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INTERNATIONAL STANDARD

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Wearable electronic devices and technologies – Part 204-1: Electronic textile – Test method for assessing washing durability of e-textile products

Technologies et dispositifs électroniques prêts-à-porter – Partie 204-1: Textile électronique – Méthode d'essai pour l'évaluation de la durabilité au lavage des produits e-textiles

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –

Part 204-1: Electronic textile – Test method for assessing washing durability of e-textile products

FOREWORD

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IEC 63203-204-1 has been prepared by IEC technical committee 124: Wearable electronic devices and technologies. It is an International Standard.

This second edition cancels and replaces the first edition published in 2021. This edition constitutes a technical revision.

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

a) Subclause 3.2 on conductive textiles has been deleted.
b) Subclause 3.3 on leisurewear and sportswear has been deleted.
c) Subclause 3.2 on washing procedure has been added.
d) Figure 1 has been updated.

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e) The optional measurement of conductive tracks has been added in 4.1 to the checklist before carrying out washing durability test.

f) Additions have been made to the list in Clause 6.

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

Draft	Report on voting
124/214/FDIS	124/217/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. 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 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 in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –

Part 204-1: Electronic textile – Test method for assessing washing durability of e-textile products

1 Scope

This document specifies a household washing durability test method for e-textile products. This document includes testing procedures for e-textile products with electrically conductive components and sensors to collect the data of the user.

This document does not cover safety or heat-generation test methods. Products containing components other than those listed in this clause are not covered by this document.

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

ISO 6330:2012, *Textiles – Domestic washing and drying procedures for textile testing*

3 Terms and definitions

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

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

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

3.1
e-textile product
product made from textiles and integrated electronics that together perform one or more functions such as measuring body temperature, heart rate or electrocardiogram, etc.

3.2
washing procedure
cycle of washing action including water supplying, washing, and repeated rinsing, spinning and water supplying and ending with spinning as predetermined on the washing machine

4 Test method – General

4.1 Checklist before carrying out washing durability test

Check the product as described in the user manual and confirm the proper operation according to the instructions in the manual. (Measurement of conductive tracks is optional. If the product contains areas of non-isolated conductive textile, resistance measurement

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according to EN 16812 can be conducted additionally.) Then, measure the resistance and mark the measurement point, so that the same point can be measured after each washing durability test. Since the shape of the product varies, select the appropriate method to measure the resistance. The method of measuring conductive track resistance should be decided between the manufacturer and the user.

4.2 Washing durability test conditions

The washing durability test shall comply with the test procedure in ISO 6330:2012. ISO 6330:2012 offers various test procedures. E-textile products contain a unit that connects the modules with conductive track because of the nature of the product. Therefore, a hand-wash procedure is considered appropriate because it causes less damage to the product.

Conditions for washing the e-textile products are given as follows in this Subclause 4.2 and in 4.3.

The type of washing machine, detergent, washing method, drying method and number of repetitions are selected from methods standardized based on the manufacturer's designated care label. If not specified, the washing machine type is an ISO 6330:2012 reference washing machine Type A, the washing procedure is 4H, and the drying method is procedure A – line dry.

If there is an agreement between the user and the supplier to apply the washing conditions as specified in another International Standard, those alternative washing conditions shall be applied instead of those specified in this Subclause 4.2.

4.3 Check of operation before and after washing durability test

It is necessary to check the operation of the e-textile product under test after repeated washing and drying of the product in accordance with the test conditions. According to the procedure to check the operation status before washing in accordance with the user manual, double-check the operation status after washing and measure the resistance of the conductive textile to determine whether there is any disconnection (see Annex A).

5 Test procedure

5.1 Pretreatment

The specimens shall be stored for at least 24 h in standard atmosphere conditions ((20,0 ± 2,0) °C and (65,0 ± 4,0) % relative humidity (RH) in accordance with ISO 139). Start operating the product in the manner specified in the user manual. The product shall be checked to ensure it is operating normally, and that it functions in accordance with the user manual. If the features do not work as described in the user manual, record malfunction in the test report. All detachable components (e.g. connection module or batteries) shall be detached before washing. All embedded components shall remain on the product during the washing durability test.

5.2 Washing

Wash and dry the specimens in accordance with one of the procedures specified in ISO 6330:2012, following the manufacturer's designated care label.

5.3 Test after washing and drying

After the e-textile products have been processed with washing and drying, prepare to check the performance of the product. Check the operation status and function of the product according to the specified order in the user manual (see example in Figure 1).

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