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Australian Standard 1194, Part 2—1983

WINDING WIRES

Part 2—ENAMELLED RECTANGULAR COPPER WINDING WIRES

[Title allocated by Defence Cataloguing Authority: WIRE, ELECTRICAL (Rectangular, Copper, Enamelled) NSC 6145]

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Australian Electrical and Electronic Manufacturers Association

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AUSTRALIAN STANDARD

WINDING WIRES

Part 2

ENAMELLED RECTANGULAR COPPER WINDING WIRES

AS 1194, Part 2—1983

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PREFACE

This standard was prepared by the Association's Committee on Electric Wires and Cables as a part revision of AS C73. It supersedes those requirements of AS C73 that relate to enamelled rectangular copper winding wire.

Eventually all standards relating to winding wire will be embodied in a four-part standard designated AS 1194, the Parts being as follows:

Part 1—Enamelled Round Copper Winding Wires (see Note)
Part 2—Enamelled Rectangular Copper Winding Wires (this standard)
Part 3—Enamelled Round Aluminium Winding Wires (in course of preparation)
Part 4—Enamelled Rectangular Aluminium Winding Wires (under consideration)

NOTE: The current standard for enamelled round copper winding wires is AS 1194—1979. That standard is now being revised and when published it will form Part 1 of AS 1194.

The nominal dimensions of conductors specified in this standard are identical with those specified in IEC 182, Basic Dimensions of Winding Wires. The dimensions specified are preferred sizes and should be used wherever possible. Where, for technical reasons, intermediate wire dimensions (which are non-preferred) are required, Appendix A provides guidance on the selection of those dimensions.

Tolerances on the dimensions of conductors are also identical with IEC values. Two grades of enamel are provided for. The maximum increase in dimensions of Grades 1 and 2 wire are identical with those specified in BS 4516, Part 2.

In the preparation of this standard, consideration was given to the following documents:

IEC 172	Test Procedure for the Evaluation of the Thermal Endurance of Enamelled Wire by the Lowering of the Electric Strength between Twisted Wires
IEC 182	Basic Dimensions of Winding Wires
IEC 251	Methods of Test for Winding Wires
BS 4516	Enamelled Copper Conductors (Polyvinyl Acetal Base with High Mechanical Properties) Part 2—Rectangular Conductors

Acknowledgement is made of the assistance received therefrom.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
ENAMELLED RECTANGULAR COPPER WINDING WIRES

SECTION 1. SCOPE AND DEFINITIONS

1.1 SCOPE. This standard specifies requirements for enamelled rectangular copper winding wires to be used for windings of electrical equipment.

Dimensions and material requirements for the conductor and enamelled covering are specified and tests are given to establish compliance with the standard.

Three types of enamel covering are specified. These are polyvinyl acetal (PVA), polyesterimide (PEI) and modified polyester overcoated with polyamide-imide (PE-AI).

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

AS 1279	Copper Refinery Shapes
AS 1767	Insulating Oil for Transformers and Switchgear
AS 1852	International Electrotechnical Vocabulary
SAA MP19	Report on Preferred Numbers and Their Use
IEC 28	International Standards of Resistance for Copper
IEC 172	Test Procedures for the Evaluation of the Thermal Endurance of Enamelled Wire by the Lowering of the Electric Strength Between Twisted Wires
IEC 182	Basic Dimensions of Winding Wires
IEC 304	Standard Colours for PVC Insulation for Low-frequency Cables and Wires

1.3 DEFINITIONS. For the purpose of this standard, the definitions in AS 1852 and the following apply:

1.3.1 Conductor—the bare metal remaining after removal of all covering.

1.3.2 Wire or strip—the rectangular conductor complete with all covering.

1.3.3 Overall thickness—the thickness dimension measured across the wire or strip including the final layer of covering (see Fig. 3.1).

1.3.4 Overall width—the width dimension measured across the wire or strip including the final layer of covering (see Fig. 3.1).

1.3.5 Increase in dimensions due to enamel.

(a) The difference between the overall thickness and the conductor thickness, reported as 'increase in thickness' due to enamel.

(b) The difference between the overall width and the conductor width, reported as the 'increase in width' due to enamel.

1.3.6 Grade of enamel—an expression used to designate the thickness of enamel covering. It is used in the form Grade 1 and Grade 2, the higher grade number designating thicker enamel.

1.3.7 Thermal endurance temperature (previously known as temperature index)—the temperature in degrees Celsius corresponding to an extrapolated life of 20 000 h on an Arrhenius plot.

NOTES:

1. The plot uses the 'straight line of best fit' to the measured lives of groups of specimens aged at not less than three evaluated temperatures complying with the requirements of IEC 172.
2. In coil design the choice of the thermal endurance temperature is generally governed by temperatures reached at 'hot spots'.

1.3.8 Crack—an opening in the enamel covering which exposes the conductor to view at a magnification of 6× to 10×.

1.3.9 Loss of adhesion—the absence of bond between the enamel and the conductor as exhibited by relative movement between the two.

1.3.10 Routine tests—tests made by the manufacturer on all batches of wire.

1.3.11 Special tests—tests made by the manufacturer on samples of completed wire to verify that the finished product meets the requirements of this standard.

1.3.12 Specimen—a length of wire selected for testing.