

Australian/New Zealand Standard™

**Wheelchairs—Resistance to ignition of
non-integrated seat and back support
cushions**

**Part 10: Requirements and test
methods**



AS/NZS ISO 16840.10:2015

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Association of Consultants in Access Australia
Australian Rehabilitation and Assistive Technology Association
Bus and Coach Association of New Zealand
Commercial Vehicle Industry Association of Australia
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-067 Assistive Technology Products for Persons with Disability.

The objective of this standard is to specify requirements and test methods to assess the resistance to ignition by smouldering cigarette equivalent heat source, of non-integrated postural support components of a wheelchair. This standard only applies where the postural support components are specifically designed to protect tissue integrity; all other postural support components used in wheelchairs are expected to meet the requirements of AS/NZS ISO 7176.16.

This Standard is identical with, and has been reproduced from, ISO 16840-10:2014, *Wheelchairs—Resistance to ignition of non-integrated seat and back support cushions, Part 10: Requirements and test methods*.

As this Standard is reproduced from an International Standard, the following applies:

- (a) In the source text ‘this part of ISO 16840’ should read ‘this Australian/New Zealand standard’.
- (b) A full point substitutes for a comma when referring to a decimal marker.

None of the normative references in the source document have been adopted as Australian or Australian/New Zealand Standards.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annexes to which they apply. A ‘normative’ annex is an integral part of a Standard, whereas an ‘informative’ annex is only for information and guidance.

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INTRODUCTION

The ignition and subsequent burning of wheelchairs is very rare, but can occur as a result of

- being close to a burning object such as a fire beside the wheelchair,
- overheating of any electrical or electronic device on the wheelchair, and
- contact from sparks or flames (such as welding sparks, cigarettes, or matches).

Wheelchair occupants are at particular risk of injury or death from these fires and resulting fumes because they may not have the ability to move away from the wheelchair.

Wheelchairs can be considered to be comprised of the following components:

- a) structural components such as the frame, wheels, etc. which are essential to the mechanical integrity of the wheelchair;
- b) postural support devices, such as sling seats, sling back supports, arm supports, foot supports, etc., which are attached to the wheelchair and are primarily intended to give postural support to the wheelchair occupant (these can also be intended to aid in pressure redistribution);
- c) devices to manage tissue integrity, such as seat and back support cushions which are intended to have primarily a clinical function to minimize the risks of skin damage (these can also be intended to control or accommodate posture);
- d) power-related components such as motors, energy sources, controllers etc., which are required for the functioning of powered devices on wheelchairs.

Each of the above components has a different severity of risk associated with its likelihood of igniting and its resulting harm to the wheelchair occupant. ISO standards have been published or are in preparation to specify requirements and test methods for the above categories of components to help manufacturers and purchasers of wheelchairs to design and procure wheelchairs and their components which are appropriate for the risk of ignition balanced against the functional needs of the wheelchair occupant. The aim of these ISO standards is to provide appropriate alternatives to using furniture-based flammability standards, to reflect the uses and purposes of wheelchairs and their accessories.

The development of an ISO standard on the resistance to ignition of structural components [see list item a) above] has not yet commenced. The most likely sources of ignition are proximity to a heat source such as an electric radiator or domestic fire or a heat source such as a lighted match or cigarette falling onto the structure.

ISO 7176-16 is primarily concerned with the resistance to ignition of postural support device components of a wheelchair [see list item b) above]. These typically include arm supports, sling seats, sling back supports, lower leg supports, foot supports, lateral supports, head supports, etc. The most likely source of ignition is an open flame source falling onto the component's surface or into gaps between surfaces. Consequently that standard is written around resistance to a heat source equivalent to a lighted match in contact with a test sample of an assembly of the upholstered part's composite materials in both a vertical and horizontal orientation.

The power related components [see list item d) above] are the subject of ISO 7176-14 which specifies requirements to prevent overheating in electrical components that could lead to a fire.

The tissue integrity devices [see list item c) above] are the subject of this part of ISO 16840, and permit a less stringent resistance to ignition than in ISO 7176-16, based upon the priority of these components for their clinical function, which might override the need for a high resistance to ignitability.

The requirements of this part of ISO 16840 have been set at a basic minimum level and are less severe than mandatory requirements in some countries. This part of ISO 16840 has been produced to allow for the use of materials that would not meet the requirements of ISO 7176-16, but the manufacturer is required to make the case as to why ISO 7176-16 could not be employed. Good practice is also to use

materials which minimize the risk of release of toxic substances as a result of ignition. Materials chosen are to comply also with biocompatibility requirements (ISO 10993-1 and ISO 10993-10).

The day to day usage of a wheelchair may affect its materials' resistance to ignition through cyclic loading, movement of materials, washing, cleaning, etc. Manufacturers will often take this effect into account as part of their risk assessment when selecting materials for their products to minimize the effects of this normal use. However, although this part of ISO 16840 can be used on parts that have been used, etc., the test samples specify new or unused parts.

Different environments commonly encountered by some wheelchair occupants may also affect the flammability of materials. For example, home oxygen systems, delivery systems for drugs carried in an inflammable medium, etc., can turn an inert material into a flammable one. Dust and other materials accumulated within the chair have also been found to be a source of readily ignitable material. Wheelchair manufacturers and occupants should be aware of these risks, and design and use wheelchairs accordingly as covered by ISO 14971.

This part of ISO 16840 describes testing an assembly of the composite of materials as used in the wheelchair component, because the resistance to ignition of these materials individually can be quite different from those when assembled as a composite. Hence, the results of this part of ISO 16840 do not give any indication of the resistance to ignition of any of the separate individual materials of the test sample.

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Wheelchairs—Resistance to ignition of non-integrated seat and back support cushions**Part 10:
Requirements and test methods****1 Scope**

This part of ISO 16840 specifies requirements and test methods to assess the resistance to ignition by smouldering cigarette equivalent of non-integrated components of a wheelchair intended to protect tissue integrity.

The test measures only the resistance to ignition by smouldering cigarette equivalent of the items tested and not the ignitability of the complete wheelchair. It gives an indication, but cannot guarantee, the ignition behaviour of the assembled non-integrated devices of a complete wheelchair.

This part of ISO 16840 does not apply to resistance to ignition of structural parts of a wheelchair, nor does it cover postural support devices. This part of ISO 16840 does not cover changes in resistance to ignition as a result of regular washing or use.

This part of ISO 16840 allows for the separate testing of removable non-integrated components of a wheelchair which are normally used in the horizontal plane (e.g. a seat cushion) from those normally used in the vertical plane (e.g. a back support).

This part of ISO 16840 describes testing an assembly of the composite of materials as used in the removable non-integrated component. The results of this part of ISO 16840 do not give any indication of the resistance to ignition of any of the separate individual materials of the test sample.

NOTE 1 The intent of this part of ISO 16840 is primarily to cover removable cushions whose described purpose is that of protecting skin tissue against pressure, shear, and maceration related damage.

NOTE 2 The requirements of this part of ISO 16840 have been set at a basic minimal level and are less severe than mandatory requirements in some countries.

Where practical, it is advisable that manufacturers use materials with superior resistance to ignition. The manufacturer is required to make the case as to why ISO 7176-16 could not be employed rather than this part of ISO 16840.

NOTE 3 Requirements for the control of risks from sources of fire created by electrical and electronic components are included in ISO 7176-14

2 Normative references

The following referenced documents are indispensable for the application 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 14971, *Medical devices — Application of risk management to medical devices*

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

EN 1021-1:2006, *Furniture — Assessment of the ignitability of upholstered furniture — Part 1: Ignition source smouldering cigarette*