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

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

AMENDEMENT 1: Annexes supplémentaires

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AMENDMENT 1

PROOF/ÉPREUVE

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This document was prepared by Technical Committee ISO/TC 173, *Assistive products* Sub-committee SC1, *Wheelchairs*.

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Wheelchair seating —

Part 10: Resistance to ignition of postural support devices — Requirements and test method

AMENDMENT 1: Amended with additional Annexes

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).

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.

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.

Dimensions in millimetres

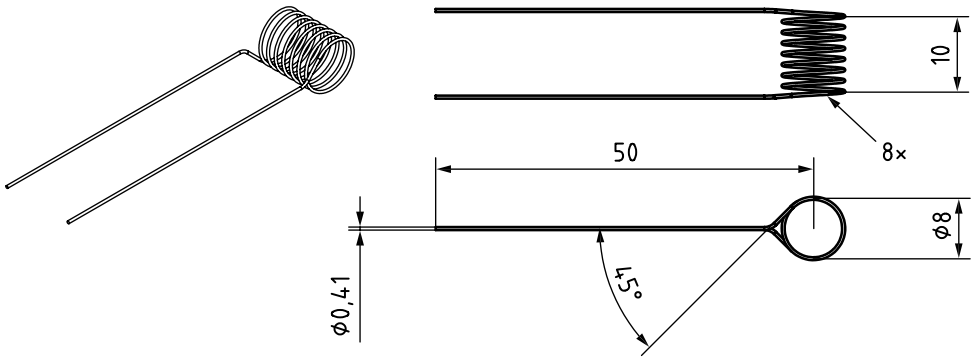

Figure D.1 — Dimensions of wire coil

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 s ± 1 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/m^2 white bond copier paper cut to 5 mm ± 1 mm x 40 mm ± 5 mm and folded, as shown in Figure D.2.

NOTE This paper is equivalent to 20 lb paper.

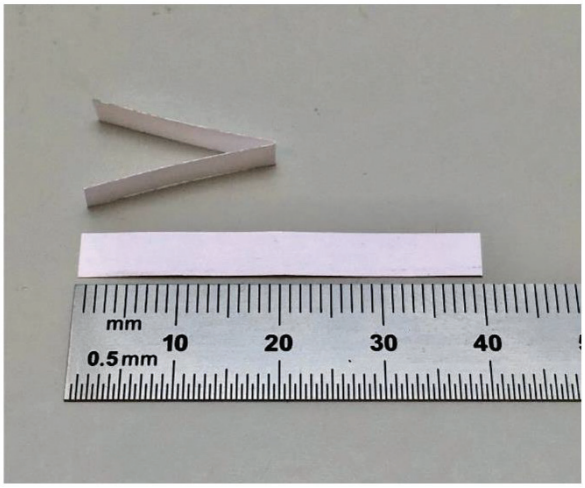

Figure D.2 — A paper calibration strip, folded in half

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.

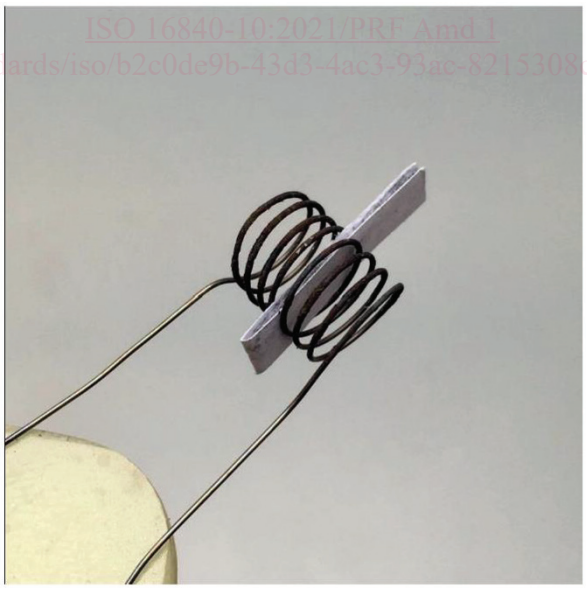

Figure D.3 — Paper calibration strip placed between middle coils

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 ± 30°, 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 ± 3°. A suitable test rig may be used to hold the test sample in position.

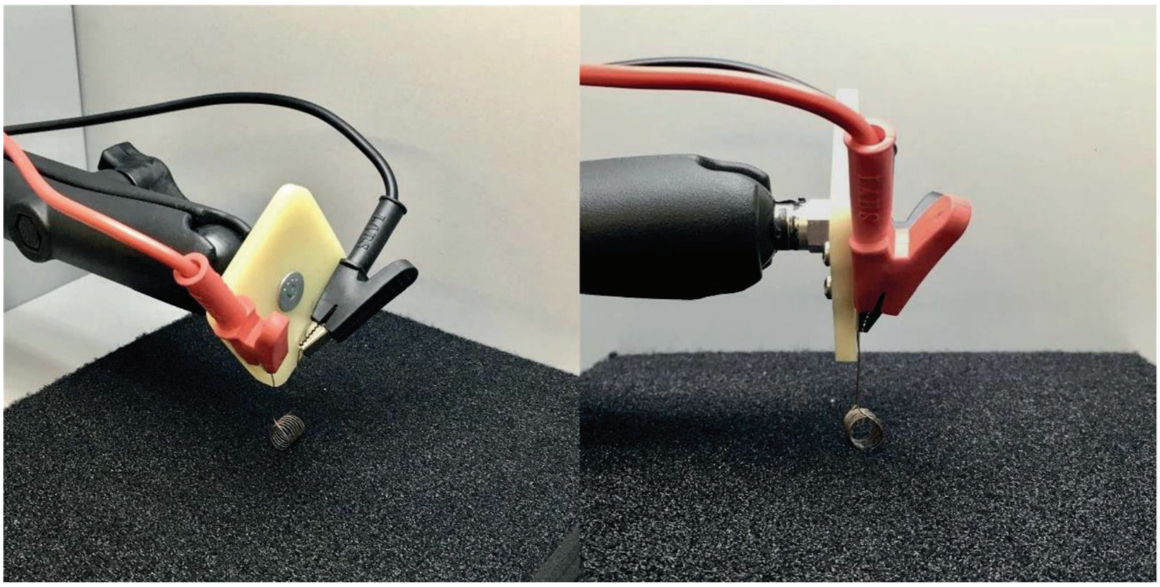

Figure D.4 — Placement position of wire coil heat source on a horizontal surface

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 s ± 1 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 ± 3°. A suitable test rig may be used to hold the test sample in position.