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Part 202-13: Materials - Conductive ink - Sheet resistance measurement method for conductive layer in printed and in-mould-electronics

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

Draft	Report on voting
119/589/FDIS	119/600/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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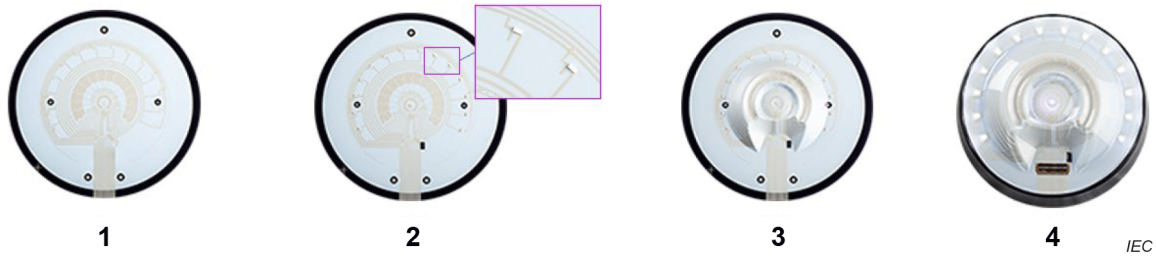
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INTRODUCTION

Conductive layer resistance is an important characteristic when designing printed and in-mould-electronics. A test pattern for conductive ink layer enables measuring its resistance and thickness.

In-mould-electronics (IME) typically contains the following manufacturing processes: printing, surface mounting of components, thermoforming and injection moulding (see Figure 1). During these processes the conductive layer is subjected to heat, and at times, also to pressure. This typically changes conductive layer resistance. Measuring the resistance of a test pattern after different manufacturing steps shows how the conductive layer resistance changes.



NOTE Process 1 is printing, process 2 is surface mounting on flat film, process 3 is thermoforming and process 4 is injection moulding.

Figure 1 – IME manufacturing processes

1 Scope

This part of IEC 62899 specifies a test pattern as well as resistance and thickness measurement methods for the conductive layer in printed and in-mould-electronics.

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 62899-202:2023, *Printed electronics - Part 202: Materials - Conductive ink*

ISO 291, *Plastics - Standard atmospheres for conditioning and testing*

3 Terms and definitions

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

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

– IEC Electropedia: available at https://www.electropedia.org/

– ISO Online browsing platform: available at https://www.iso.org/obp

3.1
in-mould-electronics
IME
3D circuit manufactured by integrating and embedding printed electronics and electronic components within shaped structures

Note 1 to entry: Manufacturing steps include, but are not limited to, printing, surface mounting, thermoforming and injection moulding.

[SOURCE: IEC 62899-202-10:2023, 3.1]

3.2
mesh count
number of threads per unit length in a screen mesh

Note 1 to entry: Mesh count is described in terms of unit tpcm (threads per centimetre).

[SOURCE: ISO 2834-3:2008 3.6, modified – Note 1 has been added.]

3.3
ink stack
combination of ink layers printed on a substrate

Note 1 to entry: Ink layers can include graphic ink layers and functional layers, or functional layers only. A stack can also include an insulation layer.

[SOURCE: IEC 62899-202-10:2023, 3.7, modified – Replaced word "conductive" with "functional" in the note.]