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Australian Standard 3191–1981

APPROVAL AND TEST SPECIFICATION FOR ELECTRIC FLEXIBLE CORDS

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STANDARDS ASSOCIATION OF AUSTRALIA
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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian-British Trade Association

Australian Electrical and Electronic Manufacturers Association

Confederation of Australian Industry

Defence Standardization Committee

Department of Construction

Department of Transport

Electrical Approvals Authorities

Electrical Contractors Associations of Australia

Electrical Testing Laboratories

Electricity Supply Association of Australia

Metals Industry Organizations

Railways of Australia Committee

Representative of SAA Committee EL/2

Telecom Australia

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AUSTRALIAN STANDARD

APPROVAL AND TEST SPECIFICATION FOR ELECTRIC FLEXIBLE CORDS

AS 3191–1981

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PREFACE

This edition of this standard was prepared by the Association's Committee on Electric Wires and Cables in conjunction with representatives from electrical contractors, consulting engineers, appliance manufacturers, motor control and low-voltage switchgear and wiring companies, and from the Association's Committees on Wiring Rules, Paper Insulated Cables and Shipbuilding Cables.

The flexible cords herein are intended for use in electrical installations at working voltages up to and including 250/440 V, or 0.6/1 kV for heavy duty types, and include elastomer cords, PVC cords, cords having fibrous insulation of glass or asbestos, composite PVC-glass and PVC-asbestos, silicone rubber and silicone rubber-glass or silicone rubber-asbestos and PTFE type cords.

This edition varies from the 1974 edition by the incorporation of all published amendments, updating of cross-references to other standards, and editorial corrections. In addition, to align the standard with new editions of AS 3116, Elastomer Insulated Electric Cables and Flexible Cables, and AS 3147, PVC Insulated Cables and Flexible Cables, the size has been changed from A5 to A4.

The format of this and other approval and test specifications for cables of voltage rating 0.6/1 kV has been prepared so that —

(a) all requirements for conductors are cross-referred to AS 1125, Conductors in Insulated Electric Cables and Flexible Cords (Metric Units);

(b) all criteria for tests on insulation and non-metallic sheath are listed in this standard, but the actual test methods are described in AS 1660, Methods of Test for Electric Cables and Flexible Cords (including Conductors, Insulation and Sheath);

(c) all criteria for tests on the finished cord are listed in this standard, but the actual test methods are described in AS 1660.

AS 1660 is published in a number of parts dealing with test methods for conductors, insulation, sheath, flexible cords, finished cables with voltage ratings of 0.6/1 kV and finished cables with voltage ratings above 0.6/1 kV, and further parts dealing with specialized cable types may be published later.

The nominal cross-sectional areas of the conductors specified herein are identical with the values recommended in IEC 228 and the dimensions for insulation and sheath thickness for PVC and elastomer insulated flexible cords are identical with the values for corresponding cords in IEC 227 and IEC 245. Not all of the PVC and elastomer insulated cords specified herein are covered in the IEC publications, however, and in such cases the thicknesses herein are generally in conformity with BS 6500. Although the elastomer and PVC insulated cords specified in Section 2 are identical dimensionally and in respect of marking with any counterparts specified by IEC, they are quite different in respect of temperature ratings and hence properties of insulants and sheaths.

It is intended that further sections will be added to this standard from time to time as the need arises and in order to provide for further types of flexible cords not at present specified.

During preparation of this edition, reference was made to the following:

IEC 227 Polyvinyl Chloride Insulated Flexible Cables and Cords with Circular Conductors and a Rated Voltage not exceeding 750 V

IEC 228 Nominal Cross-sectional Areas and Composition of Conductors of Insulated Cables

IEC 245 Rubber Insulated Flexible Cables and Cords with Circular Conductors and a Rated Voltage not exceeding 750 V

BS 6500 Insulated Flexible Cords : Metric Units.

This standard is one of a series of approval and test specifications issued by the Association. These specifications are accompanied by a general specification, AS C100, containing definitions and general requirements for electric materials and equipment. The purpose of these specifications is to outline the conditions which must be met to secure approval for the sale and use of electrical equipment in Australia. Only safety matters and conditions closely allied thereto are covered. In respect of flexible cords, however, it has been found that the minimum requirements for approvals purposes are so similar to the requirements which must be included in a purchasing specification that the two purposes can be achieved in one standard. It is intended, therefore, that in addition to being used for approvals purposes, this standard will be used as a standard for purchasing purposes but both matters are clearly delineated. (See Note 2 to Clause 1.1, Scope.)

This standard requires reference to the following Australian standards:

AS 1125 Conductors in Insulated Electric Cables and Flexible Cords (Metric Units)

AS 1660 Methods of Test for Electric Cables and Flexible Cords (including Conductors, Insulation and Sheath)

Part 2 — Test Methods for Insulation Sheath and Braid

Part 4 — Test Methods for Complete Flexible Cords

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APPROVAL AND TEST SPECIFICATION FOR ELECTRIC FLEXIBLE CORDS

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This specification applies to insulated flexible cords intended for use in electrical installations at working voltages up to and including 250/440 V, or 0.6/1 kV for heavy duty types. (See Note to Clause 1.4.)

NOTES:

1. This specification is intended to apply only to flexible cords of the types and sizes which are included.

   It is not intended however that other types or sizes of flexible cord should be precluded from use and Approvals Authorities will consider the issue of a Certificate of Suitability for connection to the supply mains under the non-prescribed scheme for other types and sizes as they are developed. Any application for such certificate should be accompanied by a description of the flexible cord. See Appendix A for details.

2. The additional requirements of this specification for purchasing purposes (see Preface) are printed with a rule in the margin. The requirements without the rule form a mandatory part of the specification for approvals and for purchasing purposes, whereas those with the rule are not mandatory for approvals purposes but form an essential part of the specification for purchasing. (See Appendix C.)

1.2 DEFINITIONS. For the purpose of this specification the definitions in AS 1125 and the following definitions shall apply:

1.2.1 Core — the conductor with its insulation or dielectric but not including any protective covering.

1.2.2 Flexible cord — one core, or two, three, four or five cores assembled together with or without fillings or protective covering. The insulation and any fillings and covering are such as to afford flexibility and the conductors are stranded, bunched or of tinsel type in accordance with the requirements for flexible cords in AS 1125 and have nominal cross-sectional areas not exceeding 4 mm².

1.2.3 Maximum permissible continuous conductor temperature — the maximum temperature at which the conductor of the cord may be operated continuously and is the temperature resulting from the combined effect of the ambient temperature and the current loading of the conductor.

1.2.4 Voltage designation — flexible cords shall be designated by the rated voltages U_o and U expressed in the form U_o/U or, in the case of cords for d.c. systems, U_o, where —

U_o is the r.m.s. power frequency voltage to earth of the supply system or d.c. voltage of the supply system for which the flexible cord is designed; and

U is the r.m.s. power frequency voltage between phases of the supply system for which the flexible cord is designed.

1.2.5 Routine tests — tests made by the manufacturer on all finished cord lengths to demonstrate the integrity of the cord.

NOTE: By agreement between the purchaser and the manufacturer (making reference to results of quality control procedures), the number of lengths of finished cord on which these tests shall be carried out may be reduced.

1.2.6 Special tests — tests made by the manufacturer on samples of completed cord, or components taken from a completed cord, at a specified frequency, so as to verify that the finished product meets the design specifications.

1.2.7 Type tests — tests required to be made by a manufacturer before supplying on a general commercial basis a type of cord covered by this specification in order to demonstrate satisfactory characteristics to meet the intended application. These tests are of such a nature that, after they have been made, they need not be repeated, unless changes are made in the cord materials or design which might change the characteristics.

1.3 MAXIMUM PERMISSIBLE CONTINUOUS CONDUCTOR TEMPERATURE. The maximum permissible continuous conductor temperature of flexible cords shall be as specified in Table 1.1.

1.4 VOLTAGE DESIGNATION. Unless otherwise specified the rated voltage of flexible cords shall be —

0.6/1 kV for heavy duty sheathed cords and heavy duty unsheathed cords

250/440 V for ordinary duty sheathed cords and screened and sheathed cords

250/250 V for light duty sheathed cords and unsheathed cords (including braided cords).

NOTE: Sheathed cords are suitable for use where the voltage between phases has a nominal value of 500 V (such as would occur in a single-phase 2 × 250 V system).