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Wheelchair seating —

Part 13: Determination of the lateral stability property of a seat cushion

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Contents

Page

Foreword

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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*.

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.

Introduction

The seat cushion, as the base of support for the wheelchair occupant, affects postural stability by resisting moments when the occupant's centre of mass is displaced. Research exploring the influence of cushion design and setup on pelvic orientation and measures of postural stability is limited. Standard test methods, highlighted in ISO 16840-2, should be used to characterize tissue integrity management properties of wheelchair seat cushions such as immersion, envelopment, hysteresis, impact damping, recovery, and horizontal stiffness.

This document provides details of test equipment and a method for the measurement of the cushion's ability to resist movements contributing to pelvic obliquity. Changes in pelvic obliquity, as a result of a shift in the centre of mass, can affect stability and mobility depending on the response of the cushion, the occupant's core muscle strength, etc. Moments in the test method are created by shifting a vertical load laterally on the top surface of a standard rigid cushion loading indenter (RCLI) simulating the buttocks and upper thighs. The test method described in this document is intended to differentiate lateral stability performance between cushions and is not appropriate for ranking cushions nor for directly matching this characteristic with an individual occupant's requirements. The link to clinical efficacy, although implied, has not been validated. It is intended that this document will evolve when the evidence of clinical relevance is confirmed. Test conditions (e.g. the RCLI) simulate a symmetric anatomy. The loads used in this document are based on the 40th to 60th percentile wheelchair occupant and are not intended to characterize any cushion properties under bariatric loading conditions or to assess the weight capacity of a cushion.

There are other stability issues of relevance to the occupant, but which are not addressed in this document. For example, because the positions of the occupant's thighs, lower legs, and feet can counterbalance any instability elements of the cushion, an anterior-posterior stability test carries lesser significance to the occupant and is not included. This document also does not address aspects of wheelchair sitting stability related to the resistance or assistance that the cushion provides to the occupant regaining a neutral pelvis following a lateral tilt as viewed in the frontal plane. Additionally, edge stability is not assessed. In some cases, the occupant will benefit from the stability provided by the cushion's edge (i.e. a strengthened edge could be of benefit in supporting the required functional posture while the occupant is seated on the cushion). In other cases, the occupant could prefer lesser stability at the edge to assist in transferring off the cushion.

Wheelchair seating —

Part 13: Determination of the lateral stability property of a seat cushion

1 Scope

This document specifies apparatus, test methods, and disclosure requirements for determination of lateral stability properties of wheelchair seat cushions by measuring the response from the cushion to a shift in the centre of mass of the load on the cushion. It provides a method of determining changes in a particular physical and mechanical property of the cushion. It does not provide information specific to cushion performance for a particular individual user. It does not provide information related to anterior-posterior stability, nor to stability contributions from cushion edges.

NOTE 1 Test conditions simulate a symmetric anatomy.

NOTE 2 Loads are intended to represent those seen under the pelvis of a 40th to 60th percentile wheelchair user.

This document is applicable to cushions used in situations other than a wheelchair.

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 7176-26, *Wheelchairs — Part 26: Vocabulary*

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 terms and definitions given in ISO 16840-2 and ISO 7176-26 and the following apply.

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

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

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

3.1
cushion lateral stability
cushion's ability to resist tilting of the pelvis as viewed in the frontal plane caused by a shifting centre of mass of occupant in a lateral direction