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Footwear - Test methods for heels - Heel pin holding strength (ISO/DIS 19957:2020)

Schuhe - Prüfverfahren für Absätze - Absatznagel-Haltefestigkeit (ISO/DIS 19957:2020)

Chaussures - Méthodes d'essai relatives aux talons - Résistance à l'arrachement de pointe à talon (ISO/DIS 19957:2020)

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Footwear — Test methods for heels — Heel pin holding strength

Chaussures — Méthodes d'essai relatives aux talons — Résistance à l'arrachement de pointe à talon

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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).

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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*.

This second edition cancels and replaces the first edition (ISO 19957:2004), which has been technically revised.

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 heels — Heel pin holding strength

1 Scope

This document specifies a test method for measuring the force required to pull a single heel pin out of a heel. This test method can be used to measure the heel pin holding strength of heel materials by using a standard heel pin and a method of insertion, or it can be used to assess the heel nailing of commercial production.

This test method is applicable to testing plastics and wooden heels for women's footwear. Heels composed of layers of fibreboard or leather and low plastics heels for men's footwear cannot be tested by this method.

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.

EN 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 7500-1:2018)*

3 Terms and definitions

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

3.1
heel pin holding strength
force required to pull a standard pin out of the heel material divided by the effective length of pin buttressing in the material, expressed as N/mm

4 Apparatus and material

4.1 The following apparatus and material shall be used:

4.2 **Tensile testing machine** complying with the requirements of EN ISO 7500-1 class 2, with a range of approximately 0 N to 2 000 N and a constant rate of traverse of 40 mm/min ± 10 mm/min.

4.3 **Small clamp or slotted hook**, which can be attached to one jaw of the tensile testing machine via a flexible coupling.

4.4 **Commercial heel nailing machine.**

4.5 Standard heel pin (see Figure 1), with the following dimensions:

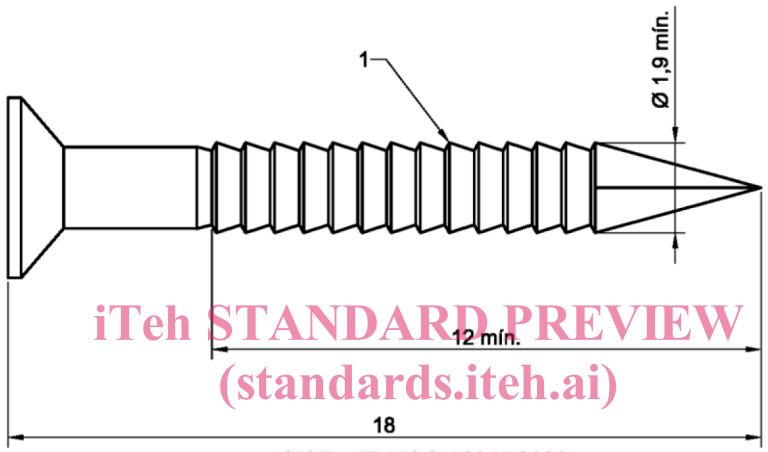
a) length: 18 mm ± 0,5 mm;

b) diameter over the buttress ridges: 1,9 mm, minimum;

c) number of complete formed buttress pressure flanks (the side of the buttress which is nearly at right angles to the pin shaft): 13 minimum;

d) distance from point to the base of the first fully formed buttress groove at the head end: 12 mm, minimum

Dimensions in millimetres



Key

1 minimum of 13 fully formed buttress flanks

Figure 1 — Standard heel pin

4.6 Metal rod

5 Sampling and preparation

5.1 Number of test specimens

For assessing the heel pin holding properties of a heel material, prepare and test three heels each containing six inserted pins, or, if it is not possible to insert six pins, four heels each containing four pins. When testing heels already attached to shoes, where possible, also prepare three containing six pins or four containing four.

5.2 Preparation

5.2.1 To measure heel pin holding properties of heel materials

Cut from 2 mm thick cellulose insole forepart board three discs per heel of diameter about 45 mm. These take place of a single layer of insole seat board because they are easier to remove after pin insertion.

Use a stand on the heel nailing machine which will insert six pins in two rows of three (or four pins in two rows of two) so that the adjacent pins in a row are 10 mm apart.

Set the machine to insert a standard heel pin and load the stand with six (or four) of the standard heel pins. Position a stack of three fibreboard discs centrally over the heel pin positions of the heel stand with the heel inverted on top.

Adjust the machine to hold that shape of heel securely and operate it to insert the heel pins. If any of the heel pins do not pass through the cellulose board discs, discard the heel and prepare another heel.

Remove the cellulose discs carefully one by one using pincers and a knife. The discs shall be cut to allow easy removal in those cases where they are not soft enough to be pulled over the heads of the heel pins without the pincers pressing on other heel pins. When all three discs are removed the length of pin not inserted (including the head) shall be between 5 mm and 8 mm. If it is outside these limits, reject the heel and prepare a new one with the machine adjusted to produce the desired depth of penetration.

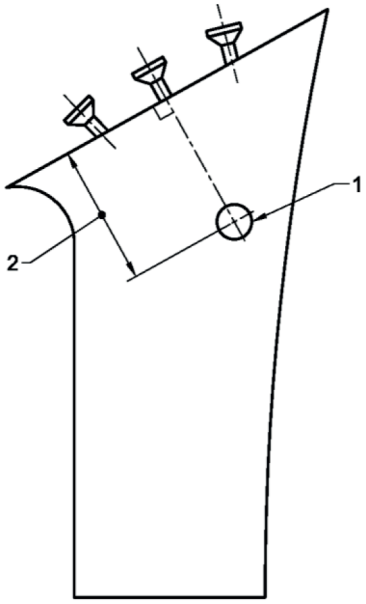
5.2.2 To test a made shoe

Cut away the upper at the seat and waist level with the insole. Cut through the sole and insole forward of the shank, and the sole and lasted margin forward of the heel breast. The seat board is too thick and rigid to be pulled off the heel pins in one piece, but it can be removed gradually by splitting it from the edge and removing it in layers.

NOTE If the heel is not made of wood, the seat board can be wetted if necessary to assist in producing delamination. If washers have been used with any of the heel pins, these can be left on as they do not affect the test.

5.2.3 Attachment to tensile testing machine

For heels prepared in the laboratory and those from shoes, drill through the heel horizontally, from side to side, at the position shown in Figure 2 (which illustrated a six pin heel) so that the hole is large enough to take a 2 mm rod. When the heel design is markedly undercut at the back, it may be necessary to drill the hole between 15 mm and 20 mm from the top of the heel (instead of the 20 mm to 25 mm shown in Figure 2) in order to ensure that the heel material between the hole and the back of the heel is strong enough to enable a test to be carried out. In such cases, record the distance of the hole from the top of the heel. In the case of a four pin heel, drill the hole to lie on the line which is perpendicular to the heel seat and midway between the two pins on one side. If the heel is reinforced with a metal dowel ensure that the drilled hole avoids it, by slight repositioning if necessary.



Key

1 drilled hole to just clear ϕ 2 rod

2 20 mm to 25 mm

Figure 2 — Prepared heel

6 Test method

6.1 Principle

The head of a heel pin is held in one jaw of a tensile testing machine and the heel in the other and a pulling force is applied approximately parallel to the shaft of the pin. Then the maximum force needed to remove the pin is recorded.

6.2 Procedure

6.2.1 Anchor the heel by inserting a metal rod (4.6) through the hole drilled in the heel and linking the ends of the rod symmetrically to one jaw of the tensile testing machine (4.2) with material of sufficient tensile strength that it will not break when the test is carried out.

NOTE In practice this can be achieved by inserting a rigid rod through the hole, attaching flexible linkages to the two ends of the rod, and clamping them to the jaw of the tensile testing machine, or by inserting a length of 2 mm welding rod through the hole, bending the ends down and clamping them to the jaw of the tensile testing machine.

6.2.2 Attach the clamp or slotted hook (4.3) to one heel pin head and attach it via a flexible linkage to the other jaw of the testing machine ensuring that the pulling force is approximately parallel to the shaft of the pin.

6.2.3 Run the machine at a constant rate of traverse of 40 mm/min ± 10 mm/min and record the maximum value of the load applied in pulling the pin out of the heel. Number the test position on the heel and the result so that the two may be linked when examining all the results. Test the other five (or three) pins in that heel, and the other two (or three) heels in the same way.