



**International
Standard**

ISO 16840-10

Wheelchair seating —

Part 10:

**Resistance to ignition of postural
support devices — Requirements
and test method**

**AMENDMENT 1: Amended with
additional Annexes and test method**

Sièges de fauteuils roulants —

*Partie 10: Résistance à l'inflammation des dispositifs de soutien
postural — Exigences et méthode d'essai*

AMENDEMENT 1: Annexes et méthode d'essai supplémentaires

**Second edition
2021-06**

**AMENDMENT 1
2024-04**

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 16840-10:2021/Amd 1:2024](https://standards.iteh.ai/catalog/standards/iso/b2c0de9b-43d3-4ac3-93ac-8215308c91a2/iso-16840-10-2021-amd-1-2024)

<https://standards.iteh.ai/catalog/standards/iso/b2c0de9b-43d3-4ac3-93ac-8215308c91a2/iso-16840-10-2021-amd-1-2024>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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* Sub-committee SC1, *Wheelchairs*.

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.

<https://standards.iteh.ai/catalog/standards/iso/b2c0de9b-43d3-4ac3-93ac-8215308c91a2/iso-16840-10-2021-amd-1-2024>

Wheelchair seating —

Part 10:

Resistance to ignition of postural support devices — Requirements and test method

AMENDMENT 1: Amended with additional Annexes and test method

Clause 4

Replace the first paragraph with the following:

Test materials used in integrated and non-integrated seat and back supports, and other postural support devices as used in wheelchairs are assembled in either horizontal or vertical samples and subjected to a heat source that is equivalent to a smouldering cigarette. The resulting effects on the test materials are observed and measured.

6.4

Change NOTE 4 to read:

NOTE 4 Other means, such as a NiCr coil, that achieve the same heat transfer to the test sample, can be used as an alternative heat source (see [Annexes D](#) and [E](#)).

ISO 16840-10:2021/Amd 1:2024

<https://standards.iteh.ai/catalog/standards/iso/b2c0de9b-43d3-4ac3-93ac-8215308c91a2/iso-16840-10-2021-amd-1-2024>

6.5

Replace the first paragraph with the following:

Prior to conditioning described in this subclause, any removable covering materials which have been subjected to water-soluble flame retardants shall be subjected to the washing and drying procedures described in Annex B.

Clause 9

Add the following NOTE after list item j):

NOTE A report template which can be used to meet this Clause is provided in [Annex F](#).

Annex D, E, and F

Add the new annexes after Annex C.

Annex D (informative)

Test method using a NiCr wire coil as a heat source

D.1 Principle

A NiCr wire coil heat source as described in this Annex has been designed and validated to approximate the heat output and thermal mass of a burning cigarette as determined by observing the ignition behaviour and resulting burn patterns from a variety of cigarettes. The repeatability of the ignition behaviour and resulting burn pattern from the device has been validated through interlaboratory testing^[10].

D.2 Test environment

The test environment shall have a temperature between 10 °C and 30 °C and a relative humidity between 15 % and 80 %.

D.3 Test enclosure

For the protection of the lab technician the test enclosure shall consist of either a room or a smaller enclosure designed to extract smoke and fumes. In absence of such conditions, the technician shall take other precautions against smoke inhalation. The enclosure shall be capable of controlled air flow between 0,0 m/s and 0,2 m/s when measured at 25 mm ± 5 mm from the heat source.

D.4 Test apparatus

D.4.1 General

The test apparatus shall be a heat source that shall consist of a wire coil of NiCr alloy resistance wire, heated by a DC power supply that has a constant current output mode.

NOTE 1 The means to create the test apparatus is contained in [Annex E](#).

NOTE 2 By adjusting the current, this apparatus can be utilized to simulate a 'match' or other heat sources.

D.4.2 Wire coil

The wire shall be made from an alloy of 60 % nickel, 16 % chromium, and 24 % iron (known as "Nichrome 60" or "Chromel C"). The diameter of the wire shall be 0,39 mm to 0,41 mm (commonly sold as 26 AWG).

NOTE 1 Nichrome 70 or 80 wire can be substituted since the paper strip calibration will account for small differences in resistance.

The wire shall be wound to produce a wire coil with the specifications shown in [Figure D.1](#).

NOTE 2 A method for winding the wire coil to these specifications is provided in [Annex E](#).

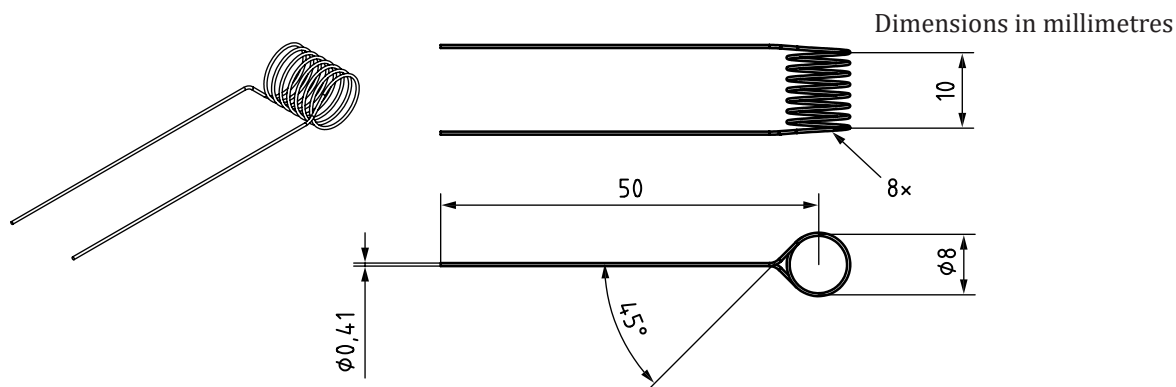


Figure D.1 — Dimensions of wire coil

D.4.3 Power supply and connection to the wire coil

The power supply shall be capable of producing a constant current between 1 A and 5 A with adjustments in 0,10 A increments. The wire coil shall be connected to the power supply by a means to ensure good electrical conductivity.

NOTE 1 Crocodile (alligator) clips on high-temperature silicone insulated wire leads are an effective means of connection.

NOTE 2 Setting the centre of the wire coil 25 mm from the crocodile clips results in a predictable length of wire through which current flows actively. This provides calibration by paper strip ignition at approximately 2,2 A to 2,3 A.

D.4.4 Conditioning the wire coil

Before the wire coil can be used for testing, it shall be conditioned for use to relax stress from the winding process and burn off any residual oil. To condition the wire, set the power supply to run at a constant current set to 12 V (to ensure adequate power) and adjust the current to 4 A for $10\text{ s} \pm 1\text{ s}$.

NOTE The wire coil will glow red hot, and, after cooling, will relax, increasing the width of the wire coil from 10 mm to (12–14) mm, with no significant change in the diameter.

D.4.5 Paper calibration strip

A paper calibration strip shall be made from 80 g/m² white bond copier paper cut to $5\text{ mm} \pm 1\text{ mm} \times 40\text{ mm} \pm 5\text{ mm}$ and folded, as shown in [Figure D.2](#).

NOTE This paper is equivalent to 20 lb paper.

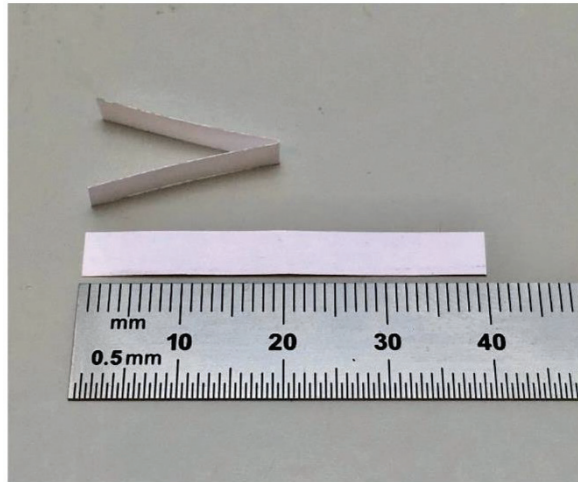


Figure D.2 — A paper calibration strip, folded in half

D.5 Heat source calibration

Calibration is required after conditioning a new wire coil, or if any other changes have been made to the connections or power supply. Calibration shall be done with the wire coil placed in the position which will be used for subsequent testing to ensure effects of air flow passing over the heat source are consistent. Calibration shall be conducted without a test sample in place, as the presence of a test sample can affect the local airflow around the wire coil.

The following process shall be followed.

- a) Place a folded paper calibration strip between middle coils ([Figure D.3](#)), with the power turned off (cold).

NOTE 1 The middle coils will be hottest.

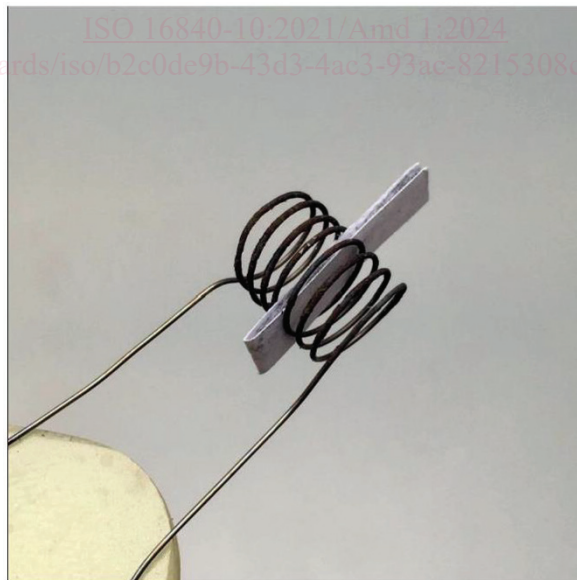


Figure D.3 — Paper calibration strip placed between middle coils

- b) Ensure the current setting results in the paper exhibiting a visible red glowing ignition within 10 s to 14 s after turning on power.
- c) If ignition occurs after 14 s, or does not occur at all, raise the current and repeat.

d) If ignition occurs before 10 s, decrease the current and repeat.

NOTE 2 To aid in seeing ignition, you can dim the lights.

NOTE 3 Based on interlaboratory experiments, 2,2 A to 2,3 A is likely to achieve this result.

NOTE 4 Variations in positioning and wire connections can contribute to variations in the current needed to achieve the paper ignition specification.

D.6 Wire coil cleaning between tests

Ensure that there is no carbon build up on the wire coil. If present, turn the power supply up to 4 A to burn off any deposits.

WARNING — Do not exceed 5 amps. A current of 5 A will heat the coil wire to a temperature of over 1 000 °C. Until the power is removed and the coil cools, this is a burn and fire hazard.

D.7 Test methods

D.7.1 Sample size

Because this test is intended to test for ignition of composite PSD samples, and not the component level materials, there is no minimal sample size requirement. Samples are tested in the orientation and configuration in which they are used. Burn area is not a pass/fail requirement, hence a minimal sample size specification is not necessary.

D.7.2 Preparation

- a) Identify the PSD.
- b) Select the surface(s) that the manufacturer assesses to be at risk from a fire source (see Annex C). These shall be identified as the test surfaces.
- c) If testing items that are intended to be used only in the range of the horizontal plane $\pm 30^\circ$, use the horizontal test, and for all other items, use the vertical test. If the item is intended for use in either plane, then only the vertical test is necessary.
- d) Place the test sample in the test environment for a minimum of 12 h to condition it for testing.

D.7.3 Horizontal test

- a) Set up the test sample in the same location used for calibration of the wire coil. The test sample shall be positioned such that the surface to be tested is horizontal $\pm 3^\circ$. A suitable test rig may be used to hold the test sample in position.

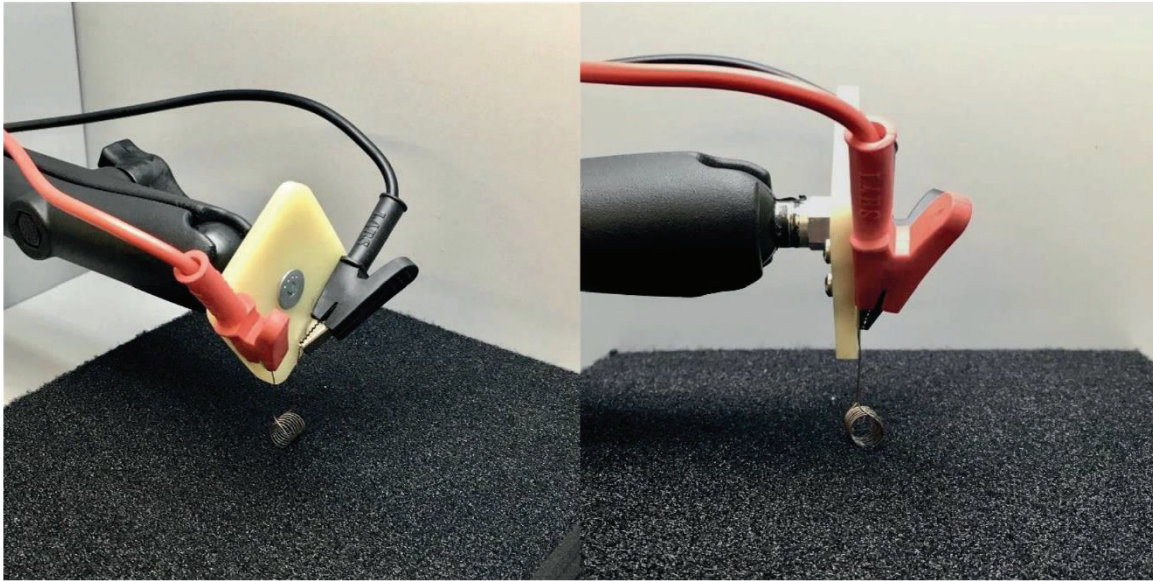


Figure D.4 — Placement position of wire coil heat source on a horizontal surface

- b) Apply the side of the wire coil to the test surface, pressing lightly, with some visible deflection of the surface. (see [Figure D.4](#)).
- c) Photograph the sample, with the hot wire coil in position, prior to testing.
- d) Switch on the power to heat the wire coil for $60 \text{ s} \pm 1 \text{ s}$. Observe the subsequent progress of ignition and record any flaming that occurs. Remove the heat source at the end of 60 s. Record any evidence of smouldering that continues after an additional 120 s.
- e) Photograph the sample, with the wire coil removed, to record results.
- f) Clean wire coil per [Clause D.6](#).
- g) Repeat [D.7.3 a\) to f\)](#) once in an unaffected area of the same test surface, for a total of two tests. If there is insufficient material to conduct a second test on the same surface, a new sample shall be used and noted on the test report.
- h) If the manufacturer has determined more than one surface is at risk, repeat [D.7.3 a\) to g\)](#) on each surface to be tested.

NOTE 1 If flaming occurs in the interior and/or surface during the test, the sample has failed.

NOTE 2 Testing can be stopped and the flames extinguished by suffocating them with a fireproof cover to prevent the spread of fire within the test enclosure.

D.7.4 Vertical test

- a) Set up the test sample in the same location used for calibration of the wire coil. The test sample shall be positioned such that the surface to be tested is vertical $\pm 3^\circ$. A suitable test rig may be used to hold the test sample in position.