

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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**Wearable electronic devices and technologies –  
Part 201-1: Electronic textile – Measurement methods for basic properties of  
conductive yarns**

**Technologies et dispositifs électroniques prêts-à-porter –  
Partie 201-1: Textile électronique – Méthodes de mesure des propriétés  
fondamentales des fils conducteurs**





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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –****Part 201-1: Electronic textile –  
Measurement methods for basic properties of conductive yarns**

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IEC 63203-201-1 has been prepared by IEC technical committee 124: Wearable electronic devices and technologies. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
124/175/FDIS	124/180/RVD

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 International Standard 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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

A list of all parts in the IEC 63203 series, published under the general title *Wearable electronic devices and technologies*, 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](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- withdrawn,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.

## INTRODUCTION

This document contains provisions for conductive yarns and defines measurement methods of properties of conductive yarns used in electronic textile (e-textile) in wearable electronics. A conductive yarn can be incorporated into the fabric which, in turn, can be used to manufacture a wearable electronics product. The conductive yarn can transmit electric signals and/or supply electric power. Therefore, measurement methods are defined for the characteristics of conductive yarns.

The IEC 63203-2 series relates mainly to measurement methods for electronic textile (e-textile) in wearable electronics.

The IEC 63203-2 series is divided into parts according to each category of electronic textile. Each part is prepared as a generic specification containing fundamental information for the area of printed electronics.

The IEC 63203-2 series consists of the following parts:

IEC 63203-201: E-textile materials

IEC 63203-201-1: E-textile materials – Conductive yarn

IEC 63203-201-2: E-textile materials – Conductive fabrics and insulation materials

IEC 63203-202: Passive electric parts for e-textiles

IEC 63203-202-1: Passive e-textile parts – Connectors for e-textile applications

IEC 63203-203: E-textile functional elements

IEC 63203-204: E-textile systems (Evaluation method for garment-type wearable systems)

IEC 63203-204-1: E-textile systems – Test method for assessing washing durability of leisurewear and sportswear e-textile systems

(Subsequent parts will be prepared according to other categories.)

Furthermore, sectional specifications, blank detail specifications, and detail specifications of each category will follow these parts.

# WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –

## Part 201-1: Electronic textile – Measurement methods for basic properties of conductive yarns

### 1 Scope

This part of IEC 63203-201 specifies provisions and test methods for measurement of properties of conductive yarns. Conductive yarns covered in this document have conductivity of a level that can be used for transmission of electric signals, supply of electric power and electromagnetic shield. They do not include high-resistance conductive yarn used for anti-static and heating use. Conductive yarns are the basic material in electronic textiles and are mainly used as conductive traces in clothes-type wearable devices, as well as with secondary processing (woven, knitted, embroidered, nonwoven, etc.) to provide conductive fabrics.

This document does not define the required characteristics of the conductive yarn; rather, it specifies the handling and measurement methods for general and electrical properties of conductive yarn.

### 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.

IEC 60468:1974, *Method of measurement of resistivity of metallic materials*

ISO 105-E04, *Textiles – Tests for colour fastness – Part E04: Colour fastness to perspiration*

ISO 139, *Textiles – Standard atmospheres for conditioning and testing*

ISO 6330, *Textiles – Domestic washing and drying procedures for textile testing*

EN 16812:2016, *Textiles and textile products – Electrically conductive textiles – Determination of the linear electrical resistance of conductive tracks*

### 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>

#### 3.1

##### **conductive fibre**

fibre, such as staple or filament, having electrical conductivity

Note 1 to entry: Conductive fibre can be used for signal line, power transmission line, and electromagnetic shield.