International Standard

ISO 16840-2

Second edition
2018-01

AMENDMENT 1
2024-04

Wheelchair seating —

Part 2: Determination of physical and mechanical characteristics of seat cushions intended to manage tissue integrity

AMENDMENT 1: Updates and addition of new Annex covering alternatively sized cushions

Sièges de fauteuils roulants —

Partie 2: Détermination des caractéristiques physiques et mécaniques des coussins d'assise et dispositifs de répartition de pression

AMENDEMENT 1: Mises à jour et ajout d'une nouvelle annexe couvrant les coussins d'autres dimensions

Reference number
ISO 16840-2:2018/Amd.1:2024(en)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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.

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

A list of all the parts of ISO 16840 can be found on the ISO website.

Wheelchair seating —

Part 2: Determination of physical and mechanical characteristics of seat cushions intended to manage tissue integrity

AMENDMENT 1: Updates and addition of new Annex covering alternatively sized cushions

5.7

Replace list items a) and b) with the following:

a) Two 50 mm ± 2 mm diameter indenters, centres spaced 110 mm ± 5 mm apart, representing ischial tuberosities.

b) Two 25 mm ± 1 mm diameter indenters, centres spaced 350 mm ± 10 mm apart, representing the trochanters.

6.1

Replace the text with the following:

6.1 Choice of cushion

Obtain an unused sample seat cushion for testing with a nominal width of 400 mm to 450 mm. If a cover is provided, ensure that it is fitted to the cushion in the orientation specified by the manufacturer.

A cushion with a 400 mm to 450 mm nominal width is the size for the RCLI indenter specified in Annex A and the LCI indenter in 5.7. Indenters for testing alternative cushion sizes are specified in Annexes D and E.

11.2

Replace list items f) to k) with the following:

f) Apply a vertical load of 140 N ± 5 N.

g) Measure the vertical distance from the horizontal supporting surface to the inferior surface of the LCI after 300 s ± 10 s to the nearest 1 mm (L_1).

h) Increase the load on LCI to 186 N ± 5 N.

i) Re-measure vertical distance from the horizontal supporting surface to the inferior surface of the LCI to the nearest 1 mm (L_2) 60 s ± 5 s after the increased load is applied.

j) Increase the load on LCI to 232 N ± 5 N.

k) Re-measure vertical distance from the horizontal supporting surface to the inferior surface of the LCI to the nearest 1 mm (L_3) 60 s ± 5 s after the increased load is applied.

11.3

Replace the text with the following:

11.3 Method of calculation

a) Calculate loaded contour depth $L_{CD} = L_{th} - L_1$ and record to the nearest 1 mm for each trial.

b) Calculate 33 % overload deflection $D_{O\,33} = L_1 - L_2$ and record to the nearest 1 mm for each trial.

c) Calculate 66 % overload deflection $D_{O\,66} = L_1 - L_3$ and record to the nearest 1 mm for each trial.

11.4

Replace the text with the following:

11.4 Test report

In addition to the information required as specified in Clause 16, report the median values for loaded contour depth (L_{CD}), 33 % overload deflection ($D_{O\,33}$), and 66 % overload deflection ($D_{O\,66}$).

Annex A

Replace Table A.1 is with the following:

Table A.1 — Cone and sphere dimensions

Cushion width (nom.) mm	Indenter width (W_i) mm	Indenter length (L_i) mm	Anterior - posterior location of load (l_f) mm	Cone angle (⌀) °	Cone width first cut (W_c) mm	Cone height w/o sphere (H_c) mm	Height with sphere (H_{cs}) mm	Major diameter of cone (D_c) mm	Minor diameter of cone (d_c) mm	Length of cone edge mm
400 – 450	360	500	127	10	180	367	494	254	124	373

NOTE 1 All tolerances (except cushion width) ±2 mm.

NOTE 2 The RCLI is constructed from cones and spheres machined according to Figure A.1. These components are assembled to form the required shape according to Table A.1.

Annex D

Replace the first sentence with the following:

This document utilizes RCLIs designed to test cushions with widths of 400 mm to 450 mm.

Replace Table D.1 with the following:

Table D.1 — Dimensional properties RCLI for alternatively sized cushions

Cushion width (nom.) mm	Indenter width (W_i) mm	Indenter length (L_i) mm	Anterior - posterior location of load (l_f) mm	Cone angle (⌀) °	Cone width first cut (W_c) mm	Cone height w/o sphere (H_c) mm	Height with sphere (H_{cs}) mm	Major diameter of cone (D_c) mm	Minor diameter of cone (d_c) mm	Length of cone edge mm
300 – 350	300	440	104	10	150	330	435	208	91	335
351 – 399	330	500	117	10	165	377	494	234	100	383
451 – 499	390	500	137	10	195	357	494	274	148	363
≥ 500	420	500	147	10	210	347	495	294	171	353

NOTE 1 All tolerances ±2 mm.

NOTE 2 The RCLI is constructed from cones and spheres machined according to Figure A.1. These components are assembled to form the required shape according to Table A.1.

Annex E

Add the following annex after Annex D, before the Bibliography.

Annex E
(informative)

LCIs for testing of alternatively sized cushions

This document utilizes an LCI designed to test cushions with widths of 400 mm to 450 mm. This annex provides different sizes that are more appropriate for testing alternative sized cushions.

Table E.1 describes alternative LCI designs for alternatively sized cushions. Applied loads also differ for these different sized indenters.

NOTE An alternative indenter size can be selected based on the relevant usable area of the cushion.

Table E.1 — Key parameters for use of LCI for alternatively sized cushions

Cushion widths used for (mm)	50 mm indenter centre spacing (mm)	25 mm indenter centre spacing (mm)	Applied nominal force (N)	Applied 33 % overload force (N)	Applied 66 % overload force (N)
351 – 399	95	320	135	180	224
451 – 499	120	380	145	193	241
≥ 500	135	430	170	226	282
All tolerances ±5 %.					