भारतीय मानक

Indian Standard

IS 8085 (Part 15) : 2023
ISO 19954 : 2003

फुटवियर की परीक्षण पद्धतियाँ

भाग 15 पूरे जूता के एक घरेलू वॉशिंग मशीन में धोने की क्षमता

Methods of Test for Footwear

Part 15 Washability in a Domestic Washing Machine for Whole Shoe

ICS 61.060

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May 2023 **Price Group 7**

Footwear Sectional Committee, CHD 19

NATIONAL FOREWORD

This Indian Standard (Part 15) which is identical with ISO 19954 : 2003 ‘Footwear — Test methods for whole shoe — Washability in a domestic washing machine’ 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.

Under the general title ‘Method of test for footwear’, this standard is being published in several other parts. This part is an adoption of ISO 19954 : 2003 which specifies a test method for the evaluation of the behaviour of footwear when subjected to domestic washing. The evaluation is based upon the modification of some characteristics measured before and after washing.

The other parts of this Indian Standard are:

IS No.	*Title*
IS 8085	Method of test for footwear
(Part 1) : 1986	Dimensions, fitting, adhesion test, peel test, heat resistance test and ageing test (*first revision*)
(Part 2) : 1999	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) : 2021	Upper sole adhesion
(Part 4) : 2019	Resistance to crack initiation and growth belt flex method
(Part 5) : 2019	Longitudinal stiffness of shanks
(Part 6) : 2021	Abrasion resistance of uppers, linings and insocks
(Part 7) : 2021	Deformability of Upper
(Part 8) : 2019	Delamination resistance of uppers
(Part 9)	Tear Strength of Uppers Linings and Insocks (*under preparation*)
(Part 10)	Heel attachment for whole shoe (*under preparation*)
(Part 11)	Attachment strength of straps, trims and accessories (*under preparation*)
(Part 12)	Tensile Performance of elastic materials (*under preparation*)
(Part 13)	Seam strength for uppers, lining and insocks (*under preparation*)
(Part 14)	Water vapour permeability and absorption for uppers and lining (*under preparation*)
(Part 16)	Flexing durability for whole shoe (*under preparation*)
(Part 17)	Abrasion resistance for accessories shoe laces (*under preparation*)
(Part 18)	Peel strength before and after repeated closing for accessories Touch and close fasteners (*under preparation*)

(*Continued on third cover*)

Contents

Page

Indian Standard

METHODS OF TEST FOR FOOTWEAR
PART 15 WASHABILITY IN A DOMESTIC WASHING MACHINE FOR WHOLE SHOE

1 Scope

This European Standard specifies a test method for the evaluation of the behaviour of footwear when subjected to domestic washing. The evaluation is based upon the modification of some characteristics measured before and after washing.

This European Standard specifies a method of domestic washing adapted to all types of footwear.

2 Normative references

This European Standard incorporates by dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12222, *Footwear - Standard atmospheres for conditioning and testing of footwear and components for footwear.*

EN ISO 6330, *Textiles - Domestic washing and drying procedures for textile testing (ISO 6330:2000).*

EN ISO 17708, *Footwear - Test methods for whole shoe - Upper sole adhesion (ISO 17708:2003).*

ISO 105-A02, *Textiles - Tests for colour fastness - Part A02: Grey scale for assessing change in colour.*

ISO 105-A03, *Textiles - Tests for colour fastness - Part A03: Grey scale for assessing staining.*

3 Apparatus and material to be used

3.1 Washing machine

A washing machine complying with 3.1.1 to 3.1.4. Other equipment can be used provided that it gives identical results to the machine described in this subclause.

3.1.1 General

The washing machine used should correspond to machine type A1 as described in EN ISO 6330.

3.1.2 Washing conditions

The washing cycle should comply with the following:

- volume of water of 18 l ± 1 l;
- temperature within the range of 30 °C to 35 °C;
- a washing time of 30 min ± 2 min;
- rotation speed of the drum of 5,4 rad/s ± 0,5 rad/s (alternative movement)[1)];
- 4 g/l of detergent specified in 3.5.

3.1.3 Rinsing conditions

The rinsing cycle should comply with the following:

- volume of water of 15 l ± 1 l;
- rinsing time of 4 min ± 1 min.

3.1.4 Wringing/Emptying conditions

3.1.4.1 Initial wringing

This cycle should comply with the following:

- 120 s ± 30 s at a rotation speed of 5,7 rad/s ± 0,5 rad/s.

3.1.4.2 Final wringing

This cycle should comply with the following:

- 6 min ± 1 min at a rotation speed of 49,5 rad/s ± 2,6 rad/s.

3.2 Textile component

It shall be a white, 100% monofibre cotton textile of 125 g/m² ± 5 g/m² cut into rectangles of (50 ± 2) cm x (50 ± 2) cm.

The textile component shall be composed of 10 such rectangles.

The textile component is used in order to simulate normal washing conditions and to minimise abrasion damage of the footwear against the drum.

3.3 Standard grey scale

The grey scales for the evaluation of colour change and colour transfer (see clause 5) shall comply with ISO 105-A02 and ISO 105-A03, respectively.

3.4 Toe spring gauge

The toe spring gauge shall be as shown in Figure 1.

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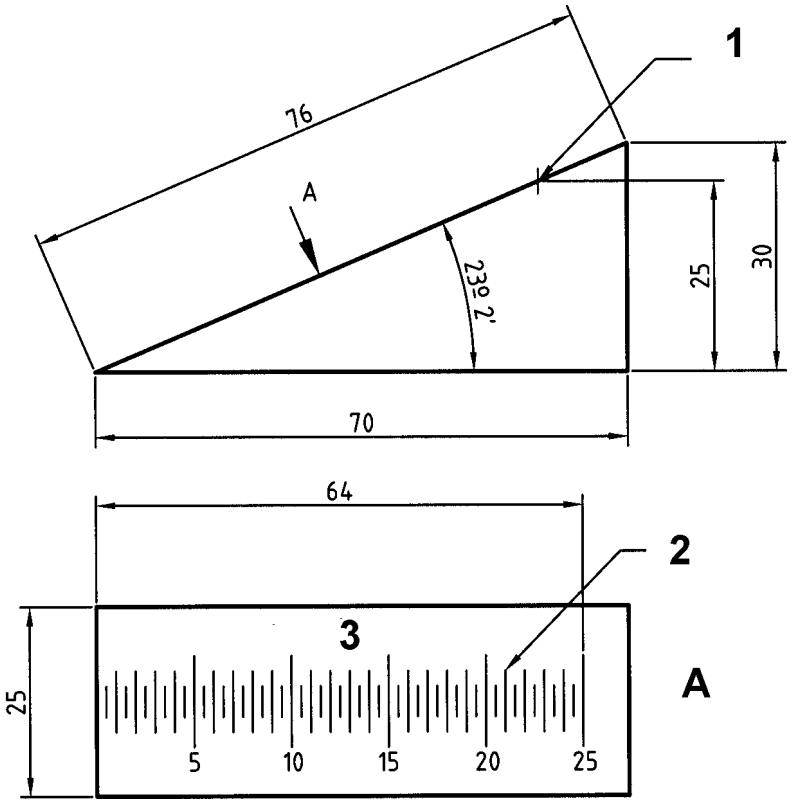
1) 1 rad ≅ 0,16 revolution.

Dimensions in millimetres



Key
1: Scale reads 25mm
2: Engrave as shown
3: Toe spring in mm
A: View on A

Figure 1 — Toe spring gauge

3.5 Detergent

The reference detergent ECE (see EN ISO 6330) shall be used.

NOTE Information on the availability of suitable detergent can be obtained from CEN/TC 309 Secretariat.

3.6 Water

Tap water can be used, under the following conditions:

- temperature of 20 °C ± 4 °C;
- pH of (7 ± 1).

4 Sampling and conditioning

4.1 The sample shall be, at least, two pairs of shoes.

Each complete item of footwear shall be considered as a test piece and at least two test pieces shall be tested.

4.2 The sample shall be conditioned according to EN 12222 for 24 h prior to the test.

5 Test method

5.1 Principle

The test pieces are examined visually. Then one of the test pieces is stored in a standard atmosphere and the other test piece, together with a reference sample of a specified textile, are washed under suitable conditions of temperature, alkalinity and detergent, so that the washing cycle is short. Then they are rinsed and dried.

After complete washing cycle, the test piece is examined in order to determine:

- upper to sole adhesion,
- any colour changes,
- miscellaneous damage, such as tearing, loss of eyelets, etc.,
- any dimensional changes which may have taken place.

5.2 Procedure

5.2.1 Initial assessment

The operator shall ensure that the visual appearance of the test pieces, for the left and right feet of the pairs, is identical.

The test piece shall be characterised by recording all of the detail (colour of material, decoration, washing instruction, etc.).

Place the test piece on a horizontal flat surface and without applying any pressure to any part of said test piece, measure the toe spring as shown in Figure 2, using the toe spring gauge (see 3.4), and record the result, in mm.

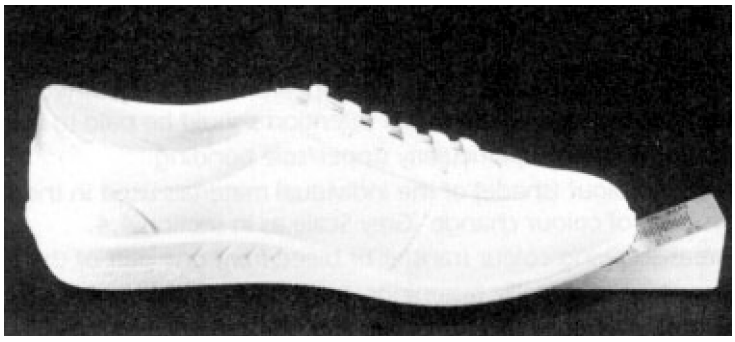


Figure 2 — Measurement of the toe spring

Finally, measure the internal length and width of the test pieces according to 5.2.3.2, and record the results, in mm, as L_1 and B_1, respectively.

5.2.2 Complete washing cycle

5.2.2.1 General

After initial assessment, the test piece corresponding to the right feet is stored in a standard atmosphere (see EN 12222), and the test piece corresponding to the left feet is submitted to the complete washing cycle.

The complete washing cycle consists of three washings and three dryings.

5.2.2.2 Washing

Put, at least, two test pieces into the drum of the washing machine (see 3.1), together with the textile component (see 3.2).

Programme the machine according to clause 3.1.

The complete washing cycle should be:

– washing (see 3.1.2);

– wringing/emptying (see 3.1.4);

– rinsing (see 3.1.3);

– emptying;

– rinsing;

– wringing/emptying;

– rinsing;

– final wringing/emptying.

At the end of the complete washing cycle, note any variation in the colour of the textile component according to ISO 105-A03. If the textile is slightly coloured, it should be replaced for the following test.

5.2.2.3 Drying

Leave the test pieces to dry freely in a standard atmosphere according to EN 12222.

NOTE Ventilation can be used to accelerate drying.

The final drying after a complete washing cycle is particularly important. It is necessary to ensure, by weighing, that the test piece is really dry, so that the difference in mass between two weightings carried out with 1 h of difference should not be greater than 1 %. The dried test piece can then be used for the following test.

5.2.3 Assessment of damages

5.2.3.1 General

Any damage caused by the complete washing cycle can be evaluated by comparing the test piece which has been tested, with the test piece corresponding to the right feet, which remains in the initial condition (see 5.2.2).

5.2.3.2 Miscellaneous damage

Note any damage of the test piece:

– cuts or tears;

– loss of accessories (decoration, eyelets, etc.);

– leaching of colour from components (from one to another).

Place the footwear on a horizontal flat surface and without applying any pressure to any part of the shoe, measure the toe spring as shown in Figure 2, using the toe spring gauge (see 3.4), and report the result, in mm.

5.2.3.3 Dimensional changes

Any deformation of the test piece is considered as a dimensional change. If the deformation is significant, verify the internal length and width of the test piece, or carry out a fitting trial, taking into account that:

- The internal length is the length between the lining in the toe area and the lining in the stiffener area. This dimension is taken along the *X* axis (see EN 13400) and on the insock (or the insole), and the measure is recorded, in mm, as L_2.

- The internal width is the length between the both sides of the lining in the footwear flexion area. This dimension is taken along the *Y* axis (EN 13400) and on the insock (or the insole), and the measure is recorded, in mm, as B_2.

The evolution of the internal length and internal width of the test piece is calculated according to clause 6.

5.2.3.4 Colour changes

Any colour change caused by washing is evaluated with the standard grey scale (see ISO 105-A02) comparing the washed and unwashed test pieces.

The final result is taken as the most severe level of colour change.

5.2.3.5 Upper to sole adhesion

The upper to sole adhesion shall be determined, on the washed and unwashed test pieces, according to EN ISO 17708, and the values obtained shall be recorded, in N/mm, as F_1 (unwashed test piece) and F_2 (washed test piece).

6 Expression of results

6.1 Calculate the change, R_1, in the internal length of each shoe tested, in mm, using the formula:

$$R_1 = L_1 - L_2$$

where

L_1 is the initial internal length of the test piece, in mm (see 5.2.1),

L_2 is the final internal length of the test piece, in mm (see 5.2.3.3).

6.2 Calculate the change, R_2, of the internal width of each shoe tested, in mm, using the formula:

$$R_2 = B_1 - B_2$$

where

B_1 is the initial internal width of the test piece, in mm (see 5.2.1),

B_2 is the final internal width of the test piece, in mm (see 5.2.3.3).

7 Test report

The test report shall include the following information:

a) reference to this standard, EN ISO 19954;

b) full description of the sample tested, including commercial styles, code, colour, nature, etc.;

c) damages observed:

- general damage, according to 5.2.3.1;
- dimensional change, according to 5.2.3.3. If necessary, quote R_1 and R_2 (see clause 6);
- any colour change, according to 5.2.3.4;

d) toe spring value before (see 5.2.1) and after (see 5.2.3.2) washing;

e) values for upper to sole adhesion, before (F_1) and after (F_2) washing, according to 5.2.3.5;

f) note, if necessary, any relevant remarks pertaining to the test (colour changes of the textile, for example);

g) any deviation from this test method and any incident which could affect the result;

h) date of testing.

Annex ZZ
(normative)

Corresponding International and European Standards for which equivalents are not given in the text

At the time of publication of this International Standard, the editions of the following documents were valid. Members of ISO and IEC maintain registers of currently valid International Standards.

EN 12222 ISO 18454:2001, *Footwear — Standard atmospheres for conditioning and testing of footwear and components for footwear*

EN 13400 ISO 17709:—[1)], *Footwear — Sampling location, preparation and duration of conditioning of samples and test pieces*

1) To be published.

Bibliography

EN 13400, *Footwear - Sampling location, preparation and duration of conditioning of samples and test pieces.*

(*Continued from second cover*)

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 is particularly drawn to the following:

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

b) Comma (,) has been used as a decimal marker in the International Standard, while in Indian Standards, the current 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 below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
EN ISO 6330 Textiles — Domestic washing and drying procedures for textile testing	IS 15370 : 2020 Textiles — Domestic washing and drying procedures for textiles testing (*first revision*)	Identical with ISO 6330 : 2012
ISO 105-A02: 1993 Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour	IS/ISO 105-A02 : 1993 Textiles — tests for colour fastness: Part A02 Grey scale for assessing change in colour	Identical
ISO 105-A03 : 2019 Textiles tests for colour fastness — Part A03: Grey scale for assessing staining	IS/ISO 105-A03 : 2019 Textiles tests for colour fastness: Part A03 Grey scale for assessing staining (*first revision*)	Identical

The technical committee has reviewed the provisions of the following International Standards referred in this standard and has decided that they are acceptable for use in conjugation with this standard:

International Standard	*Title*
EN 12222	Footwear — Standard atmospheres for conditioning and testing of footwear and components for footwear
EN ISO 17708	Footwear — Test methods for whole shoe — Upper sole adhesion

Conditioning and test atmospheres stipulated in this standard may not be applicable to tropical/ subtropical countries like India. The applicable Standard Atmospheric Conditions (SAC) for Indian Conditions are (27 ± 2)º C and (65 ± 5) percent relative humidity and may 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 numerical values (*second revision*)'.

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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.

This Indian Standard has been developed from Doc No.: CHD 19 (22013).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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