

British Standard Methods of test for

Footwear and footwear materials

Part 4. Other components

Section 4.20 Force required to pull heel pins out of shoe heels

Méthodes d'essais des chaussures et des matériaux entrant dans leur confection

Partie 4. Autres composants

Section 4.20 Force d'extraction des clous dans les talons de chaussures

Prüfverfahren für Fussbekleidung und Fussbekleidungswerkestoffe

Teil 4. Sonstige Bestandteile

Abschnitt 4.20 Kraft zum Herausziehen von Absatznägeln

NOTE. It is recommended that this Section should be read in conjunction with the information in the General introduction to BS 5131, published separately.

1 Scope

This Section describes a method for measurement of the force required to pull a single heel pin out of a heel. The method can be used to measure the heel pin holding strength of heel materials by using a standard heel pin and method of insertion or it can be used to assess the heel nailing of commercial production.

It 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.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

2 Definition

For the purposes of this British Standard the following definition applies.

heel pin holding strength. The 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.

3 Principle

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

4 Apparatus

4.1 Tensile testing machine, with a range of approximately 0 N to 1500 N and a constant rate of loading of 900 ± 300 N/min.

NOTE. A constant rate of traverse tester may be used if this is of a type where increase of load produces an appreciable movement of the load jaw (e.g. a pendulum tester). Its rate of traverse should be set to give on average the specified rate of loading over the whole range for zero jaw separation. This approximation to constant rate of loading is acceptable because the amount of jaw separation in the test is small before the maximum load is reached.

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

4.3 Commercial heel nailing machine*.

4.4 Standard heel pin*, with the following dimensions (see figure 4.20/1):

- | | |
|---|--------------|
| (a) length: | 18 mm; |
| (b) diameter over the buttress ridges: | 1.9 mm min.; |
| (c) number of complete formed buttress pressure flanks (the side of the buttress which is nearly at right angles to the pin shaft): | 13 min.; |
| (d) distance from point to the base of the first fully formed buttress groove at the head end: | 12 mm min.. |

5 Number and preparation of test specimens

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 the place of a single layer of insole seat board because they are easier to remove after pin insertion.

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

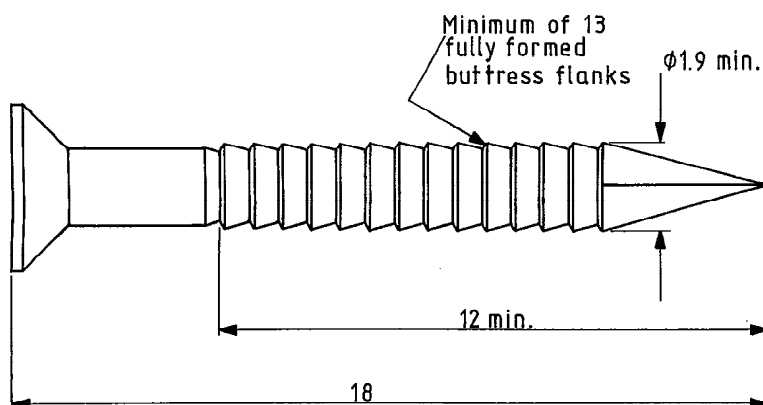
Set the machine to insert a standard heel pin and load the stand with six (or four) of the standard heel pins. Position a stack of three fibreboard discs centrally over the heel pin positions of the heel stand with the heel inverted on top.

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 may be wetted if necessary to assist in producing delamination. If washers have been used with any of the heel pins these may be left on as they do not affect the test.



All dimensions are in millimetres.

Figure 4.20/1. Standard heel pin

*For information on the availability of a heel nailing machine and standard heel pins apply to Enquiries Section, British Standards Institution, enclosing a stamped addressed envelope for reply.