equipment is to be used under conditions different from those referred to in Clause 1.2.1, then consideration should be given, in collaboration with the manufacturer, to the derating of standard equipment in terms of voltage or current or both. This may be achieved by selecting the next higher standard rating for the application. Notes on non-standard atmospheres are given in Appendix B.

1.3 SYSTEM NEUTRAL AND EARTH-FAULT FACTORS.

1.3.1 General. This standard applies to high voltage switchgear suitable for use on systems described in Clauses 1.3.2 to 1.3.5 and AS 1824, Part 1.