IEC 63203-301-1

Edition 1.0 2024-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Wearable electronic devices and technologies – Part 301-1: Test method of electrochromic films for wearable equipment

Technologies et dispositifs électroniques prêts-à-porter – Partie 301-1: Méthode d'essai des films électrochromes pour les équipements prêts-à-porter



IEC 63203-301-1:2024-03(en-fr)



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 59.080.80

ISBN 978-2-8322-8461-2

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –

Part 301-1: Test method of electrochromic films for wearable equipment

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

Draft	Report on voting
124/263/FDIS	124/273/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- withdrawn, or
- revised.

WEARABLE ELECTRONIC DEVICES AND TECHNOLOGIES –

Part 301-1: Test method of electrochromic films for wearable equipment

1 Scope

This part of IEC 63203-301-1 specifies procedures and definitions for the test method of electrochromic films for wearable equipment. This document deals with the colour changing range in visible light and the electrochromic properties of transmittance, response time and evaluation method of long-term stability. This document excludes applications of electrochromic films to displays.

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 60068-1, *Environmental testing – Part 1: General and guidance*

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
transmittance
ratio of transmitted power to incident power for given conditions of spectral composition, polarization and geometrical distribution

Note 1 to entry: In optics, frequently expressed as transmittance density or as a percentage. In communication applications, generally expressed in decibels.

[SOURCE: IEC 60050-731:1991, 731-03-31]

3.2
response time
time from a sudden change of a control quantity until the corresponding change of an output quantity has reached a specified fraction of its final value

[SOURCE: IEC 60050-431:1980, 431-02-12]

3.3
darkening time
time when a control quality suddenly becomes saturated until the corresponding change of an output quantity has reached a dark stage of its final value

3.4
bleaching time
time from a sudden change of a control quantity until such time as the corresponding change of an output quantity has reached a bright stage of its final value

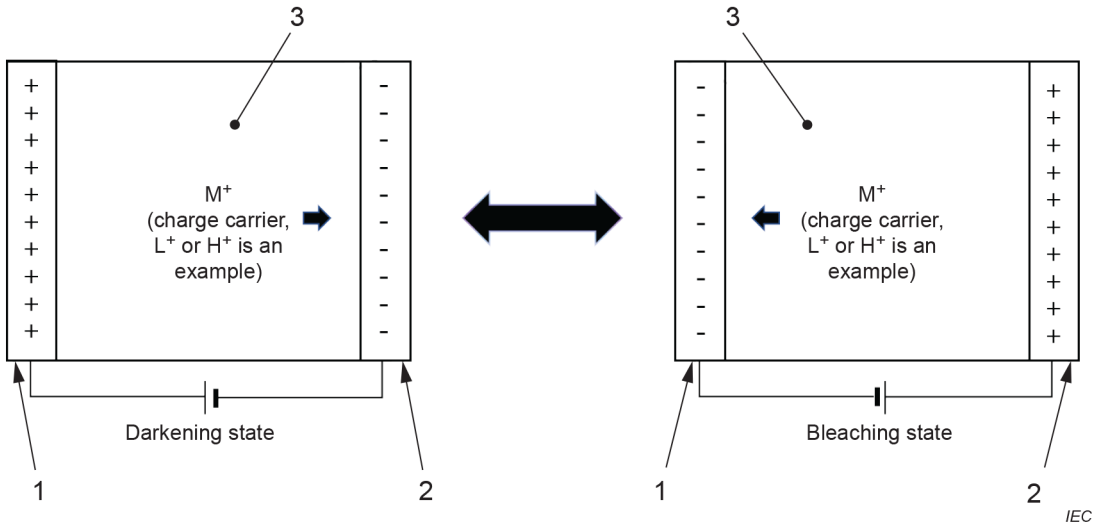
3.5
long-term stability
property of the electrochromic system which implies that for a sufficiently small initial displacement from the rest position or for a sufficiently small disturbance the state variables remain within a sufficiently small neighbourhood of the rest position in the long term

4 Test method of electrochromic films for wearable equipment

4.1 Overview

The electrochromic films have such characteristics that as the ions of H^+ or Li^+ (H^+ or Li^+ is given by way of example) are injected or released by application of an electric field the films change colour. Figure 1 shows the two statuses of electrochromic film. The electrochromic film consists of a pair of the electrochromic layers on the transparent electrode which can be applied to the external electric field. As the external electric field is applied on the transparent electrodes, the internal electrical potential of electrochromic layers has been changed. The changed potential affects the transmittance of the electrochromic layers.

In order to use the electrochromic films, the transmittance change, the response time, and the long-term stability for colour changing of the devices should be measured. The test procedure of the properties is described in 4.3.



Key

1 working electrode

2 counter electrode

3 electrolyte

Figure 1 – Schematic diagram of the electrochromic films: bleached and darkening