IEC 62899-402-2

Edition 1.0 2020-08

INTERNATIONAL STANDARD

colour inside

Printed electronics –
Part 402-2: Printability – Measurement of qualities – Edge waviness

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.180

ISBN 978-2-8322-8769-9

Warning! Make sure that you obtained this publication from an authorized distributor.

® Registered trademark of the International Electrotechnical Commission

CONTENTS

FOREWORD 3
INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Atmospheric conditions for evaluation and conditioning 7
5 Measuring methods and instruments 8
5.1 Image acquisition 8
5.2 Measuring instrument 8
5.3 Analysis software 8
5.4 Preparation of image (specimen) 9
5.5 Data collection and analysis 9
5.6 Obtaining edge waviness and related attributes 12
6 Report of results 12
6.1 Test identification information 12
6.2 Instrument specification 12
6.3 Results 12
Bibliography 13

Figure 1 – ROI image of the specimen, and inner edge and test line selection 9
Figure 2 – Distribution graph of pattern edge waviness 10
Figure 3 – Distribution graph of pattern edge waviness of the sample with a spike on the edge 11
Figure 4 – Distribution graph of pattern edge waviness of the sample with a groove on the edge 11

Table 1 – Reporting items (example) 12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

PRINTED ELECTRONICS –

Part 402-2: Printability – Measurement of qualities – Edge waviness

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62899-402-2 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
119/310/FDIS	119/317/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.

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

This part of IEC 62899-402 describes the measurement methods of printed patterns to evaluate their printability in the field of printed electronics. Printability is defined as both the qualities of printed patterns and the reproducibility of printing designs as the interaction result of printing media, inks and substrates. The qualities of printed patterns are satisfied by accurate measuring of the printed patterns two- and/or three-dimensionally with mechanical, physical and optical apparatus. The reproducibility of printing designs is achieved by estimating the reproducibility of replica. In terms of the business background, the requests from the industry applying the printing technology to the electronics manufacturing concern the guarantees of both the quality and reproducibility of printed patterns and printing designs to facilitate international trade and enhance user value in the field of printed electronics.

This document provides fundamental information on the measurement of printed pattern edge waviness to evaluate the printability in the field of printed electronics. An assurance of printability enhances user value of printed electronics and facilitates international trade. This document includes the measurement procedure, as well as the definition of edge waviness and related attributes such as average edge, touch edge and distribution edge of edge waviness, which are quite different from those that appear in the printing of graphic arts or from etching processes.

This document excludes the standardization of any kind of measurement equipment or system. It focuses on specifying the properties related to edge waviness of the printed patterns obtained by an optical measurement system.

PRINTED ELECTRONICS –

Part 402-2: Printability – Measurement of qualities – Edge waviness

1 Scope

This part of IEC 62899 describes the measurement methods of the edge waviness of printed patterns in printed 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.

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