



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

GB/T 3903.12-2021

Footwear - Test methods for outsoles - Tear strength

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1 Scope

This document describes test methods for the determination of tear strength of footwear outsoles by using trousers-shaped samples.

This document applies to footwear outsoles of all materials.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. 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

GB/T 16825.1, Verification of static uniaxial testing machines - Part 1:

Tension/compression testing machines - Verification and calibration of the force-measuring system (GB/T 16825.1-2008, ISO 7500-1:2004, IDT)

GB/T 22049, Footwear - Standard atmospheres for conditioning and testing of footwear and components for footwear (GB/T 22049-2019, ISO 18454:2018, IDT)

GB/T 22050, Footwear - Sampling location preparation and duration of conditioning of samples and test pieces (GB/T 22050-2008, ISO 17709:2004, IDT)

3 Terms and definitions

The following terms and definitions are applicable to this document.

3.1 trouser tear strength Divide the median of the force required to tear the incision on the trousers-shaped sample by the thickness of the sample.

3.2 median The number in the middle of an ordered set of data.

Indexing serial number description:

a - cutting direction.

Figure 2 - Leather outsole trousers-shaped sample

4.2 Cutting knife

Razor blade or sharp knife, which is used for making incisions or cuts on the sample.

Make incisions of 40 mm $\pm$ 5 mm on the sample in the directions that are shown in Figures 1 and 2; the last 1 mm (approximately) of the incision is done with a razor blade or a sharp knife.

4.3.1 The tensile testing machine complies with the requirements of GB/T 16825.1; the

accuracy is level 2; the moving speed of the clamps is 100 mm/min $\pm$ 10 mm/min. The tensile testing machine is equipped with a device, of low inertia, which can automatically record the force value.

4.3.2 The clamps of the tensile testing machine shall be able to clamp the sample when

the tensile force increases, and to apply uniform pressure to the clamping end of the sample. The clamps shall be equipped with a positioning device, so that the sample can be clamped symmetrically and in the same direction as the pulling force.

4.4 Thickness gauge

The thickness gauge shall have a firm base, and its presser foot shall have a constant weight load, which can be applied with a pressure of 10 kPa $\pm$ 3 kPa (see ISO 23529).

The presser foot of the thickness gauge shall be a circular plane whose diameter is 10 mm $\pm$ 0.1 mm. The meter scale is 0.01 mm.

5 Sampling and conditioning

Take at least 3 samples according to GB/T 22050. When the sample size does not meet the sampling requirements, both parties shall agree on whether to use the actual sample length for testing, and record the sample length in the report. Before testing, all samples shall be subjected to conditioning for at least 24 h according to GB/T 22049. Use the punching die

(4.1) to cut out the sample. The sample thickness should preferably be:

- For polymeric and elastic solid core outsoles, the thickness should be 2.0 mm +/- 0.2 mm;
- For semi-foamed and foamed outsoles, the thickness should be 4.0 mm +/- 0.2 mm;
- For leather outsoles, the thickness should be the original outsoles thickness.

Measure the thickness at 3 different points and take the average.

Where:

TS - trouser tear strength, in Newtons per millimeter (N/mm);

F - median of the peak force, in Newtons (N).

The median of the peak force on the curve (see 3.2) is determined by the following appropriate method.

Note: When applying the method described in this document, the tensile force is a time-varying variable during the test.

Method A (a curve with less than 5 peaks):

All peaks are considered when determining the median.

If there is only one peak, the peak is the median.

Method B (a curve with 5 to 20 peaks):

The peaks within the middle 80% of the complete curve are considered when determining the median.

d - the average thickness of the sample, in millimeters (mm).

The test result is the average of the test results of 3 samples.

8 Test report The test report shall include the following contents:

- a) Number of this document;
- b) Sample thickness;
- c) Detailed description of the sample, including style, article number, color and material, etc.;
- d) Test result, which is calculated according to Chapter 7;
- e) Test date;
- f) Any deviation from this test method;
- g) Standard environmental conditions during the test;

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