INTERNATIONAL STANDARD

ISO 22653

First edition
2003-12-01

Footwear — Test methods for lining and insocks — Static friction

Chaussures — Méthodes d'essai pour la doublure et pour la première de propreté — Frottement statique

Reference number
ISO 22653:2003(E)

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Published in Switzerland

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 22653 was prepared by CEN (as EN 12826:2000) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 216, *Footwear*, in parallel with its approval by the ISO member bodies.

For the purposes of international standardization, a list of corresponding International and European Standards for which equivalents are not given in EN 12826 has been added as Annex ZZ.

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 309 "Footwear", the secretariat of which is held by AENOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European standard specifies two methods of assessing the frictional properties of lining and insocks, irrespective of the material.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 12222, *Footwear – Standard atmospheres for conditioning and testing of footwear and components for footwear.*

3 Definitions

For the purposes of this standard the following definitions apply:

3.1
coefficient of static friction (μ_s)
the ratio of the force necessary to cause the tangential separation of two stationary surfaces to the perpendicular force acting upon the two surfaces

3.2
coefficient of kinetic friction (μ_k)
the ratio of the force necessary to maintain a constant velocity between two surfaces in contact to the perpendicular force acting upon the two surfaces

3.3
kinetic angle of surface drag *(D_k)*
the angle of the inclined plane at which the test sled will slide down the inclined plane when sliding is initiated by a standard impulse

3.4
static angle of surface drag *(D_s)*
the angle of the inclined plane at which the test sled will slide down the inclined plane under its own mass and momentum

4 Apparatus and material

The following apparatus and material shall be used:

4.1 Method A

4.1.1 A sled, (150 mm ± 1 mm) long x (100 mm ± 1 mm) wide having a mass of 700 g ± 15 g to which a lining or insock test specimen is attached (see 5.1.1) and a test specimen support of cellular rubber, or plastics material, 3 mm thick and of medium apparent density. The surface of the sled is flat and smooth or polished. The edges of the sled do not contain any burrs or roughness.

When laid upon the horizontal bed of the test instrument the sliding surface of the sled is parallel with the horizontal bed, in full planar contact and without distortion.

4.1.2 A driving mechanism, to move the sled or horizontal bed in such a manner that the relative movement of one with the other can be maintained at a constant velocity of 800 mm/min ± 80 mm/min.

The drive mechanism is automatically disengaged or de-energized at the end of the test run (see 4.1.3).

4.1.3 A flat bed of rigid construction, having a smooth or polished surface to which the comparator material (see 5.1.2) is fixed in such a manner that the comparator material is not stretched more than a necessary minimum to remove wrinkles or other non-permanent distortions.

The flat bed is of a length to permit a relative surface travel during the test of approximately 400 mm and of a width to permit approximately 50 mm of clearance between the edge of the sled and any edge obstructions.

4.1.4 A measuring device, in the form of a strain gauge, with an associated autographic recording instrument to determine accurately the force necessary to initiate movement and the force necessary to maintain a constant velocity thereafter. The response time of the recording instrument is less than 0,25 s.

4.2 Method B

4.2.1 Instrument for the determination of static angle of surface drag *(D_s)*

4.2.1.1 Rigid platform, not less than 300 mm long and not less than 100 mm wide and hinged at one end to a baseboard provided with levelling screws. The rigid platform shall be provided with a spirit level and means for measuring the angle of inclination with an accuracy of ± 0,5°.

4.2.1.2 A piece of woollen melton cloth[1]), measuring approximately 250 mm long and 100 mm wide with its length in the cross direction and fixed under slight tension to the platform (see 4.2.1.1)

NOTE The melton cloth should be covered when the apparatus is not in use. It should be replaced at intervals, or if contaminated.

4.2.1.3 Specimen carrier, made of metal, with dimensions as illustrated in figure 1. The total mass of the carrier including the clamping screw shall be adjusted to 300 g by balanced boring out of the upper section of the carrier.

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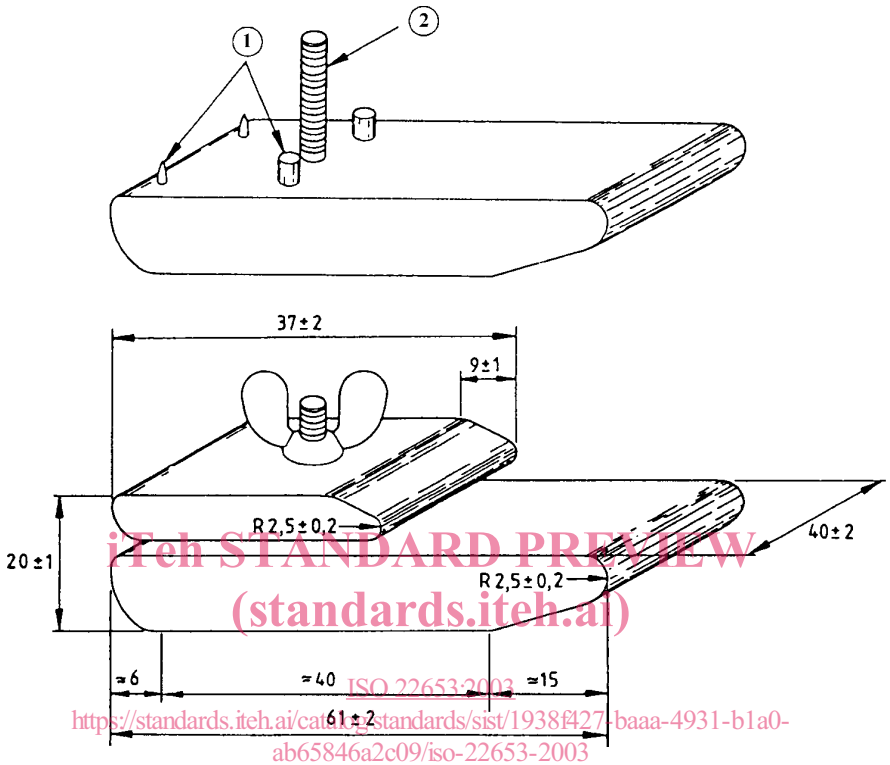
[1]) Recommended physical characteristics of woven fabrics:

Fibre content:	90 % Wool, 10 % Cotton
Weave:	3/1 broken
Finish and other details:	woollen spun
Mass per unit area:	min. 650 g/m^2
Threads per unit length:	warp: min. 14,6 per cm, weft: min. 11,0 per cm
Breaking strength:	warp: min. 355 N per 50 mm, weft: min. 325 N per 50 mm
Dimensional change:	max. 2,0

Dimensions in millimetres



Key

1 Suggested arrangement only for locating pins and/or locating lugs
2 Thread locating and securing spindle for specimen carrier top part

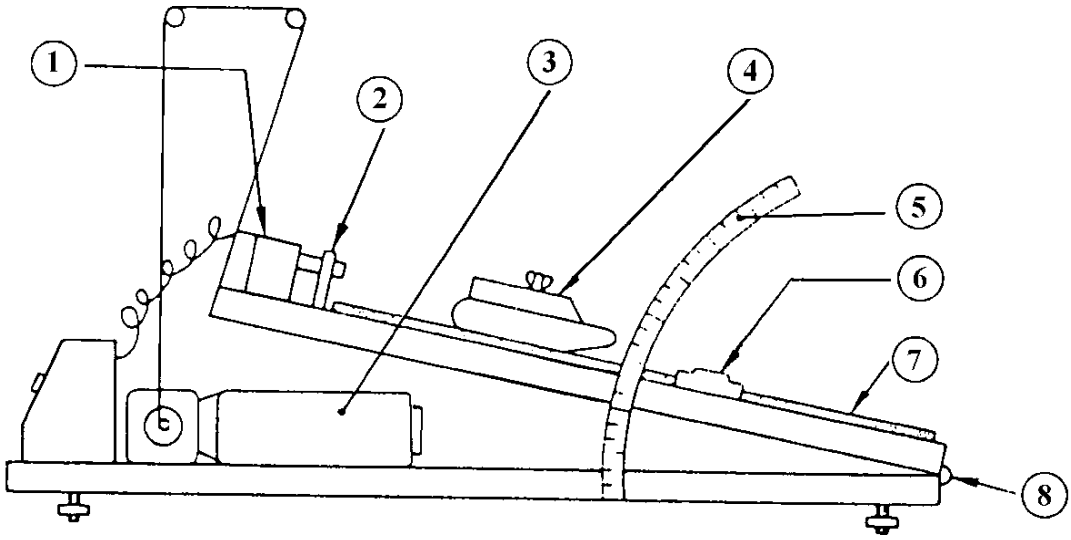
Figure 1 – Specimen holder for method B

4.2.1.4 Electric motor, suitably geared to tilt the plane of the platform mechanically at a rate of 15°/min ± 2°/min.

4.2.1.5 Microswitch included in the circuit in series with the electric motor (4.2.1.4) and is positioned at the top end of the platform (4.2.1.1) so that the actuating lever of the switch may be depressed by the back edge of the specimen carrier (4.2.1.3) resting on the melton cloth. A suitable stop shall be provided such that the distance of travel of the specimen carrier between the stop and the contact breaking position of the switch is 4,5 mm ± 0,5 mm.

The force required to depress the actuating lever of the microswitch shall be between 40 mN and 80 mN.

A suitable apparatus is shown schematically in figure 2.



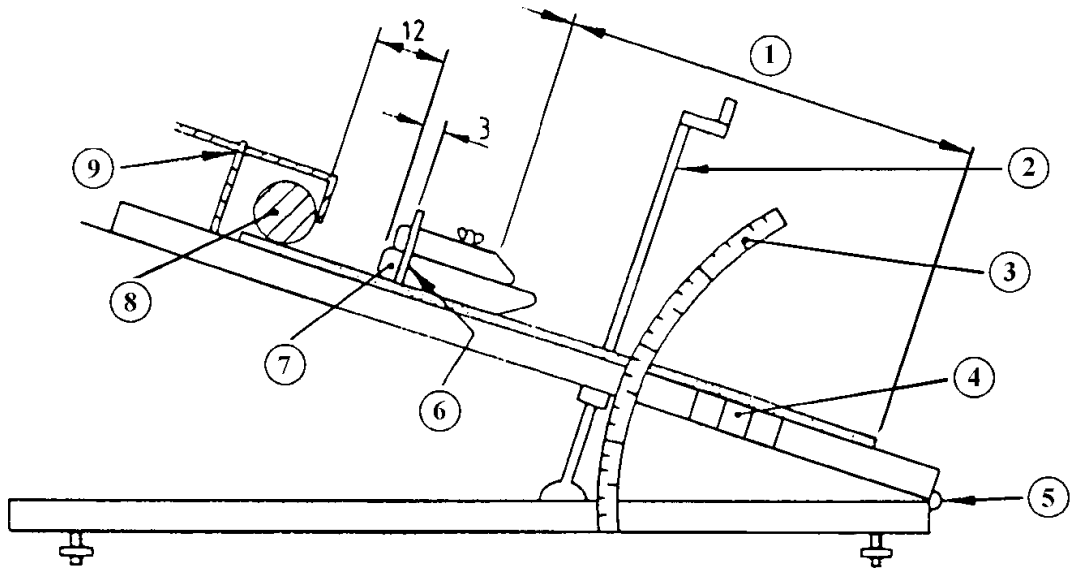
Key
1 Microswitch
2 Stop
3 Motor
4 Specimen carrier
5 Protractor
6 Spirit level
7 Melton cloth
8 Hinge

Figure 2 – Apparatus for method B – Mode 1

4.2.2 Instrument for the determination of the kinetic angle of surface drag (D_k)

A suitable apparatus is shown in figure 3.

Dimensions in millimetres



Key

1 Not less than 200
2 Inclination screw
3 Protractor
4 Spirit level
5 Hinge
6 Arresting bar
7 Specimen carrier
8 Metal roller
9 Pivot

Figure 3 – Apparatus for method B – Mode 2

The rigid platform (4.2.1.1) and the specimen carrier (4.2.1.3) shall be suitable. Means are provided for tilting the rigid platform so that it may be positioned accurately to within ± 0,5° of a required degree of inclination. Provision shall be made to impulse the back of the specimen carrier by a force of approximately 3 N in order to initiate sliding (see 6.2.2.2).

NOTE The impulse force of 3 N on the back of the specimen carrier can be achieved by a metal cylinder of appropriate dimensions and mass. This method is however subject to changes in resultant force at different inclinations of the platform.

5 Sampling and conditioning

5.1 Method A

5.1.1 Cut two lining or insock test pieces each measuring 250 mm x 100 mm, one in the longitudinal direction of the lining or insock material and one in the transversal direction.