भारतीय मानक

Indian Standard

IS 8085 (Part 28) : 2024
ISO 19958 : 2004

फुटवियर की परीक्षण पद्धतियाँ
भाग 28 ऊपरी हिस्से की धारण शक्ति — हील्स और ऊपरी हिस्से

Methods of Test for Footwear
Part 28 Top Piece Retention Strength — Heels and Top Pieces

ICS 61.060

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Footwear Sectional Committee, CHD 19

NATIONAL FOREWORD

This Indian Standard (Part 28) which is identical to ISO 19958 : 2004 ‘Footwear — Test methods for heels and top pieces — Top piece retention strength’ issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Footwear Sectional Committee and approval of the Chemical Division Council.

This Indian Standard first published as a part of IS 8085 under the general title ‘Methods of test for footwear’. This part is an adoption of ISO 19958 : 2004 which specifies a test method for measuring the force required to detach the top piece from the underside of the shoe heel. The test is applicable to heels with the top piece already attached which have been removed from complete shoes, to heels alone with the top piece attached and, in some instances, to heels with separate push-in top pieces. All heels, except reinforced slender heels with top pieces attached by steel spigots and built stacked heels, can be tested by this method.

This Indian Standard is published in several parts. The other parts in this series are:

Part 1 Dimensions, fitting, adhesion test, peel test, heat resistance test and ageing test

Part 2 Footwear performance test, stiffness test for shanks, lastometer test for cracking of uppers; and performance test for upper fabrics, coated fabrics, sock lining and other lining materials.

Part 3 Upper sole adhesion

Part 4 Resistance to crack initiation and growth — Belt flex method

Part 5 Longitudinal stiffness of shanks

Part 6 Abrasion resistance of uppers, linings and insocks

Part 7 Deformability of upper

Part 8 Delamination resistance of uppers

Part 9 Tear strength of uppers linings and insocks

Part 10 Heel attachment for whole shoe

Part 11 Attachment strength of straps, trims and accessories

Part 12 Tensile performance of elastic materials

Part 13 Seam strength for uppers, lining and insocks

Part 14 Water vapour permeability and absorption for uppers and lining

Part 15 Washability in a domestic washing machine for whole shoe

Part 16 Flexing durability for whole shoe

Part 17 Abrasion resistance for accessories shoe laces

Part 18 Peel strength before and after repeated closing for accessories touch

Part 19 Shear strength before and after repeated closing for accessories touch and close fasteners

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Indian Standard

METHODS OF TEST FOR FOOTWEAR

PART 28 TOP PIECE RETENTION STRENGTH — HEELS AND TOP PIECES

1 Scope

This European Standard specifies a test method for measuring the force required to detach the top piece from the underside of the shoe heel. The test is applicable to heels with the top piece already attached which have been removed from complete shoes, to heels alone with the top piece attached and, in some instances, to heels with separate push-in top pieces. All heels, except reinforced slender heels with top pieces attached by steel spigots and built stacked heels, can be tested by this method.

2 Normative references

The following referenced document is indispensable for the application 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 - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines (ISO 7500-1:1999).*

3 Terms and definitions

For the purposes of this European Standard, the following term and definition apply.

top piece retention strength
maximum force, expressed in Newton, required to pull off a top piece from the heel

4 Apparatus and materials

4.1 The following apparatus and materials shall be used.

4.2 Tensile testing machine, complying with the requirements of EN ISO 7500-1 class 2, with a range of 0 N to 1000 N and a constant-rate-of-loading of 15 N/s ± 5 N/s. A constant-rate-of-traverse tester, for which increase of force produces an appreciable movement of the load jaw (e.g. a “pendulum” tester”), may be used if the rate of traverse is set to give, on average, the specified rate of force application when a test is carried out. Alternatively, a constant-rate-of-traverse tester for which there is little movement on the load jaw may be used if the top piece is attached to one jaw of the tester via one or more extensible cords which are substantially elastic over the force range of the test and the rate of traverse is adjusted until the specified rate of force application is obtained.

4.3 Drill, with twist drill beats of suitable sizes (see 5.2.1.4 and 5.2.1.5).

4.4 Bolt, of size M 4 or size M 3 for slender heels, and preferably of length 40 mm or more with a small metal ring or loop attached to its head by brazing. If only low heels are being tested, however, the bolt need not be longer than about 20 mm.

4.5 Rod, of diameter 2 mm and appropriate length or one or more strong extensible cords, e.g. nylon shoes laces.

5 Sampling and conditioning

5.1 General

The form of the test piece needs to be varied according to the height of the heels. For medium and high heels the type of test piece shown in Figure 1 is convenient, in which the heel is held by one cord or rod. For heels of less than about 20 mm in height this cord is likely to interfere with the bolt attached to the top piece. In such cases the form of attachment shown in Figure 2 should be used.

5.2 Preparation

5.2.1 Medium and high heels

5.2.1.1 The prepared test piece is illustrated in Figure 1.

5.2.1.2 It is permissible to test heels and top pieces supplied separately, provided the top piece can be attached in the laboratory by essentially the same method as in production. Push-in top pieces shall be inserted fully by pneumatic pressure. Some types of these top pieces are additionally attached by short nails inserted through holes moulded in the top piece. This also may be inserted in the laboratory, by hammering or pneumatic pressure, but the correct nail shall be used. The top piece may be attached by staples using a staple gun provided the staples are the same as those used in production.

The attachment of the top piece may precede or follow the other details of the preparation described in 5.2.1.3, 5.2.1.4 and 5.2.1.5.

5.2.1.3 Cut through the heel stem parallel to the top piece and approximately 30 mm from it, in order to gain access to the cavity and inner side of the top piece or top piece spigot. This may be done with the heel still attached to the shoe or, if preferred, the heel may be detached first by removing the heel attaching pins. For fairly low heels the amount cut off may be reduced to approximately 20 mm provided there is still enough room for the bolt (see 6.2.2). Otherwise the procedure for low heels described in 5.2 should be used. In the case of heels having the “Autoloc” type of top piece attachment which do not have a full height centre cavity in the stem, it is necessary to drill a hole down the centre of the stem from the cut surface to the “Autoloc” cavity or recess on the underside of the heel. The diameter of this hole should be not less than 10 mm.

5.2.1.4 Drill a hole vertically through the centre of the top piece just large enough to accommodate a suitable bolt of the type described in 4.4.

5.2.1.5 Drill the heel stem horizontally from one side to the other approximately 5 mm above the cut surface, as shown in Figure 1, so that the drilled hole, which should be large enough to take the rod or cord described in 4.5, is parallel to the heel breast and passes through the vertical centreline of the top piece.

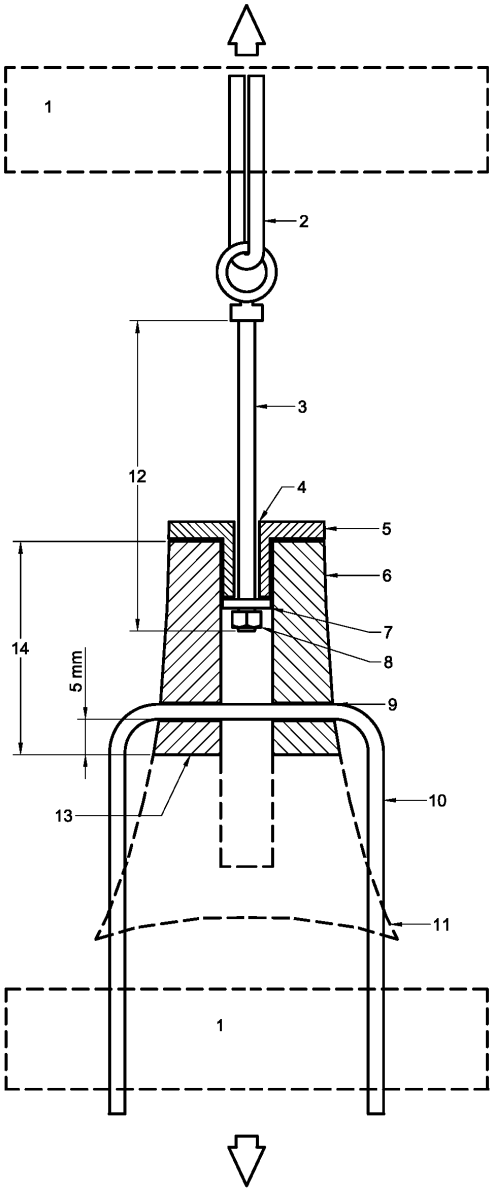
5.2.2 Low heels

5.2.2.1 The prepared test piece is shown in Figure 2. Where the heel is attached to a shoe, remove it by extracting the heel attaching pins.

5.2.2.2 Cut out any rib or ribs across the centre cavity in the heel, taking care not to damage the top piece when doing this.

5.2.2.3 Drill a hole vertically through the centre of the top piece just large enough to accommodate a suitable bolt of the type described in 4.4.

5.2.2.4 Drill two holes horizontally through the heel from one side to the other, large enough to take the cord described in 4.5. They shall be parallel to the heel breast, approximately 6 mm from the heel/top piece interface and approximately 12 mm on each side of the centre of the top piece.



Key

1 Tensile machine jaw
2 Rod to top jaw
3 Bolt
4 Drilled hole in top-piece for bolt
5 Top-piece
6 Heel
7 Washer
8 Nut
9 Drilled hole for rod or cord
10 Rod or cord to bottom jaw
11 Part of heel not required for test
12 At least 40 mm
13 Heel cut along this line
14 Approximately 30 mm

Figure 1 — Testing of high and medium heels. Side view of testing assembly and section through heel

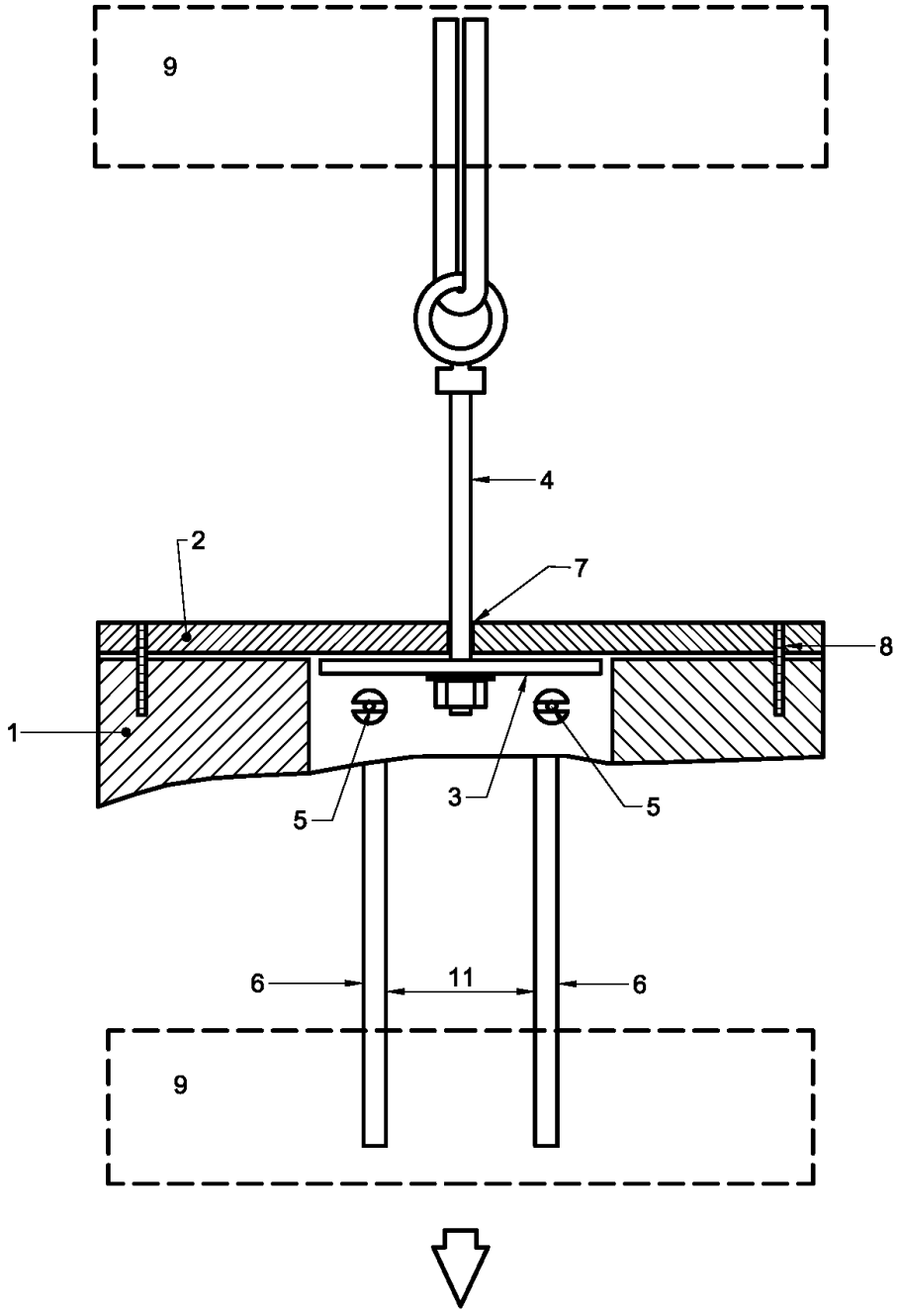
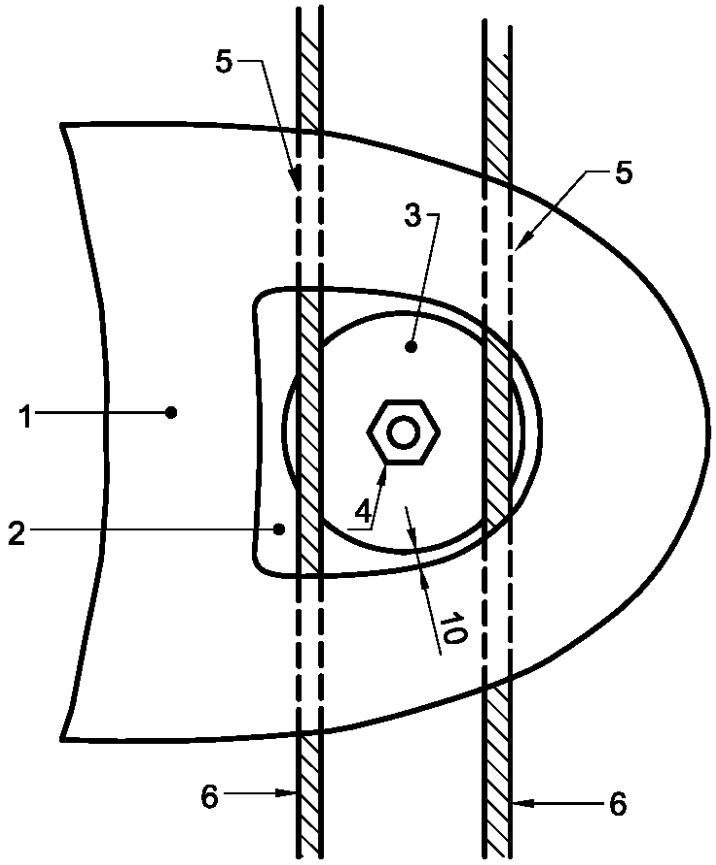


Figure 2a - Side view of test assembly and section through heel and top piece in the heel/toe direction



Key

1 Plastic heel
2 Top piece
3 Washer
4 Bolt and nut
5 Horizontal hole drilled through heel with cord F insert
6 Cord
7 Holes drills in top piece with bolt D insert
8 Grindery for attaching top piece to heal, inserted during shoe or heel manufacture
9 Tensile machine jaw
10 Not more than 2 mm
11 Approximately 24 mm

Figure 2b - Plan view from underneath with cords laid flat

Figure 2 — Testing of low heels

6 Test method

6.1 Principle

The top piece is pulled off by a steadily increasing force which is applied to its centre perpendicular to the top piece/heel interface. The top piece is first to be drilled to receive a bolt which is attached to one jaw of the tensile machine and the heel cut and drilled to attach it to the other jaw. Several heels need to be tested and the results expressed individually as usually it is the lower values, rather than the average, which are the most important.

6.2 Procedure

6.2.1 Where a constant-rate-of-traverse tensile testing machine is being used, carry out a preliminary test using the procedure described in 6.2.2 to 6.2.5 to establish the rate of traverse which is necessary to get a rate of force application of 15 N/s ± 5 N/s. For a constant-rate-of-loading machine simply set into this specified rate.

6.2.2 Pass the bolt fully through the hole in the top piece from the outside and attach to it a suitable washer and nut. In the case of medium and high heels prepare as in Figure 1 screw on the nut only until the end of the bolt just protrudes through it; if screwed on further, the end of the bolt may prevent the insertion of the rod or cord through the horizontal hole. The washer used should be almost as large as the cavity in the heel, the gap between the edge of the washer and the nearest part of the wall of the cavity being no more than 2 mm.

6.2.3 Attach the bolt to the upper jaw of the tensile testing machine. A loop of welding rod treaded through the ring on the bolt with its ends clamped in the jaws of the machine is a suitable way of doing this.

6.2.4 For medium and high heels, insert a rod or cord horizontally through the hole in the heel stem and attach its ends symmetrically in the lower jaw of the machine (if welding rod is used the ends can be bent and clamped in the jaw).

For low heels, insert two similar cords through the two drilled horizontal holes and clamp the four ends symmetrically so that the heel is horizontal and will remain so during the test (cord is recommended in preference to rod for low heels because it is difficult to bend and clamp rod so that the heel is horizontal).

6.2.5 Start the machine and record the highest force reached as the top piece is pulled out of the heel. For many low heels with large top pieces there will be an initial peak force corresponding to detachment of only part of the top piece. Record this force as well as the highest force reached before the top piece is detached completely (in some cases the initial peak may be the highest force).

6.2.6 Repeat the test with other five top piece/heel assemblies by following the same procedure.

7 Expression of results

For each individual top piece/heel assembly, quote the maximum force, in N, required to detach the top piece completely and the initial peak force (if any). Also describe the types and position of the failures corresponding to these recorded forces.

8 Test report

The test report shall include the following information:

a) the results, expressed in accordance with clause 7;

b) a full description of the samples tested, including commercial styles codes, colours, nature, etc.;

c) reference to the method of test;

d) the date of testing.

(*Continued from second cover*)

Part 20 Flex Resistance for uppers and lining

Part 21 Strength of slide fastener pullers

Part 22 Attachment strength of end stops

Part 23 Resistance to repeated opening and closing

Part 24 Lateral Strength for slide fasteners

Part 25 Slip resistance

Part 26 Tensile strength and elongation for uppers

Part 27 Flex resistance of outsoles

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations.Certain conventions and terminologies are, however, not identical to those used in Indian Standards. Attention isparticularly drawn to the following:

a) Wherever the words `International Standard' appear referring to this standard, they should be read as `IndianStandard'; and

b) Comma (,) has been used as a decimal marker in the International Standard, while in Indian Standards, thecurrent practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed belowalong with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
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	IS 1828 (Part 1) : 2022/ ISO 7500-1 : 2018 Metallic materials — Calibration and verification of static uniaxial testing machines: Part 1 Tension/ compression testing machines — Calibration and verification of the force-Measuring system (*fifth revision*)	Identical

In this adopted standard, reference appears to certain International Standards where the standard atmospheric conditions to be observed are stipulated which are not applicable to tropical/subtropical countries. The applicablestandard atmospheric conditions for Indian conditions are (27 ± 2) °C and (65 ± 5) percent, relative humidity andshall be observed while using this standard.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numericalvalues (*second revision*)'

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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