



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Footwear - Test methods for insoles - Heel pin holding strength

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1 Scope

This document describes a method for determining the pin holding strength of footwear insole materials to prevent pins from penetrating the insole.

This document applies to assembled insoles with heels, as well as to insoles of external heels fixed with pins.

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 version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

ISO 5893, Rubber and plastics test equipment - Tensile, flexural and compression types (constant rate of traverse) - Specification

ISO 17709, Footwear - Sampling location, preparation and duration of conditioning of samples and test pieces

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

3 Terms and definitions

The following terms and definitions are applicable to this document.

The addresses of terminology databases maintained by ISO and IEC for standardization are as follows:

3.1 heel pin holding strength Indexing serial number description:

F - applied force.

Figure 1 - Accessories of the tensile testing machine

4.4 Thickness gauge, which shall meet the following requirements:

The thickness gauge shall have a stable platform; its presser foot shall have a fixed weight load to be applied with a pressure of 3.85 N $\pm$ 0.10 N. The presser foot is a circular plane with a diameter of 10.0 mm; its movement direction is perpendicular to the anvil surface. The anvil is a horizontal cylinder with a diameter of 10.0 mm; it protrudes 3 mm from the surface of the platform whose diameter is 50 mm. The axes of the presser foot, platform and protruded anvil shall be the same, in the same direction as the movement of the presser foot. The bottom surface of the presser foot and the surface of the anvil shall be parallel, and the error shall not exceed 0.005 mm. The division of the thickness gauge dial shall be 0.01 mm. The dial shall have a large enough measuring range; the pointer shall be able to close to the dial, to eliminate visual errors as much as possible. The dial reading is accurate to 0.01 mm.

4.6 Rectangular cutter, to take samples of a size of 80 mm x 20 mm. The inner surface

of the cutter is chamfered about 5° outwards, so that the knife will not damage the edge of the sample during sample preparation.

5 Sampling and conditioning

Use a rectangular cutter (4.6) to cut two 80 mm x 20 mm rectangular samples from the shoe insole material. One of the samples is for the dry test (see 6.1), and the other is for the wet test (see 6.2).

When cutting samples from footwear insole or molded insole, sampling shall be carried out in accordance with ISO 17709.

The sample for the dry test (see 6.1) shall be subjected to conditioning for at least 48 h according to the requirements of ISO 18454 before the test; the test shall be carried out in this environment.

The sample that is subjected to the wet test as described in 6.2 do not require conditioning before the test.

6.1.1 Use the thickness gauge (4.4) to measure the thickness of 3 points on the center

line of the sample parallel to the 80 mm side; the distances from one end of the sample are 20 mm, 40 mm and 60 mm, respectively.

6.1.2 Use the drill bit (4.1) whose diameter is 2.0 mm to drill 3 through holes on the

center line of the sample parallel to the 80 mm side; the distances from one end of the sample are 20 mm, 40 mm and 60 mm, respectively.

6.1.3 Put the pin rod of the simulated pin into one hole; the pin cap is on the contact

surface of the sample and the foot. Start the tensile testing machine (4.2); move the clamps at a speed of 100 mm/min $\pm$ 20 mm/min; record the force value continuously until the inner bottom is penetrated by the pin cap. Record the maximum force value;

calibrate it if the weight of any test accessories has an effect on the test force.

6.2.1 According to the method that is described in 6.1.1, measure the thickness of the

sample. Use the drill bit (4.1) whose diameter is 2.0 mm to drill 3 through holes on the center line of the sample parallel to the 80 mm side; the distances from one end of the sample are 20 mm, 40 mm and 60 mm, respectively. Immerse the sample in distilled water at 23 °C $\pm$ 2 °C for 6 h. Then, remove from the water and blot the surface dry.

6.2.2 Immediately carry out the test according to the steps as described in 6.1.3 and

6.1.4.

7 Test results

7.1 Calculate the average value of the maximum force values of the three samples;

express the results in Newtons (N), which are used as the heel pin holding strength of the dry test and the wet test, respectively.

8 Test report

The test report shall include the following contents:

a) number of this document;

b) results of the dry test and wet test of the insole material, which shall be expressed in accordance with 7.1;

c) thickness of the insole material, which shall be expressed in accordance with 7.2;

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