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colour inside

Printed electronics –
Part 402-4: Printability – Measurement of qualities – Classification and measurement methods for morphology

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IEC TR 62899-402-4 has been prepared by IEC technical committee 119: Printed Electronics. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
119/300/DTR	119/357/RVDTR

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 Technical Report 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/standardsdev/publications.

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 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- withdrawn,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.

INTRODUCTION

The IEC 62899-402 series specifies basic measurement methods for printed patterns prepared using printed electronics technology. An overview of the documents in the IEC 62899-402 series is given in IEC 62899-401.

Since the surface morphologies of printed patterns strongly affect the electrical properties of patterns as well as the printing process such as overlay printing onto the patterns, IEC TC 119 plans to prepare other documents to measure the vertical variance of printed patterns, such as the future IEC 62899-402-5 which deals with "'surface roughness", the future IEC 62899-402-6 which deals with "thickness" and the future IEC 62899-402-7 which deals with "surface profile"'. These future documents were designed based on assumptions from classical technologies such as photolithography. However, the cross section of patterns by photolithography has usually a trapezoidal or rectangular shape, and the surface of the patterns is always flat and smooth. In contrast, the actual surface of the printed pattern has various morphologies, because the characteristic surface morphologies are formed by the various printing technologies used in printed electronics, and factors that cannot be controlled perfectly are included in the process of forming the surface. Reflecting those features, the range of variance to be measured in the area of printed electronics becomes very broad, and various measurement methods are used in those measurements. In order to prepare the subsequent documents, the current measurement methods should be reviewed in a technical report. This review will clarify the relation between the morphologies and the appropriate measurement methods.

According to the complicated surface morphologies, it is not easy to specify the measuring point on the surface. This problem will also be reviewed in this document by organizing the definitions of morphologies.

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1 Scope

This part of IEC 62899-402, which is a Technical Report, is a preparatory work for the documents dealing with the measurement method of the vertical direction (surface forms) of printed patterns made by printed electronics technology.

The printed pattern of interest in this document is limited to straight lines on substrates with a flat surface. This document focuses on the classification and measurement methods for surface forms from the nanometer scale to the micrometer scale, and suggests the strategy for the subsequent documents.

2 Normative references

There are no normative references in this document.