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Wheelchair seating —

Part 11:
Determination of dissipation characteristics of sensible perspiration into seat cushions

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 173, *Assistive products*, Subcommittee SC 1, *Wheelchairs*.

This first edition of ISO 16840-11 cancels and replaces ISO/TS 16840-11:2014, which has been technically revised.

The main changes are as follows:

— addition of details around the test apparatus, preparation and method to make the test easier to process.

A list of all parts in the ISO 16840 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Dissipating perspiration and moisture on seat cushions is important to prevent pressure injuries and tissue maceration, and for comfortable sitting. Perspiration can occur as water vapour, and/or as moisture – sensible moisture has not undergone a phase change to vapour, whereas insensible moisture has undergone the phase change and is in the vapour phase.

The results of the testing methods in this document have not been clinically validated to support any medical claims of prevention of pressure injuries or prevention of tissue maceration.

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Wheelchair seating —

Part 11: Determination of dissipation characteristics of sensible perspiration into seat cushions

1 Scope

This document specifies a method for determining the dissipation characteristics of simulated sensible perspiration exposure on seat cushions of a wheelchair under test conditions that simulate body loading on support surfaces with flat and contoured profiles. The test method is applicable to a wide variety of seat cushion materials and constructions that are used across the world.

The test method is intended to determine how the cushion handles a liquid load. It is not intended to determine how the cushion responds to a continuous release of liquid or vapour.

This document also specifies apparatus to measure dissipation characteristics (of perspiration) of seat cushions and the approach to be employed in measuring these characteristics.

This document is applicable to seat cushions for wheelchairs that include a cushion cover.

NOTE The significance of the dissipation characteristics of the seat cushion can be greatly affected by the clothing worn, for example a moisture wicking cover might not help the skin condition of the patient sitting in a wet adult diaper.

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 16840-2:2018, *Wheelchair seating — Part 2: Determination of physical and mechanical characteristics of seat cushions intended to manage tissue integrity*

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
indenter ischial tuberosity
one of two locations on the inferior surface of an indenter that corresponds in position to the location of a human ischial tuberosity

3.2
electrical impedance
complex number ratio of the voltage to the current in an alternating current circuit

Note 1 to entry: Impedance extends the concept of electrical resistance to the alternating current circuit.

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3.3
sensible perspiration
perspiration that has not gone through a phase change to the vapour phase

Note 1 to entry: This is perspiration that can be felt as being moist by a person, in contrast with the water vapour phase of perspiration, which is described as insensible.

4 Abbreviated terms

PRCLI perspiration rigid cushion loading indenter

RCLI rigid cushion loading indenter

5 Principle

Human sensible perspiration in the area between the cushion and buttocks has four possible states:

a) existing in between a cushion and the buttock (such as with a sealed vinyl cover);

b) dissipated into the cushion cover, but not into the cushion;

c) dissipated more generally into both the cover and cushion;

d) drawn away from the cover (which becomes dry) and into the cushion.

The dissipation behaviour of the cover/cushion system can be evaluated by measuring the changing impedance at a location of interest following a discharge of simulated liquid perspiration into the area between the rigid cushion loading indenter and the cushion. The test method employs delivery of solution that simulates sensible perspiration in a single bolus. This allows the rate of dissipation to be determined.

The testing system has four elements:

— a RCLI simulating temperature, weight, and shape in a loading buttock;

— a discharge system that releases a discrete amount of solution that simulates sensible perspiration;

— a measurement system of the changing impedance associated with changing solution concentration near the electrodes (indirectly indicating the absorption of the cover/cushion);

— a test environment of defined temperature and humidity.

6 Test apparatus

The following test apparatus shall be used.

6.1 Perspiration rigid cushion loading indenter

6.1.1 Shape of PRCLI

The PRCLI is formed from 4 mm ± 1 mm polycarbonate sheet formed according to the specifications for a RCLI with the inner surface of the shell formed to match the contour specified in ISO 16840-2:2018, Annex A.

6.1.2 Temperature control on the PRCLI

The PRCLI shall include a means of maintaining the temperature at 35 °C ± 0,1 °C in the inferior surface of the PRCLI.

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