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Footwear — Attachment strength of straps, trims and accessories

Chaussures — Résistance de fixation des lanières, bandes et accessoires

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Contents

Page

Foreword

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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 — Attachment strength of straps, trims and accessories

1 Scope

This document specifies a method for determining the attachment strength of footwear upper straps joined to the sole, hooks, eyelets and trims.

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 7500-1, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system*

ISO 18454, *Footwear — Standard atmospheres for conditioning and testing of footwear and components for footwear*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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/

3.1
trim
item attached to the upper including both decorative and functional

EXAMPLE Buttons, upper decorations.

4 Apparatus

4.1 A tensile testing machine with the following:

— A jaw separation rate of (100 ± 10) mm/min.

— A suitable force range for the sample to be tested, with 2 % accuracy, as specified for Class 2 in ISO 7500-1. For most cases, the adequate force range is 0 N to 1 000 N.

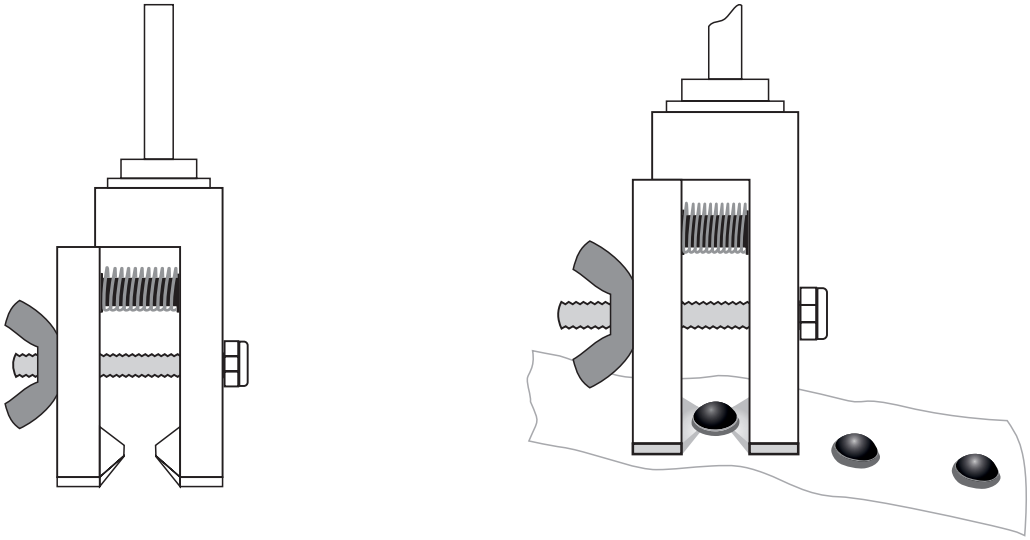
— A means of recording the force, as specified in ISO 7500-1, Class 2.

— A clamping device comprising the following:

  — jaws whose central shafts are aligned in the direction of the force applied that is perpendicular to the external edges of the jaws. The upper and lower jaws lie on the same plane;

  — the jaws are manufactured in such a way that they are able to hold the test-piece and prevent it from slipping, and their edges do not cut or damage the test-piece.

Examples of suitable jaws for trims and accessories are shown in Figure 1 and for straps, in Figure 2.



a) Side view **b) Side view: testing trim**

Figure 1 — Clamping device for rigid accessories

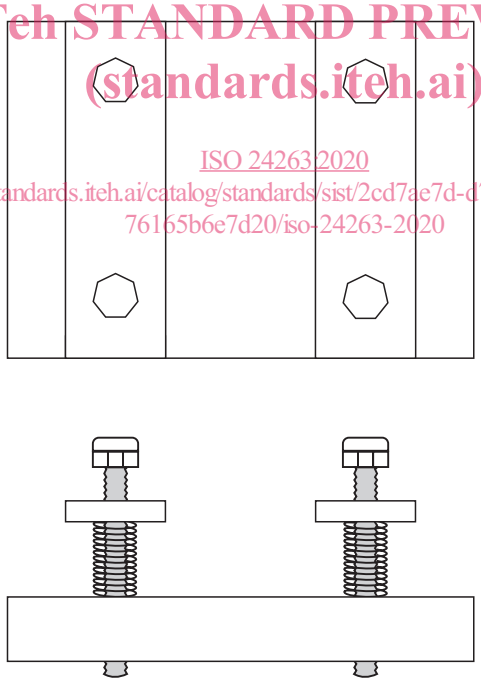


Figure 2 — Clamping device for straps (top and side)

4.2 A Vernier calliper with scale divisions of 0,5 mm.

4.3 Laces, whose attachment strength is higher than that of the eyelets/hooks to be tested.

4.4 A knife or a similar cutting tool.

5 Sampling and conditioning

5.1 Attachment strength of straps

At least two shoes shall be tested. This method only allows straps of no more than 35 mm in width to be tested. The width of straps shall be measured just at the feather line.

5.2 Attachment strength of trims

At least five trim pieces shall be tested. Only test pieces that allow inserting a 1 mm thick gauge between the piece and the upper material can be tested.

5.3 Attachment strength of hooks and eyelets

At least five test-pieces obtained from separate uppers or uppers detached from the soles shall be tested.

Condition the samples 24 h before testing, according to ISO 18454, at (23 ± 2) °C and (50 ± 5) % relative humidity.

6 Preparation of test-pieces

6.1 Attachment strength of straps

Make an incision on the insole approximately 15 mm away from the place where the strap joins the sole/insole. The incision shall be deep and precise enough to ensure that the strap is completely cut but not the sole material to prevent its weakening.

6.2 Attachment strength of trims

No previous preparation of test pieces is needed.

6.3 Attachment strength of hooks and eyelets

Test-pieces can be obtained from separate uppers, uppers detached from the soles, or conduct the test directly on the shoe. In the first two cases, the test can be conducted directly on the upper, but test-pieces can also be obtained by cutting straps from the facing, more specifically from the space between two consecutive eyelets/hooks, in such a way that the straps have an eyelet/hook in the middle.

7 Procedure

7.1 Attachment strength of straps

7.1.1 Before testing, measure the width of each strap at the feather line to the nearest 0,5 mm using the Vernier calliper (4.2). The width shall be included in the test report with the obtained result (see 8.1).

7.1.2 Then clamp the test-piece (shoe) prepared as described in 5.1 in the clamping device, and clamp the strap to be tested in the upper jaw of the tensile testing machine. The shoe shall lie as horizontally as

possible so that the test can reproduce as much as possible the tension that the strap would be subjected to in real use conditions (Figure 3).

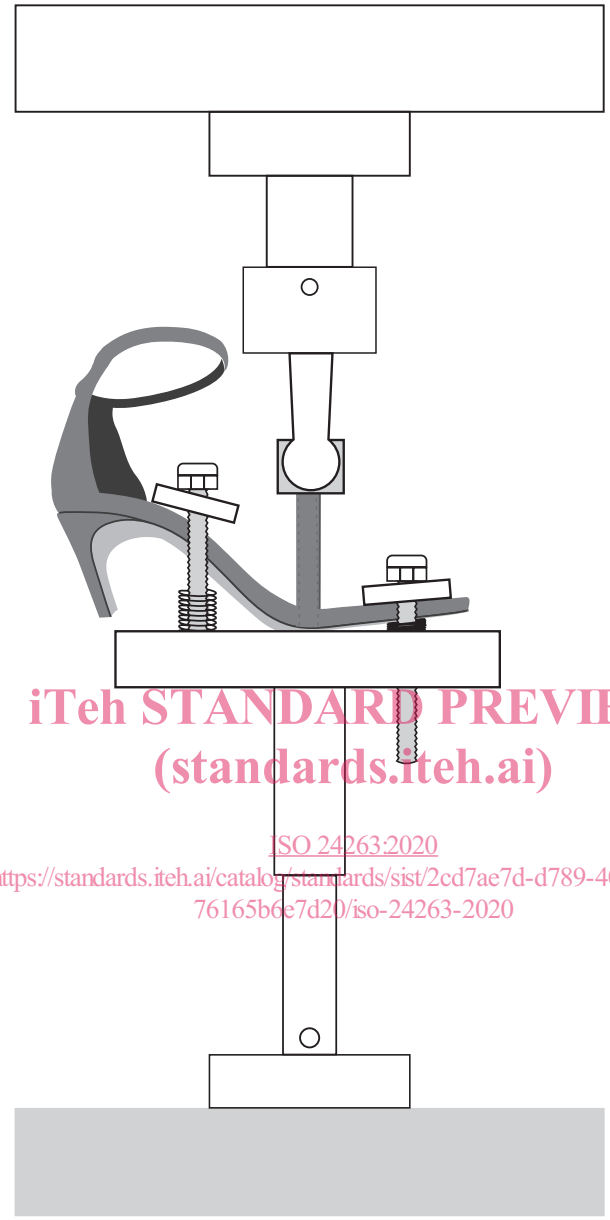


Figure 3 — Testing assembly

7.1.3 Run the tensile testing machine and record the attachment strength required to completely separate the strap from the shoe.

7.1.4 Record the test-piece appearance after test completion:

— Strap breakage.

— Sole breakage.

— Strap detachment.

7.1.5 Repeat the above procedure with the rest of the straps to be tested.

7.2 Attachment strength of trims

7.2.1 Clamp the test-piece in the lower clamping device and then clamp the trim in the upper jaw. In case of rigid trims use the clamping device shown in Figure 1. The jaws and the clamping device shall not damage the trim in such a way that the results might be altered.

7.2.2 Run the tensile testing machine and record the maximum attachment strength in N. Record the test-piece appearance after test completion:

— trim detachment;

— trim breakage.

7.3 Attachment strength of hooks and eyelets

7.3.1 Clamp in the lower jaw the facing of the shoe, underneath an eyelet/hook without touching it, in such a way that the central shaft of the jaw coincides with the centre of the eyelet/hook. Pass a lace through the eyelet/hook to be tested and clamp both ends in the middle of the upper jaw.

7.3.2 When testing straps, centre the strap in the lower jaw and clamp it. Then pass a lace through the eyelet/hook and clamp it with the upper jaw as described in the above paragraph.

7.3.3 When testing shoes, clamp the shoe in such a way that the central shafts of the upper and lower jaws, the eyelet/hook, and the lace are aligned in the direction of the force.

7.3.4 Run the tensile testing machine until failure of any of the components occurs and record the maximum force obtained.

7.3.5 Note the type of failure observed.

7.3.6 Repeat the procedure with the rest of the test pieces.

8 Expression of results

8.1 Attachment strength of straps

The results are expressed in N, recording the maximum force value obtained on each strap and the test-piece appearance. The width of each strap shall be included.

8.2 Attachment strength of trims

The results are expressed in N, recording the average force value obtained and the test-piece appearance.

8.3 Attachment strength of hooks and eyelets

The results are expressed in N, indicating the average force obtained. Details of the type of failure shall also be provided.

9 Test report

The test report shall contain the following information:

a) identification or description of the footwear tested (photograph is recommended);