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**Wheelchair seating —**

**Part 3:**

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

*Sièges de fauteuils roulants —*

*Partie 3: Détermination de la résistance aux charges statiques,  
dynamiques et cycliques pour les dispositifs de maintien de la posture*

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# Contents

	Page
Foreword.....	iv
Introduction.....	v
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>2</b>
<b>3 Terms and definitions.....</b>	<b>2</b>
<b>4 Principle.....</b>	<b>5</b>
4.1 Overview .....	5
4.1.1 General .....	5
4.1.2 Repetitive load .....	5
4.1.3 Static load .....	5
4.1.4 Impact load.....	5
4.2 PSD Sample.....	5
<b>5 Requirements.....</b>	<b>5</b>
<b>6 Test report requirements.....</b>	<b>6</b>
<b>Annex A (normative) Method for repetitive load testing of PSDs.....</b>	<b>9</b>
<b>Annex B (normative) Method for static load testing of PSDs.....</b>	<b>17</b>
<b>Annex C (normative) Method for impact testing of PSDs.....</b>	<b>28</b>
<b>Annex D (normative) Mounting fixtures for the testing of postural support devices.....</b>	<b>32</b>
<b>Annex E (normative) PSD Loading Pads.....</b>	<b>36</b>
<b>Bibliography.....</b>	<b>41</b>

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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](http://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](http://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](http://www.iso.org/iso/foreword.html).

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

This third edition cancels and replaces the second edition (ISO 16840-3:2014), which has been technically revised.

The main changes are as follows:

- the structure of the document has been updated;
- test results have been added;
- pass/fail requirements have been established.

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](http://www.iso.org/members.html).

This corrected version of ISO 16840-3:2022 incorporates the following corrections:

- Missing list items were added to [6.10](#) and [B.5.8](#);
- Text clarified in [A.5.3](#).

## Introduction

Postural support devices (PSDs), 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 the PSD's ability to withstand static, impact, and repetitive loads. This document specifies test methods and requirements for the strength of PSDs as manufactured, which are designed to identify likely points of failure by breaking, yielding, or loosening of components - it is not intended to predict the long-term useful life. The useful life of a device depends upon many variables of use, aging, and environment: the way in which it is installed, the frequency of use and forces to which it is subjected, abrasion points, vibration and fatigue, cleaning and periodic maintenance, and temperature, humidity and UV exposure.

The tests involve mounting the PSD to a rigid test fixture to simulate mounting on a wheelchair. Rigid test fixtures are used to provide a worst-case situation by minimizing shock-absorption that can come, for example, from the damping effects of flex in the wheelchair frame, and also to make these tests repeatable by removing the variable of wheelchair type. Repetitive, static, and impact loads are then applied, as appropriate, according to the type of PSD, to determine if the minimum strength requirements are met.

When a series of strength/impact tests are performed on a PSD, the same sample PSD is used throughout and the tests conducted in series, from least stringent [lowest forces] to most stringent [highest forces]. In this manner, the PSD will be subjected to lower forces, which would typically be more frequently encountered in daily use, before being subjected to the higher forces that pose a greater risk of failure. If the sample PSD fails in a less stringent test, there is generally no reason to conduct more stringent tests until the PSD has been redesigned. Individual tests can be conducted using a unique sample PSD for each test, but this will not provide the same level of assurance about performance.

Some of the tests represented in this document are derived from ISO 7176-8. Many of the pass/fail criteria, test principles and test equipment are the same for this document as for ISO 7176-8.

Parts of this document are continuing to be developed so that future revisions can include the results of work in the following areas:

- further development of the test forces based on clinical data in order to determine actual impact, static, and repetitive forces that PSDs are subjected to;
- the collection of further data on the most common failures experienced in actual use of PSDs is ongoing;
- addressing any additional unaddressed PSD testing needs, including gaps as currently identified in [Table 1](#).

