
Wheelchair seating —

Part 3:

Determination of static, impact and repetitive load strengths for postural support devices

Sièges de fauteuils roulants —

Partie 3: Détermination des efforts statiques, d'impact et cycliques pour les dispositifs de maintien de la posture



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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 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*.

This second edition cancels and replaces the first edition (ISO 16840-3:2006), which has been technically revised.

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*

Introduction

Postural support devices (PSD), constructed as additional components to wheelchair seating or as wheelchair seating in its own right, are widely available and used extensively by people with disabilities. The selection or prescription of the most appropriate PSD is intended to be, where appropriate, partially dependent on knowledge of its ability to withstand static, impact, and repeated loads. This part of ISO 16840 is intended to specify test methods to provide this information.

The tests involve mounting the PSD on rigid test fixtures to simulate mounting on a wheelchair. Rigid test fixtures are utilized to provide a worst-case situation, which is repeatable and avoids destroying multiple wheelchairs during testing. Static, impact, and repeated loads are then applied to simulate normal usage. In some of the defined tests, performance criteria have been established. In others, no minimum requirements are currently specified. Tests are repeated at increasing forces or torques until one or more performance limits are reached. Repetitive load tests with a specific load or torque application are intended to induce fatigue-related performance limits.

Tests represented in this part of ISO 16840 were derived from ISO 7176-8. Many of the test principles and much of the test equipment are the same for this part of ISO 16840 and ISO 7176-8.

It is anticipated that parts of this part of ISO 16840 will continue to be developed and that future revisions can include the results of ongoing work in the following areas:

- further development of the test forces based on clinical data is necessary in order to determine actual impact, static, and repetitive forces that PSDs are subjected to;
- further work for the collection of data on the most common failures experienced in actual use of PSDs is ongoing.

Wheelchair seating —

Part 3:

Determination of static, impact and repetitive load strengths for postural support devices

1 Scope

This part of ISO 16840 specifies test methods for the determination of static, impact, and repetitive load strengths as well as disclosure requirements for postural support devices (PSD) with associated attachment hardware intended for use with an undefined wheelchair.

This part of ISO 16840 does not apply to the strength of PSDs under crash conditions in a motor vehicle.

This part of ISO 16840 does not apply to PSDs that are designed to fail under certain static, dynamic, or repetitive loads.

NOTE 1 ISO 16840-4 provides test methods and requirements for some PSDs when used as part of a wheelchair seat in a motor vehicle.

NOTE 2 Performance criteria have been established in some of the defined tests. In others, no minimum requirements are currently specified.

NOTE 3 For masses greater than 150 kg or less than 25 kg, appropriate extrapolation of test apparatus dimensions, mounting point separation, etc. are permitted.

NOTE 4 Rigid surrogate test fixtures are utilized to provide a worst-case situation, and consequently this part of ISO 16840 does not test a PSD on a particular wheelchair.

NOTE 5 If one PSD achieves a higher loading at the point of failure than another, it does not necessarily mean that it is better or worse. The type of failure and flexibility of the PSD can be considered as well. The maximum offset distance to the centre of the PSD from the adjacent attachment point can also be considered.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 898-7, *Mechanical properties of fasteners — Part 7: Torsional test and minimum torques for bolts and screws with nominal diameters 1 mm to 10 mm*

ISO 7176-8:1998, *Wheelchairs — Part 8: Requirements and test methods for static, impact and fatigue strengths*

ISO 7176-15, *Wheelchairs — Part 15: Requirements for information disclosure, documentation and labelling*

ISO 7176-26:2007, *Wheelchairs — Part 26: Vocabulary*

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