
Footwear — Test methods for whole shoe — Flexing durability

Chaussures — Méthodes d'essai pour toute la chaussure — Durabilité vis-à-vis de la flexion

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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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 216, *Footwear*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 309, *Footwear*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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.

Footwear — Test methods for whole shoe — Flexing durability

1 Scope

This document specifies two test methods for the determination of the flexing durability of whole shoes. The two methods might not give comparable results.

NOTE The selected test method depends on agreement between relative parties who use this test method or product standards which reference this test method.

These methods are not applicable to the whole shoes with heel height more than 50 mm, or the thickness of flexing area of the soles more than 25 mm, or flexing angle less than 45° according to ISO 17707:2005, Clause 6.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 18454, *Footwear — Standard atmospheres for conditioning and testing of footwear and components for footwear*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Principle

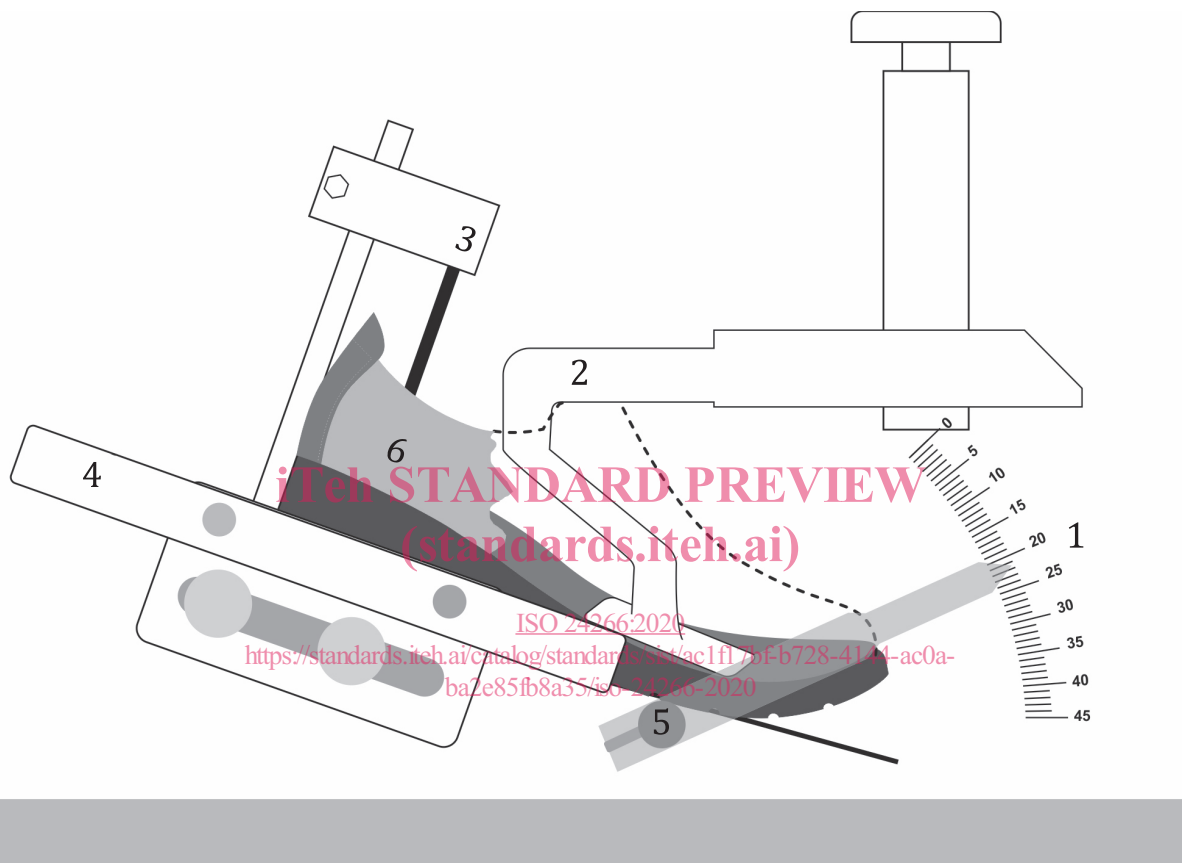
The footwear specimen is repeatedly flexed through a specified angle about its normal flexing line by a test machine. After a predetermined time or number of flexes the footwear is subjectively assessed for signs of damage.

5 Apparatus

5.1 Method A

5.1.1 Flexing machine. See [Figure 1](#).

5.1.1.1 A means of firmly clamping any type of footwear at the heel and toe. A number of toe clamps will be necessary to ensure all sizes of footwear can be clamped securely.



Key

- 1 flexing angle indicator
- 2 front holding clamp
- 3 rear holding clamp
- 4 shoe platform
- 5 flexing axis
- 6 test piece (whole shoe)

Figure 1 — Flexing machine (method A)

5.1.1.2 A system of flexing the footwear about its flexing line at a rate of (140 ± 10) cycles per minute through a range of flexing angles.

5.1.1.3 A means of recording either the number of flexes or the duration of the test providing the speed of the machine is constant and known.

5.1.2 Vernier callipers, to an accuracy of better than 0,02 mm.

5.2 Method B

5.2.1 Flexing machine. See [Figure 2](#).

5.2.1.1 The flexing angle can be adjusted between 0° to 55°, see [Figure 2](#).

5.2.1.2 The flexing frequency can be adjusted between 100 cycles to 300 cycles per minute.

5.2.1.3 Sample holder shall be able to fasten the sample firmly to ensure it will not loosen during test. The inclination angle of sample holder is adjustable to make sure test sample can be under normal condition without flex in any directions when the machine is at the minimum flex angle.

5.2.1.4 A means of stopping the machine automatically after the specified flexing cycles.

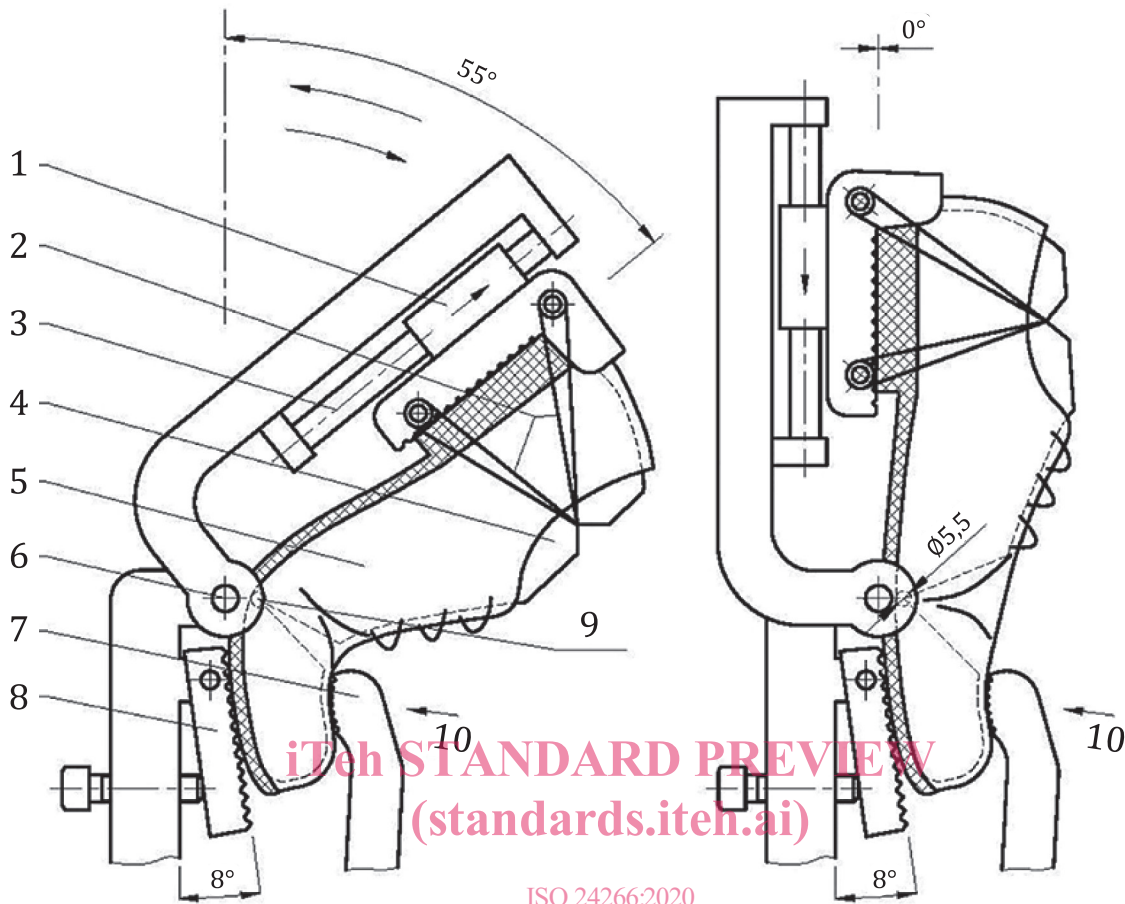
5.2.1.5 A means of blasting air to the flexing area of sample to prevent overheating.

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Dimensions in millimetres



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Key

- 1 slider
- 2 strings used to fix the back of the sample
- 3 slide rail
- 4 flexing last
- 5 sample (whole shoe)
- 6 flexing central axis
- 7 front part of the clamp
- 8 adjustable backer
- 9 flexing axis of the last
- 10 sample holder

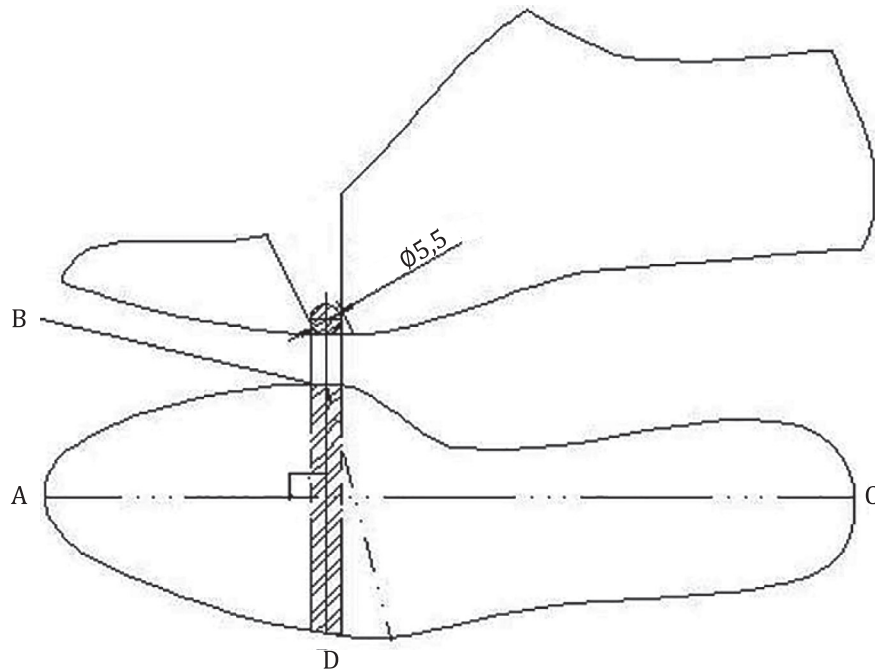
Figure 2 — Flexing machine (method B)

5.2.2 Flexing last

5.2.2.1 Steel axis in the bottom of the last should be fixed in a way that the last flexing at the joint position and the bottom of the last should be smooth when the last keeps at normal and flexing position (see [Figure 3](#)), a size of Ø 5,5 mm × 40 mm is commonly used.

5.2.2.2 The maximum flexible angle of the flexing last is no less than 50°.

Dimensions in millimetres

**Key**

AC	central line
B	ball point at the medial points of the last
BD	steel axis

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Figure 3 — Flexing last

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5.2.3 Vernier callipers, to an accuracy of better than 0,02 mm.

5.2.4 Cutting tool.

The cutting tool is shown in [Figure 4](#).

Means of firmly clamping the footwear is advisable to minimize the risk of breaking the cutting tool as it is withdrawn from the outsole.

6 Sampling and conditioning

6.1 Use at least one pair of whole shoes for each test.

6.2 Place all test pieces in a standard controlled atmosphere in accordance with ISO 18454 for at least 4 h prior to test. The test shall also be carried out under this controlled atmosphere.