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Footwear — Attachments strength of straps, trims and accessories

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Foreword

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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).

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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*.

Footwear — Attachments strength of straps, trims and accessories

1 Scope

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 Apparatus and materials

3.1 A tensile testing machine with:

- 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:
 - o jaws the central shafts of which are aligned in the direction of the load applied that is perpendicular to the external edges of the jaws. The upper and lower jaws lie on the same plane;
 - o 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](#).

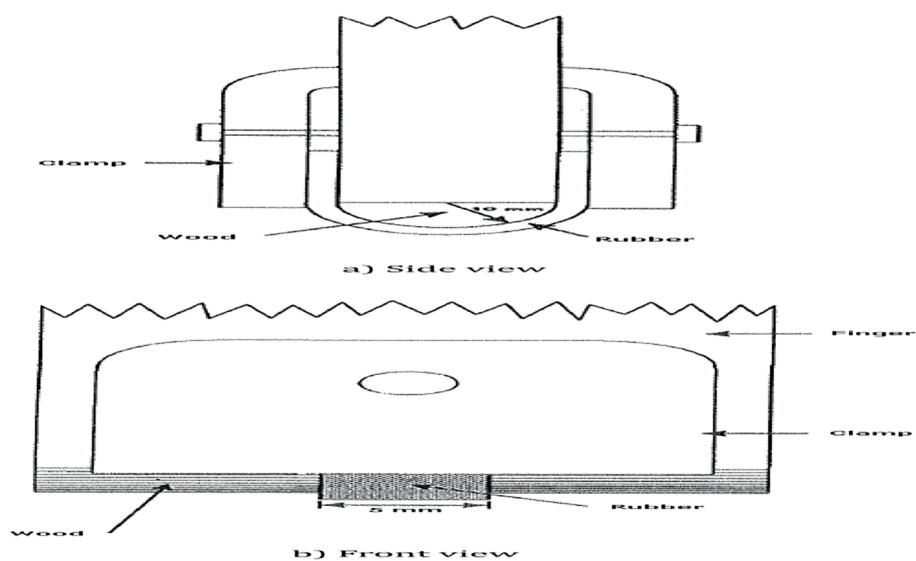


Figure 1 — Clamping device for accessories

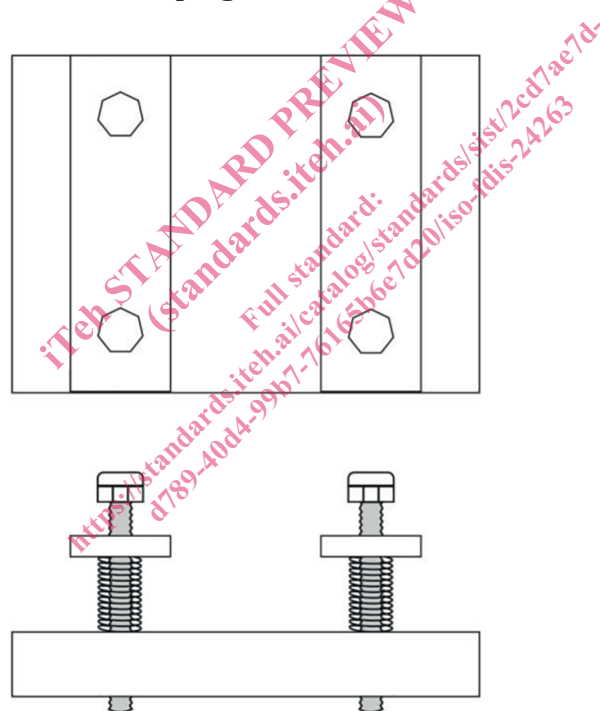


Figure 2 — Clamping device for straps (plan and elevation)

- 3.2 A vernier calliper with scale divisions of 0,5 mm.
- 3.3 A drill.
- 3.4 Laces the tensile strength of which is higher than that of the eyelets/hooks to be tested.
- 3.5 A knife or a similar cutting tool.

4 Sampling and conditioning

4.1 Method A — Tensile strength of straps

At least three shoes shall be tested. This method only allows straps of no more than 35 mm in width to be tested.

4.2 Method B — Tensile strength of ornaments

At least five ornament pieces shall be tested. Only test pieces that allow inserting a 2 mm thick gauge between the piece and the upper material can be tested.

4.3 Method C — Tensile 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 $(23 \pm 2) ^\circ\text{C}$ and $(50 \pm 5) \%$ relative humidity.

5 Preparation of test-pieces

5.1 Method A — Tensile 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.

5.2 Method B — Tensile strength of ornaments

No previous preparation of test pieces is needed.

5.3 Method C — Tensile 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.

6 Procedure

6.1 Method A — Tensile strength of straps

6.1.1 Before testing, measure the width of each strap to the nearest 0,5 mm using the vernier calliper.

6.1.2 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).

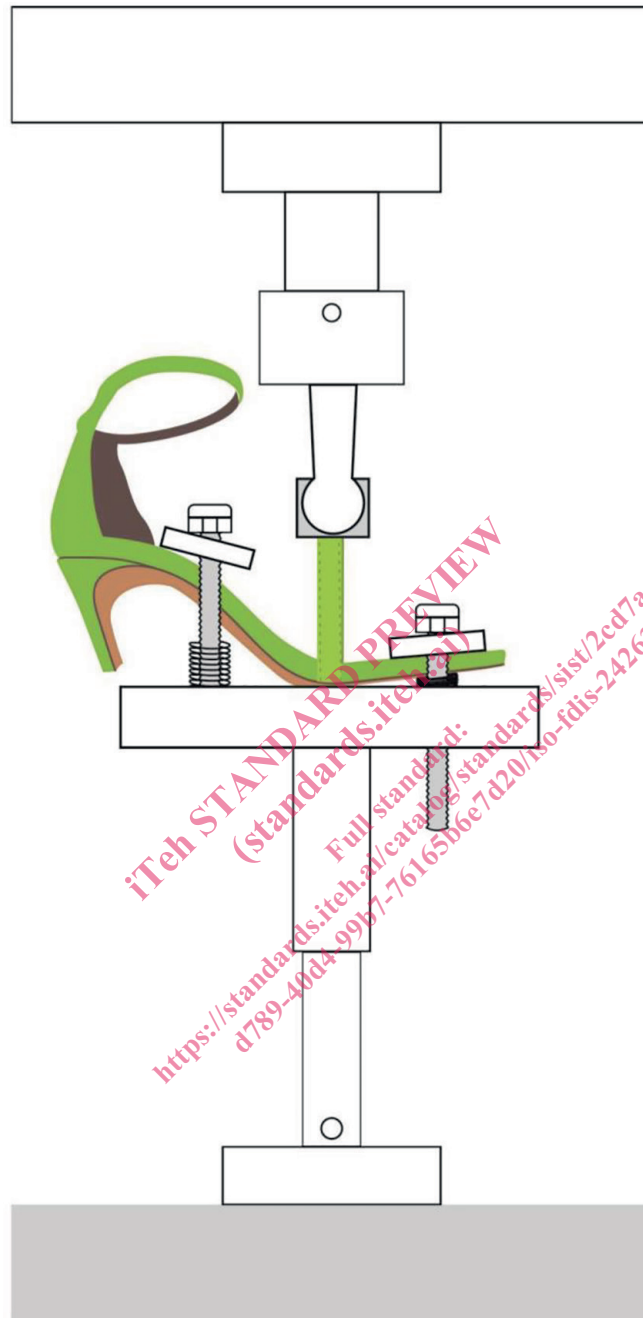


Figure 3 — Testing assembly

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

6.1.4 Record the test-piece appearance after test completion:

- o Strap breakage.
- o Sole breakage.
- o Strap detachment.

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

6.2 Method B — Tensile strength of ornaments

6.2.1 Clamp the test-piece in the lower clamping device and then clamp the small piece in the upper jaw. The jaws and the clamping device shall not damage the ornament in such a way that the results may be altered.

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

- o ornament detachment;
- o ornament breakage.

6.3 Method C — Tensile strength of hooks and eyelets

6.3.1 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.

6.3.2 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.

6.3.3 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 load.

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

6.3.5 Note the type of failure observed:

- o eyelet/hook failure;
- o upper material failure.

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

7 Expression of results

7.1 Method A — Tensile strength of straps

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

7.2 Method B — Tensile strength of ornaments

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

7.3 Method C — Tensile 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.