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INTERNATIONAL STANDARD

colour inside

Printed electronics –
Part 202-3: Materials – Conductive ink – Measurement of sheet resistance of conductive films – Contactless method

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PRINTED ELECTRONICS –

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FOREWORD

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International Standard IEC 62899-202-3 has been prepared by IEC technical committee 119: Printed Electronics.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
119/240/FDIS	119/246/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62899 series, published under the general title *Printed electronics*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Conductive films, transparent or non-transparent, are a key element for electronic products. A widespread method used for the measurement of the sheet resistance of conductive films is the 4-point probe measurement. Nevertheless, making an electrical contact with the probes is sometimes critical for the measurement. For some devices or films which are covered with an insulating layer or composed of micro-/nano-structures, establishing an electrical contact is difficult, which makes the 4-point probe method not suitable for the measurement of sheet resistance (see Table A.1 and Figures A.1 and A.2 in Annex A). The 4-point probe method is also sensitive to contact force and layer thickness. The eddy-current-based measurement method, which does not require electrical contact, is widely used for this purpose in the industry. This document specifies a standard method for measurement of sheet resistance using a contactless eddy-current method.

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1 Scope

This part of IEC 62899 defines terms and specifies a standard method for the measurement of the sheet resistance of printed conductive films using a contactless eddy-current method.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62899-202, *Printed electronics – Materials – Part 202: Conductive ink*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
sheet resistance
R_S
electrical resistance of a thin film material measured across the opposite ends of a square area

Note 1 to entry: The unit of sheet resistance is expressed in ohms (Ω). However, for the purpose of this procedure, it represents the unit of ohms per square with the thickness of the film.

[SOURCE: IEC TS 61836:2016, 3.4.81, modified – the second sentence of the note has been added.]

3.2
eddy current
electric current induced within conductors by a time-varying magnetic field in the conductor

3.3
4-probe measurement
method to measure the resistance of a material whose measured value is independent on the probe resistance

Note 1 to entry: In this method, 4 probes contact the test sample in a linear arrangement. A voltage drop is measured between the two inner probes while a current source supplies current through the outer probes. The resistance of the sample can be calculated by Ohm's law. Furthermore, the resistivity of the sample can be obtained by consideration of the geometric factors of the sample.