AS 1531—1991

Australian Standard®

Conductors—Bare overhead—Aluminium and aluminium alloy

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This Australian Standard was prepared by Committee EL/10, Overhead Lines. It was approved on behalf of the Council of Standards Australia on 10 April 1991 and published on 10 June 1991.

The following interests are represented on Committee EL/10:

Australian Electrical and Electronic Manufacturers Association

Australian Porcelain Insulators Association

Confederation of Australian Industry

Electrical and Radio Federation of Victoria

Electricity Supply Association of Australia

Railways of Australia Committee

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AS C75.2—1965.
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PREFACE

This Standard was prepared by the Standards Australia Committee on Overhead Lines and supersedes the three parts of AS 1531, *Aluminium conductors for overhead power transmission purposes*:

Part 1—1974 *All aluminium* (*AAC*).

Part 2—1974 *All aluminium alloy* (*AAAC*).

Part 3—1984 *All aluminium alloy* (*AAAC 1120*).

In determining conductor sizes, a range of wire sizes has been provided similar to those specified in the 1974/1984 edition. The facility is also provided for conductors with other dimensions to be supplied by reference to this Standard.

To assist users in selecting the most suitable conductor for a particular application, the calculated equivalent aluminium area, calculated conductor breaking load, and d.c. resistance for the standard conductors are given.

This edition of the Standard differs from the previous suite of Standards as follows:

(a) Section 2: Wire sizes have been rationalized.

(b) Section 3: The number of standard sizes, especially in the alloy range, has been reduced.

(c) Section 4: For test purposes, requirements have been added to sequentially identify wire and conductor during production.

(d) Appendix B: Now includes the coefficient of linear expansion and the theoretical basis for the calculation of modulus of elasticity.

(e) Appendix D: This new appendix has been included which highlights items which should be specified by the purchaser or agreed between purchaser and manufacturer at the time of order.

In the preparation of this Standard reference was made to the following Standards:

IEC 207 *Aluminium stranded conductors.*

IEC 208 *Aluminium alloy stranded conductors* (*aluminium–magnesium–silicon type*).

IEC 468 *Method of measurement of resistivity of metallic materials.*

SS 424 08 13 *Aluminium alloy wire for stranded conductors for overhead lines.*

SS 424 08 14 *Aluminium alloy stranded conductors for overhead lines.*

Acknowledgement is made of the assistance received from those sources.

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STANDARDS AUSTRALIA

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies requirements and tests for homogeneous bare electrical conductors for overhead power transmission, and constructed of all aluminium or all aluminium alloy wires.

NOTES:

1 Appendix A gives methods to calculate conductor properties.
2 Appendix B gives the coefficient of linear expansion and the theoretical basis for the calculation of modulus of elasticity.
3 Appendix C lists code names which may be used to refer to specific type and construction of conductor.
4 Appendix D lists information which should be supplied with enquiries and orders for conductors.

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

AS	
1391	Method for tensile testing of metals
2505	Methods for bend and related testing of metals
2505.5	Part 5: Torsion and wrapping tests on wire
2848	Aluminium and aluminium alloys—Compositions and designations
2848.1	Part 1: Wrought products
2857	Timber drums for insulated electric cables and bare conductors
C365	Drums for bare stranded conductors
C365.2	Part 2: Metal drums
IEC	
468	Method of measurement of resistivity of metallic materials
ASTM	
D566	Test method for dropping point of lubricating grease

1.3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

1.3.1 Wire—a filament of drawn metal having a constant circular cross-section.

1.3.2 Conductor—a finished circular stranded assembly consisting of seven or more wires laid up together.

1.3.3 Diameter—the mean of two measurements at right angles taken at any one cross-section.

1.3.4 Direction of lay—the direction of lay is defined as right-hand or left-hand, as follows:

(a) Right-hand lay—when the slope of the wires is in the direction of the central part of the letter Z when the conductor is held vertically.

(b) Left-hand lay—when the slope of the wires is in the direction of the central part of the letter S when the conductor is held vertically.

1.3.5 Lay length—the axial length of one complete turn of the helix formed by an individual wire in a stranded conductor.

1.3.6 Lay ratio—the ratio of the lay length to the nominal external diameter of the corresponding layer of wires in the stranded conductor.

1.3.7 Breaking load of a wire—the maximum load obtained in a tensile test of that wire.

1.3.8 Ultimate tensile stress—the breaking load divided by the original cross-sectional area of the test wire.

1.3.9 Non-greased conductor—a conductor which is dry and free from grease, other than a residue of wire drawing lubricant that may be on the wires.

1.3.10 Fully greased conductor—a conductor in which grease is applied to all wires with the exception of the outermost layer.

1.3.11 Surface fracture—a crack on the surface of a wire visible to an observer with normal or corrected vision.

1.3.12 Spool—a container of wire which is to be installed on a stranding machine to manufacture the conductor.