Wheelchair seating —

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

Sièges de fauteuils roulants —
Partie 6: Simulation d’utilisation et détermination des changements de propriétés des coussins de sièges
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**Annex A (informative)**

Influences that drive changes in seat cushion performance

Bibliography
Foreword

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

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


Future parts dealing with methods for determining heat and water vapour characteristics and clinical guidelines for the measurement of postural support surfaces and body segments are planned.
Introduction

Wheelchair seat cushions provide improved support and injury prevention for the user. They are used by those with a variety of needs and by those with varying degrees of disability. Wheelchair seat cushions are prescribed based on their ability to perform under a range of circumstances, from intermittent use to robust sports use, and use by those with regular incontinence. Each application presents different conditions that can change the performance of the cushion and can expose the user to hidden risks. Standards for the evaluation of wheelchair cushions under a wide range of conditions are paramount. This part of ISO 16840 describes test methods that characterize the changes in physical and mechanical properties of seat cushions based on their age and use. The standard offers a suite of test methods, not all of which will be appropriate for all cushions, and therefore, the manufacturer is to determine which are appropriate for their cushion construction and use. It is designed to provide a close approximation of the changes that have been observed to occur over time. The protocol consists of performing tests to characterize the properties of a new cushion, subjecting the cushion to multiple simulated aging processes, then re-testing the cushion properties. Changes that occur are reported.

Prior to following the protocol, the manufacturer is to recommend the environment of use of the cushion, the anticipated failure modes of the cushion, and the cushion characterization tests appropriate for their product. Just as not all tests are appropriate for all cushions, the exposures within the tests might not be appropriate for all cushions. Tests may be modified or eliminated based on suitability for materials, architecture, or use conditions, i.e. a rotational component could be added to the cyclic loading, generating additional wear. For some materials, 70 °C can change the failure mode from typical to temperature-based, depending on the material properties of this cushion. In such a case, 50 °C may be selected to accelerate the aging of the cushion over a longer period of time to simulate a failure more typical of aging. Any deviations are to be documented.

These tests are not appropriate for ranking or scoring cushions or for directly matching these characteristics with the requirements of individual users. While the results of these tests can aid the clinician in providing care to the patient through selection of surface characteristics that will, in their professional judgment, aid the care, treatment, or recovery of the patient, these tests are not to be interpreted as prescriptive in and of themselves. The link to clinical efficacy, although implied, has not been validated. It is intended that this part of ISO 16840 will evolve when clinical relevance is confirmed. Further parts of the ISO 16840 series will describe test methods for characterizing other surface characteristics that can further aid the clinician in the care and treatment of patients.
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