Australian Standard®

# Electric cables—Polymeric insulated

## Part 1: For working voltages 1.9/3.3 (3.6) kV up to and including 19/33 (36) kV

This Australian Standard was prepared by Committee EL/3, Electric Wires and Cables. It was approved on behalf of the Council of Standards Australia on 31 August 1993 and published on 20 December 1993.

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The following interests are represented on Committee EL/3:

Australian Electrical and Electronic Manufacturers Association

Department of Defence

Electrical regulatory authorities

Electricity Supply Association of Australia

Office of Energy, N.S.W.

Railways of Australia Committee

Testing interests

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# PREFACE

This Standard was prepared by the Standards Australia Committee on Electric Wires and Cables to supersede AS 1429—1985, *Polymeric insulated cables for electricity supply at working voltages 1.9/3.3 kV up to and including 19/33 kV.*

In the Standard, Sections 1 to 3 cover the general requirements for cables with individually or collectively screened cores, Section 4 requirements are specific to cables with individually screened cores, and Section 5 requirements are specific to three-core cables with collectively screened cores.

This revised Standard differs from the previous edition in the following significant ways:

(a) The low density polyethylene insulation, the conductor and insulation thermoplastic screens, and the 75°C rated PVC sheath have been deleted.

(b) More detailed requirements and recommendations are specified for the (metallic) individual or collective screens. Copper tape screens have been deleted.

(c) Provision (optional) has been made for the water-blocking of single-core cables, for protection from boring insects, and for the metre marking of cables.

(d) Some changes have been made to cable tests and criteria.

(e) Requirements for high voltage d.c. test after installation have been deleted.

(f) The Standard now includes all the necessary data for determining the dimensions of protective coverings, and test requirements have been combined into one table.

In the preparation of this Standard, consideration was given to the following publications and acknowledgment is made of the assistance received:

| | |
|---|---|
| IEC 229 | Tests on cable oversheaths which have a special protective function and are applied by extrusion |
| IEC 502 | Extruded solid dielectric insulated power cables for rated voltages from 1 kV up to 30 kV |
| IEC 811 | Common test methods for insulating and sheathing materials of electric cables |
| AEIC CS5 | Thermoplastic and crosslinked polyethylene insulated shielded power cables rated 5 kV through 35 kV |
| AEIC CS6 | Ethylene propylene rubber insulated shielded power cables rated 5 kV through 69 kV |
| NEMA No WC 7 | Cross-linked-thermosetting-polyethylene-insulated wire and cable for the transmission and distribution of electrical energy |
| NEMA No WC 8 | Ethylene-propylene-rubber-insulated wire and cable for the transmission and distribution of electrical energy |

The nominal cross-sectional areas of the conductors specified herein are identical with the values specified in AS 1125, *Conductors in insulated electric cables and flexible cords*. The dimensions for insulation and non-metallic sheath thicknesses are identical with the values recommended in IEC 502. Certain tests and criteria in this Standard are more stringent than those in IEC 502.

Two types of insulation and non-metallic sheath compounds are specified in this Standard, namely insulation comprising cross-linked polyethylene (XLPE) or ethylene propylene rubber (EPR) and non-metallic sheath comprising polyvinyl chloride (PVC) or high density polyethylene (HDPE).

Although the Standard provides tables of insulation thicknesses and the necessary information to establish precisely the dimensions of the cable protective coverings, no cable dimension tables are provided owing to the variety of cable constructions that could possibly affect such dimensions.

The terms '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.

CONTENTS

*Page*

*Page*

APPENDICES

STANDARDS AUSTRALIA

# Australian Standard

# Electric cables—Polymeric insulated

## Part 1: For working voltages 1.9/3.3 (3.6) kV up to and including 19/33 (36) kV

## SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE** This Standard specifies requirements for cross-linked polyethylene (XLPE) and ethylene propylene rubber (EPR) insulated cables for fixed installations for electricity supply.

NOTE: Optional requirements for water-blocking, protection from boring insects and metre marking on cable are provided in Clauses 2.17, 2.18 and 2.20.

Section 4 applies to single-core and three-core cables comprising individually screened cores and Section 5 applies to three-core cables comprising collectively screened cores.

**1.2 REFERENCED DOCUMENTS** The following documents are referred to in this Standard:

AS

1018 Partial discharge measurements

1125 Conductors in insulated electric cables and flexible cords

1660 Methods of test for electric cables, cords and conductors

1931 High voltage testing techniques

2857 Timber drums for insulated electric cables and bare conductors

2893 Electric cables—Lead and lead alloy sheaths—Composition

3863 Galvanized mild steel wire for armouring cables

3983 Metal drums for insulated electric cables and bare conductors

IEC

986 Guide to the short-circuit temperature limits of electric cables with a rated voltage from 1.8/3 (3.6) kV to 18/30 (36) kV

**1.3 DEFINITIONS** For the purposes of this Standard, the relevant definitions in the referenced Standards and those below apply:

**1.3.1 Approximate value**—a value which is neither guaranteed nor checked.

**1.3.2 Collective screen**—a metallic screen applied over the laid-up core assembly.

**1.3.3 Conductor screen**—a layer or layers of non-metallic semiconductive material applied directly over the conductor.

**1.3.4 Core (of a cable)**—an assembly comprising a conductor, semiconductive conductor screen, insulation and semiconductive insulation screen.

**1.3.5 Direction of lay**—the slope of the core, screen wire or armour wire, or the like when the cable is held vertically.

It is right-hand when the slope is in the direction of the central part of the letter Z, and left-hand when the slope is in the direction of the central part of the letter S.