



DPC: 24 / 30499559 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 02 September 2024

Origin: International

Latest date for receipt of comments: 30 September 2024

Project No. 2024/02466

Responsible committee: AMT/9 Printed Electronics

Interested committees:

Title: BS EN IEC 60050-543 International Electrotechnical Vocabulary (IEV)

Part 543: Printed and Flexible Electronics

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

**WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD.
THIS DRAFT IS NOT CURRENT BEYOND 18 September 2024**

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <http://standardsdevelopment.bsigroup.com>

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



119/508/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 60050-543 ED1

DATE OF CIRCULATION:

2024-08-23

CLOSING DATE FOR COMMENTS:

2024-10-18

SUPERSEDES DOCUMENTS:

119/453/NP, 119/472/RVN

IEC TC 119 : PRINTED ELECTRONICS

SECRETARIAT:

Korea, Republic of

SECRETARY:

Mr Kyung-Tae Kang

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 1, TC 91

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

International Electrotechnical Vocabulary (IEV) - Part 543: Printed and Flexible Electronics

NOTE FROM TC/SC OFFICERS:

The IEV template is used for the CD.

CONTENTS

1		
2	CONTENTS	21
3	FOREWORD	3
4	INTRODUCTION	5
5	1 Scope	8
6	2 Normative References	8
7	3 Terms and definitions	8
8	543-01 – GENERAL TERMS RELATING TO PRINTED AND FLEXIBLE ELECTRONICS	9
9	543-02 - TERMS RELATING TO MATERIALS	13
10	543-03 – TERMS RELATING TO PROCESS	22
11	543-04 - TERMS RELATING TO PRINTABILITY	33
12	543-05 - TERMS RELATING TO PRINTED DEVICE, COMPONENT AND SYSTEM	40
13		
14		

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL ELECTROTECHNICAL VOCABULARY -

Part 543: Printed and Flexible Electronics

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.

This first edition of International Standard IEC 60050-543 comprises terminology formerly published in IEC 62899-101:2019, and developed by IEC technical committee 119: Printed Electronics. It includes also a few entries defining basic printed and flexible electronics concepts derived from the publications of IEC TC 119, , IEC TC 91.

IEC 60050-543 was reviewed by IEC technical committee 119: Printed Electronics, for inclusion in the International Electrotechnical Vocabulary.

This publication was developed in accordance with the ISO/IEC Directives, Part 1, IEC Supplement, Annexes SK and SL, and was approved by the validation team of IEC technical committee 1: Terminology, under the normal database procedure.

A list of all parts of the IEC 60050 series, published under the general title International Electrotechnical Vocabulary can be found on the IEC website and is available at www.electropedia.org.

69 All parts of the IEC 60050 series have the status of a horizontal standard in accordance with
70 IEC Guide 108.

71

72

INTRODUCTION

Principles and Rules followed

General

The IECV (IEC60050, International Electrotechnical Vocabulary) is a general-purpose multilingual vocabulary covering the field of electrotechnology, electronics and telecommunication (available at www.electropedia.org). It comprises about 22000 terminological entries, each corresponding to a concept. These terminological entries are distributed among about 90 parts, each part corresponding to a given field.

EXAMPLE

Part 161 (IEC 60050-161): Electromagnetic compatibility Part 411 (IEC 60050-411): Rotating machines

The terminological entries follow a hierarchical classification scheme part/section/concept; within the sections, the terminological entries are organized in a systematic order.

The terms and definitions (and possibly non-verbal representations, examples, notes to entry and sources) in the entries are given in two or more of the three IEC languages, that is French, English and Russian (principal IECV languages).

In each terminological entry, the terms alone are also given in several of the additional IECV languages [Arabic (ar), Czech (cs), German (de), Spanish (es), Finnish (fi), Italian (it), Japanese (ja), Korean (ko), Norwegian [Bokmål (nb) and Nynorsk (nn)], Polish (pl), Portuguese (pt), Slovenian (sl), Serbian (sr), Swedish (sv) and Chinese (zh)].

Information regarding the IECV and the drafting and presentation of the terminological entries is provided in the IEC Supplement to the ISO/IEC Directives, Annex SK. The following constitutes a summary of these rules.

Organization of a terminological entry

Each of the terminological entries corresponds to a concept, and comprises:

- an IECV number,
- possibly a letter symbol for the quantity or unit,

then, for the principal IECV languages present in the part:

- the term designating the concept, called "preferred term", possibly accompanied by synonyms and abbreviations,
- the definition of the concept,
- possibly non-verbal representations, examples and notes to entry,
- possibly the source,

and finally, for the additional IECV languages, the terms alone.

IEV number

The IECV number is comprised of three elements, separated by hyphens: part number: 3 digits, section number: 2 digits,

110 entry number: sequence of decimal digits in which leading zeroes are permissible but
111 redundant (e.g. 1 to 113, 01 to 99, 001 to 127).

112 **EXAMPLE 845-27-003**

113 Letter symbols for quantities and units

114 These symbols, which are language independent, are given on a separate line following the
115 IEV number.

116 **EXAMPLE 131-12-04**

117 **R**
118 **resistance**

119

120 **Preferred term and synonyms**

121 The preferred term is the term that heads a terminological entry in a given language; it can be
122 followed by synonyms. It is printed in boldface.

123 *Synonyms:*

124 The synonyms are printed on separate lines under the preferred term: preferred synonyms are
125 printed in boldface, admitted and deprecated synonyms are printed in lightface. Deprecated
126 synonyms are prefixed by the text "DEPRECATED:".

127 *Absence of an appropriate term:*

128 When no appropriate term exists in a given language, the preferred term is replaced by five
129 dots, as follows:

130 "....." (and there are of course no synonyms)

131 **Attributes**

132 Each term (and synonym) can be followed by attributes giving additional information, and
133 printed in lightface on the same line as the corresponding term, following this term.

134 **EXAMPLE**

135 *specific use of the term:*

136 **transmission line**, <in electric power systems>

137 *national variant:*

138 **lift**, GB

139 *grammatical information:*

140 **quantize**, verb

141 **transient**, noun

142 **AC**, adj

143 **Source**

144 In some cases, it has been necessary to include in an IEV part a concept taken from another
145 IEV part, or from another authoritative terminology document (ISO/IEC Guide 99, ISO/IEC
146 2382, etc.), either with or without modification to the definition (and possibly to the term).

147 This is indicated by the mention of this source, printed in lightface, and placed at the end of
148 the terminological entry in each of the principal IEV languages present.

149 EXAMPLE SOURCE: IEC 60050-131:2002, 131-03-13, modified

150 **Terms in additional IEV languages**

151 These terms are placed following the terminological entries in the principal IEV languages, on
152 separate lines (a single line for each language), preceded by the alpha-2 code for the
153 language defined in ISO 639-1, and in the alphabetic order of this code.

154

INTERNATIONAL ELECTROTECHNICAL VOCABULARY (IEV) -

Part 543: Printed and Flexible Electronics

1 Scope

This part of IEC 60050 gives the general terminology addressing topics including, but not limited to, materials, printing processes, printability and quality assessment of printed components and systems reliant on printed and flexible devices for their essential functionalities. It focuses on terms that are of particular importance to printed and flexible devices. It is intended to facilitate communication between bodies and individuals in industry and those who interact with them. It has the status of a horizontal standard in accordance with IEC Guide 108, Guidelines for ensuring the coherency of IEC publications – Application of horizontal standards.

This terminology is consistent with the terminology developed in the other specialized parts of the IEV.

This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108.

One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications.

2 Normative References

There are no normative references in this document.

3 Terms and definitions

543-01 – GENERAL TERMS RELATING TO PRINTED AND FLEXIBLE ELECTRONICS

543-01-01

printed electronics

type of electrical or electronic devices, components or systems manufactured using printing processes

[SOURCE: IEC 62899-101:2019, 3.102 modified by adding “components” after “devices”]

543-01-02

printed electronics process

additive printing or coating method used to generate electrical or electronic circuitry or devices

[SOURCE: IEC 62899-101:2019, 3.103]

543-01-03

printed functional component process

additive printing or coating method used to generate functional components for electronic devices

[SOURCE: IEC 62899-101:2019, 3.101 modified replacing “process of using printed methods for functional components, such as organic semiconductors” by “additive printing or coating method to generate functional components for electronic devices” and Note 1 to entry deleted]

543-01-04

printed passive component process

additive printing or coating method used to generate passive components, such as resistor, capacitor and inductor

[SOURCE: IEC 62899-101:2019, 3.105 modified replacing “process of using printed methods for” by “additive printing or coating method used to generate” and Note 1 to entry deleted]

543-01-05

hybrid printed electronics

printed electronics (543-01-01) incorporating, or incorporated with, non-printed electronic devices

Note 1 to Entry: Non-printed electronic devices are conventional silicon microelectronics

Note 2 to Entry: The process of incorporation includes the related process chains such as mounting techniques and packaging aspects

[SOURCE: IEC 62899-101:2019, 3.66 modified by adding Notes 1 and 2]

543-01-06

functional printing

achievement of capabilities beyond graphics and visual information using adapted standard printing methods

[SOURCE: IEC 62899-101:2019, 3.62]

543-01-07**hybrid printing**

method using more than one *printed electronics process* (543-01-02) to generate functional products

[SOURCE: IEC 62899-101:2019, 3.66, modified replacing “printing” by “method” and “for multilayer” by “to generate”]

543-01-08**organic electronics**

branch of electronics which uses organic materials for the fabrication of passive and active electronic components and devices

[SOURCE: IEC 60050-511:2018, 511-02-03 modified adding “and devices” after “electronic components”]

543-01-09**in-mould-electronics****IME**

3D circuit manufactured by integrating and embedding printed electronics and electronic components within shaped structures

Note 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]

543-01-10**printed board**

completely processed printed circuit and *printed wiring* (543-01-13) configurations

Note to entry: This includes single-sided, double-sided and multilayer boards with rigid, flexible and rigid-flex base materials

[SOURCE: IEC 61188-6-1:2021, 3.10 modified deleting Note 2 to Entry]

543-01-11**printed component**

unit that is formed as part of a *printed pattern* (543-04-02)

Note to Entry: The printed component can be active or passive

[SOURCE: IEC 60194-2:2017, 3.16.27 modified by replacing “part” by “unit”; deleting “such as an inductor, resistor, capacitor,.....line”; and adding a Note to entry

543-01-12**printed contact**

portion of a printed conductive pattern that serves to connect two conductive parts forming a single continuous conductive path

[SOURCE: IEC 60194-2:2017, 3.16.29 modified: adding “printed” before “conductive pattern”, “to connect two conductive parts forming a single continuous conductive path” after “serves” and deleting “as one part of a conductive system”]

543-01-13**printed wiring**

conductive pattern that provides point-to-point connections to printed components in a predetermined arrangement on a common base

[SOURCE: IEC 60194-2:2017, 3.16.31 modified; “but not” replaced by “to”; Note 1 to entry deleted]

543-01-14**electrical test**

functional inspection process of *printed electronics* (543-01-01) especially for short and open circuits

[SOURCE: IEC 62899-101:2019, 3.46]

543-01-15**Wire, <in printed and flexible electronics>**

flexible conductor or semiconductor material or film, with or without an insulating covering, the length of which is large with respect to its cross-sectional dimensions

Note to entry: The cross-section of a wire may have any shape, but the term “wire” is not generally used for ribbons or tapes.

[SOURCE: IEC 60050-151:2018, 151-12-28, modified adding <in printed and flexible electronics> to the definition]

543-01-16**flexibility**

propensity of a printed substrate, component or system to be bent, folded, creased or twisted upon application of mechanical stress

[SOURCE: IEC 62899-101:2019, 3.59, modified deleting “sheet-like object (“, and “electronics”, replacing “devices” by “systems” and including “folded” and “twisted” in the definition]

543-01-17**torsion test**

action of twisting a system, device or substrate, by subjecting one end of the specimen to a torsional load, while the other end is held in place, or rotated in the opposite direction

Note to entry: Properties that can be determined in a torsion test include but are not limited to sheer modulus, shear strength, electronic performance under sheer, or durability under periodic torsional loads.

[SOURCE: IEC 62899-101:2019, 3.140]

543-01-18**rolling test**

test for measuring the endurance of a flexible printed electronics system while or after rolling and unrolling it onto and from a cylindrical roller with a specified radius

Note to entry: A rolling test can be used to determine the suitability of a flexible printed device for roll-to-roll processing.

[SOURCE: IEC 62899-101:2019, 3.114]