TECHNICAL REPORT

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Wheelchair seating —

Part 9: Clinical interface pressure mapping guidelines for seating

Sieges de fauteuils roulants —

Partie 9: Lignes directrices pour l'utilisation d'un système de mappage de pression

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 173, *Assistive products for persons with disability*, Subcommittee SC 1, *Wheelchairs*.

ISO 16840 consists of the following parts, under the general title *Wheelchair seating*:

— *Part 1: Vocabulary, reference axis convention and measures for body segments, posture and postural support surfaces*

— *Part 2: Determination of physical and mechanical characteristics of devices intended to manage tissue integrity — Seat cushions*

— *Part 3: Determination of static, impact and repetitive load strengths for postural support devices*

— *Part 4: Seating systems for use in motor vehicles*

— *Part 6: Simulated use and determination of the changes in properties of seat cushions*

— *Part 9: Clinical interface pressure mapping guidelines for seating* [Technical Report]

— *Part 10: Resistance to ignition of non-integrated seat and back support cushions — Requirements and test methods*

— *Part 11: Determination of perspiration dissipation characteristics of seat cushions intended to manage tissue integrity* [Technical Specification]

— *Part 12: Apparatus and method for cushion envelopment testing* [Technical Specification]

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Introduction

The purpose of this Technical Report is to provide information as to where interface pressure mapping (IPM) can fit into a clinical assessment of an individual and their seating system, to highlight what can be achieved, and bring awareness of the limitations.

The use of IPM in the clinic is increasingly used to support clinicians in the evaluation of individual seating systems for individual clients. To get the best value from IPM requires a knowledge of the basic concepts of the interface pressure distribution (see Clause 2), the ability to define and apply a correct protocol for the application of IPM (see Clause 4), the ability to prepare correct documentation of the IPM (see Clause 5), and the skill in interpreting the collected data (see Clause 6).

The aim of an IPM test session can be different in a clinical or rehabilitation environment. In some cases, it can be a tool to compare the behaviour of different pressure care or postural cushions. It can also be used to support the clinician in finding the best match between cushion and client. Various applications looking at the broader picture are covered in Clause 3. Whichever the application, the main objective behind using an IPM needs to be clear from the beginning.

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Wheelchair seating —

Part 9:
Clinical interface pressure mapping guidelines for seating

1 Scope

This Technical Report has been produced to guide users in the performance of the tasks that are directly involved in the clinical use of interface pressure mapping (IPM) or are synergistic with its use in a comprehensive wheelchair seating evaluation.

This Technical Report does not cover other aspects of the clinical assessment process (e.g. taking a medical history), nor the prescription or treatment process which might arise from an assessment. These guidelines are not meant to be a substitute for clinical reasoning and judgement within the context of a complete assessment.

This Technical Report refers to the state of the art of IPM experiences in a seating scenario. Most of the principles covered can be extrapolated to whole body (in bed) or to foot assessments, for example.

2 Definitions and glossary

2.1 Calibration

Calibration is a process wherein the sensing mat is subjected to known forces. The sensor responses are monitored and modelled in the software.

NOTE A record is kept of the responses (called a calibration file) and whenever the sensors output a similar response, the result is related to the previously known forces. In most cases, this is done by placing the mat in a purpose-built chamber with an air-filled bladder. The bladder is inflated and the pressure in the bladder is measured. It is assumed to be evenly pressurized over the mat.

Calibration allows for the software to accommodate changes with time (creep) or pressure (hysteresis) exhibited by the sensors.

Recalibrate the mat whenever the readings look unreliable, after excessive use, or at the manufacturer's recommended interval. Keep track of the uses of the mat and the date of the last calibration. Old calibration files should be retained (old calibration files can be loaded for comparison to determine change over a period).

2.2 Coefficient of Variation (CoV)

The CoV is expressed as a percentage:

$$Coefficient\ of\ Variation = \frac{Standard\ deviation}{Mean} \quad (1)$$

NOTE This is one of the statistical measures available to assess how evenly the pressure is distributed across a support surface. The lower the CoV, the lower the variability in the data set.

2.3 Conformity

The ability of the IPM mat to adapt to irregular shapes without creasing.

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