IEC TR 62899-250

Edition 2.0 2025-03

TECHNICAL REPORT

Printed electronics –
Part 250: Material technologies required in printed electronics for wearable smart devices

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.035.01; 31.180; 59.080.80

ISBN 978-2-8327-0257-4

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

PRINTED ELECTRONICS –

Part 250: Material technologies required in printed electronics for wearable smart devices

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TR 62899-250 has been prepared by IEC technical committee 119: Printed electronics. It is a Technical Report.

This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) added classification of e-textile integrated type;
b) added Clause 5, “Verification of conclusions in IEC TR 62899-250:2016 (edition 1)”;
c) added explanation of 3D printed circuits;

d) introduced trends in standardization activities, especially those after the first edition publication;

e) added new issues that became clear after the first edition was published.

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

Draft	Report on voting
119/509/DTR	119/536/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/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, or
- revised.

INTRODUCTION

IEC TR 62899-250 (edition 1), published in 2016, discussed and summarized the applicability of printed electronics technology in the rapidly expanding area of wearable electronics and the concomitant need for standardization of new measurement methods. Many of the issues raised by the TR regarding the need for new standardization have actually been developed and have already been published as international standards.

The establishment of IEC/TC 124 in 2017 is a particularly noteworthy event in this standardization field. And multiple industrial organizations have progressed standardization activities in flexible electronics field that span both wearable and printed electronics.

During this period, the evolution of this technology field has accelerated, and new technologies are being introduced one after another. Therefore, there is no change in the situation where there is an ongoing need for new standards.

The second edition of this document, following the first edition, aims to provide guidance for future standardization work on wearable and printed electronic. And standardization activities in the field of both printed and wearable electronics are reviewed from a global perspective, in order to prevent standardization conflicts between different standardization organizations.

PRINTED ELECTRONICS –

Part 250: Material technologies required in printed electronics for wearable smart devices

1 Scope

This part of IEC 62899, which is a Technical Report, explores a new technological field to establish standardization activities in TC 119 (Printed electronics) in particular, and to contribute to the development and market expansion of wearable smart device (WSD) technology.

2 Normative references

There are no normative references in this document.