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INTERNATIONAL STANDARD

colour inside

Printed electronics –
Part 204: Materials – Insulator ink – Measurement methods of properties of insulator inks and printed insulating layers

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRINTED ELECTRONICS –

Part 204: Materials – Insulator ink – Measurement methods of properties of insulator inks and printed insulating layers

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International Standard IEC 62899-204 has been prepared by IEC technical committee 119: Printed Electronics.

The text of this standard is based on the following documents:

FDIS	Report on voting
119/256/FDIS	119/268/RVD

Full information on the voting for the approval of this 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 publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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

The IEC 62899 series deals mainly with evaluation methods for materials of printed electronics. The series also includes storage methods, packaging and marking, and transportation conditions.

The IEC 62899 series is divided into several parts according to each material. Each part is prepared as a generic specification containing fundamental information for the area of printing electronics.

The IEC 62899 series consists of the following parts:

Part 1: Terminology

Part 201: Materials – Substrates

Part 202: Materials – Conductive ink

Part 203: Materials – Semiconductor ink

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

Part 301-X: Equipment – Contact printing – Rigid master

Part 302-X: Equipment – Inkjet

Part 303-X: Equipment – Roll-to-roll printing

Part 401: Printability – Overview

Part 402-X: Printability – Measurement of qualities

Part 403-X: Printability – Requirements for reproducibility

Part 502-X: Quality assessment – Organic light emitting diode (OLED) elements

Furthermore, sectional specifications, blank detail specifications, and detail specifications for each material will be based on these parts.

This part of IEC 62899 is prepared for insulator materials used in printed electronics and contains the test conditions, the evaluation methods and the storage conditions.

PRINTED ELECTRONICS –

Part 204: Materials – Insulator ink – Measurement methods of properties of insulator inks and printed insulating layers

1 Scope

This part of IEC 62899 defines the terms and specifies the standard methods for characterisation and evaluation.

This document is applicable to insulator inks and printed insulating layers that are made from insulator inks used for printed electronics. The insulator inks include dielectric inks.

2 Normative references

The following documents are referred to in the text 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 60243 (all parts), *Electric strength of insulating materials – Test methods*

IEC 62631-2-1, *Dielectric and resistive properties of solid insulating materials – Part 2-1: Relative permittivity and dissipation factor – Technical frequencies (0,1 Hz to 10 MHz) – AC methods*

IEC 62899-201, *Printed electronics – Part 201: Materials – Substrates*

ISO 5-2, *Photography and graphic technology – Density measurements – Part 2: Geometric conditions for transmittance density*

ISO 5-3, *Photography and graphic technology – Density measurements – Part 3: Spectral conditions*

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

ISO 304, *Surface active agents – Determination of surface tension by drawing up liquid films*

ISO 489, *Plastics – Determination of refractive index*

ISO 758, *Liquid chemical products for industrial use – Determination of density at 20 °C*

ISO 1183-1, *Plastics – Methods for determining the density of non-cellular plastics – Part 1: Immersion method, liquid pyknometer method and titration method*

ISO 2555, *Plastics – Resins in the liquid state or as emulsions or dispersions – Determination of apparent viscosity using a single cylinder type rotational viscometer method*

ISO 2592, *Petroleum and related products – Determination of flash and fire points – Cleveland open cup method*

ISO 2719, *Determination of flash point – Pensky-Martens closed cup method*

ISO 2811-1, *Paints and varnishes – Determination of density – Part 1: Pycnometer method*

ISO 2811-2, *Paints and varnishes – Determination of density – Part 2: Immersed body (plummet) method*

ISO 2884-1, *Paints and varnishes – Determination of viscosity using rotary viscometers – Part 1: Cone-and-plate viscometer operated at a high rate of shear*

ISO 3219, *Plastics – Polymers/resins in the liquid state or as emulsions or dispersions – Determination of viscosity using a rotational viscometer with defined shear rate*

ISO 3664, *Graphic technology and photography – Viewing conditions*

ISO 3679, *Determination of flash no-flash and flash point – Rapid equilibrium closed cup method*

ISO 11664-4, *Colorimetry – Part 4: CIE 1976 L*a*b* Colour space*

ISO 13468-1:1996, *Plastics – Determination of the total luminous transmittance of transparent materials – Part 1: Single-beam instrument*

ISO 13468-2:1999, *Plastics – Determination of the total luminous transmittance of transparent materials – Part 2: Double-beam instrument*

ISO 13655, *Graphic technology – Spectral measurement and colorimetric computation for graphic arts images*

ISO 14488, *Particulate materials – Sampling and sample splitting for the determination of particulate procedures*

ISO 14782, *Plastics – Determination of haze for transparent materials*

ISO 15212-1, *Oscillation-type density meters – Part 1: Laboratory instruments*

ISO 19403-1, *Paints and varnishes – Wettability – Part 1: Terminology and general principles*

ISO 19403-3, *Paints and varnishes – Wettability – Part 3: Determination of the surface tension of liquids using the pendant drop method*

3 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

NOTE The terms in italics are those defined in Clause 3.