भारतीय मानक

Indian Standard

IS 17043 (Part 1) : 2024

जूते — विशिष्टि

भाग 1 सेवाओं के लिए जूते

(पहला पुनरीक्षण)

Shoes — Specification

Part 1 Shoes for Services

(First Revision)

ICS 13.340.50; 61.060

भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

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Footwear Sectional Committee, CHD 19

FOREWORD

This Indian Standard (Part 1) was adopted by the Bureau of Indian Standards, after the draft finalized by the Footwear Sectional Committee had been approved by the Chemical Division Council.

This standard was originally published in 2018 and prescribed constructional and performance requirements of derby shoes which are generally used by armed forces/police forces for daily wear and for marching purposes. Realizing the need of standard on different types of casual shoes in the country, the Footwear Sectional Committee decided to revise the existing standard IS 17043 : 2018. The standard has been revised keeping in line with the recent technological developments that have taken place in the field and is published in following two parts, based on the uses of shoes:

Part 1 Shoes for services
Part 2 Shoes for general purpose

The purpose of this division was to have separate specifications for shoes used in different contexts, ensuring that each type is well-defined and catered to its specific requirements.

This standard that is (Part 1) covers basic and additional (optional) requirements, methods of sampling, and tests for shoes for services.

The shoes primarily used for general purposes are covered under a separate standard IS 17043 (Part 2).

The list of Committee members and experts who have actively contributed and participated in the development of this standard is given in Annex D.

The composition of Committee responsible for formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SHOES — SPECIFICATION

PART 1 SHOES FOR SERVICES

1 SCOPE

This standard prescribes basic and additional (optional) requirements, methods of sampling, and tests for shoes for services.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreement based on this Indian Standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 2050, **3** of IS 15298 (Part 4) and the following shall apply:

3.1 Lot — A collection of footwear in a consignment belonging to the same size and pattern or batch of manufacture. In case the batch size is small, footwear of the same size and pattern manufactured during a period, not exceeding a fortnight, may be grouped together to form a lot (also *see* **6.1.3**).

3.2 Defect — A failure or fault such that the product does not satisfy specified physical or chemical requirement, or performance characteristics. It also includes any noticeable irregularity in material, workmanship, or damage due to careless and inadequate packing.

3.3 Defective Footwear — Footwear which has one or more defects with respect to the quality characteristics under consideration.

3.4 Acceptable Quality Level (AQL) — The maximum percentage of defective product in a lot, which for the purpose of sampling of footwear, can be considered as satisfactory process average for a given characteristic.

NOTE — For every sampling plan there is an associated AQL value and this value is given as percent defective items in a lot which, under the plan, will be accepted by the purchaser.

4 PHYSICAL REQUIREMENTS

4.1 General

The shoes shall conform to the physical requirements given in Table 1.

Table 1 Physical Requirements for Shoes

(*Clause* 4.1 *and* 6.3.3)

Sl No.	Requirement		Sub-Clause	Test on Finished Footwear/Material
(1)	(2)		(3)	(4)
i)	Design	Size	**4.3.1**	X
		Weight	**4.3.2**	X
		Height of upper	**4.4**	X
ii)	Whole footwear	Ergonomic feature	**4.5.2**	X
		Bond strength Upper - outsole bond strength Interlayer bond strength	**4.5.3** **4.5.3.1** **4.5.3.2**	 X X
		Slip resistance	**4.5.4**	X
		Electrical properties Antistatic footwear	**4.5.5** **4.5.5.1**	 X
		Heat insulation of sole complex	**4.5.6**	X
		Cold insulation of sole complex	**4.5.7**	X
		Energy absorption of seat region	**4.5.8**	X

Table 1 (*Concluded*)

Sl No.	Requirement		Sub-Clause	Test on Finished Footwear/Material
(1)	(2)		(3)	(4)
iii)	Upper	Material	**4.6.1**	I
		Thickness	**4.6.1**	X
		Tear strength	**4.6.2**	X
		Water vapour permeability and coefficient	**4.6.3**	X
		Water penetration and water absorption	**4.6.4**	O
iv)	Lining material	Material	**4.7.1**	I
		Thickness	**4.7.1**	X
		Tear strength	**4.7.2**	X
		Abrasion resistance	**4.7.3**	X
		Water vapour permeability and coefficient	**4.7.4**	X
v)	Insole	Material	**4.8.1**	I
		Thickness	**4.8.1**	O
		Abrasion resistance	**4.8.2**	O
		Water absorption and desorption	**4.8.3**	O
vi)	Insocks	Material	**4.9.1**	I
		Thickness	**4.9**	X
		Water absorption and desorption	**4.9.2**	X
		Abrasion resistance	**4.9.3**	X
vii)	Toe puff and counter stiffener	Material and thickness	**4.10**	O
viii)	Tongue	Material	**4.11.1**	I
		Thickness	**4.11.1**	X
		Tear strength	**4.11.2**	X
ix)	Closing thread	Breaking load	**4.12**	O
x)	Outsole	Material	**4.13.1**	I
		Thickness	**4.13.2**	X
		Moulded density	**4.13.3**	X
		Hardness	**4.13.4**	X
		Ageing test	**4.13.5**	X
		Tear strength	**4.13.6**	O
		Abrasion resistance	**4.13.7**	X
		Flexing resistance	**4.13.8**	X
xi)	Eyelet	Material	**4.14**	I
		Colour peeling test	**4.14**	X
		Eyelet pull out test	**4.14**	X
xii)	Laces	Material	**4.15.1**	I
		Breaking load and tag retention	**4.15.2**	X

NOTE — Whenever possible, test pieces shall be taken from finished footwear.

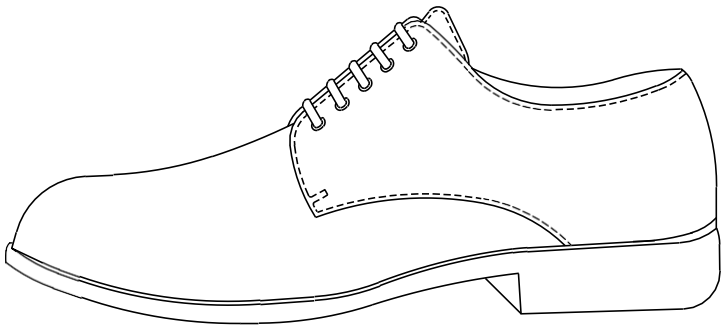
X	Tests shall be carried out on finished footwear.
O	If it is not possible to obtain large enough test piece from finished footwear, then a sample of the material from which the footwear component has been manufactured may be used and this should be noted in the test report. Manufacturer/supplier shall provide a certificate stating that the material sample provided by them has the same composition and has been prepared under similar condition which has been used for footwear.
I	Identification by visual and tactile examination.

4.2 Design

The design of the shoes shall be derby, oxford or brogue type and conform to design A (low shoe) of IS 15298 (Part 4) (*see* Fig. 1 – designs of shoes for services).

BROGUE

OXFORD



DERBY

FIG. 1 ILLUSTRATIVE DESIGNS OF SHOES FOR SERVICES SUCH AS DERBY, OXFORD AND BROGUE SHOES

4.3 Size and Weight

4.3.1 *Size*

Sizes shall be in the range of 4 to 12 (English system with G/H fitting) conforming to the dimensions given in IS 1638.

4.3.2 *Weight*

The maximum weight for a pair of shoes shall be as given in Table 2.

Table 2 Maximum Weight of Shoes

(*Clause* 4.3.2)

Sl No.	Size Category	Weight/P Air (in g), *Max*
(1)	(2)	(3)
i)	Small (sizes 4 to 6)	775
ii)	Medium (sizes 7 to 9)	850
iii)	Large (sizes 10 to 12)	925

4.4 Height of Upper

The height of the upper, when measured in accordance with **6.2** of IS 15298 (Part 1), shall be as given in Table 3.

Table 3 Height of the Upper

(*Clause* 4.4)

Sl No.	Shoe Size	Height, in mm
(1)	(2)	(3)
i)	4	< 105
ii)	5 to 6	< 109
iii)	7 to 8	< 113
iv)	9 to 10	< 117
v)	11 to 12	< 121

4.5 Properties of Whole Footwear

4.5.1 *Construction*

The upper shall be made of chrome tanned finished grain leather and lining shall be made of lining leather to absorb perspiration. The shoes are manufactured with direct moulded cleated PU-rubber soles having anti slip design. These shoes shall be made with strobel construction method.

4.5.2 *Ergonomic Feature*

The shoes shall be deemed to satisfy the ergonomic requirements if the questionnaire prescribed in **5.1** of IS 15298 (Part 1), is meeting with positive response for all criteria.

4.5.3 *Bond Strength*

The direct moulded shoes shall be subjected to adhesion tests. The testing shall be done at least 24 hours after manufacture, after allowing the shoes to cool down to room temperature.

4.5.3.1 *Upper-outsole bond strength*

When the shoes are tested according to method given in **5.2** of IS 15298 (Part 1), the bond strength shall not be less than 4.0 N/mm, unless there is tearing of the sole, in which case the bond strength shall not be less than 3.0 N/mm.

4.5.3.2 *Interlayer bond strength*

The bond between the midsole and the outer sole shall not be less than 4.0 N/mm, unless there is tearing of the sole, in which case the bond strength shall not be less than 3.0 N/mm, when tested according to method given in **5.2** of IS 15298 (Part 1).

4.5.4 *Slip Resistance*

When tested in accordance with **5.11** of IS 15298 (Part 1), the boots shall conform to **5.3.4.2**, **5.3.4.3** or **5.3.4.4** of IS 15298 (Part 4).

4.5.5 *Electrical Properties*

4.5.5.1 *Antistatic footwear*

When tested in accordance with **5.10** of IS 15298 (Part 1), after conditioning:

a) In a dry atmosphere, the electrical resistance shall be greater than 100 kΩ and less than or equal to 1 000 MΩ; and
b) In a wet atmosphere, the electrical resistance shall be greater than 100 kΩ and less than or equal to 1 000 MΩ.

NOTE — Electrical resistance does not mean shock proof. Boots with electrical resistance are capable of reducing the amount of current reaching human body in case of accidental contact with high voltage source. The resistance performance may be reduced over time due to wear and tear.

4.5.6 *Heat Insulation of Sole Complex*

When tested in accordance with **5.12** of IS 15298 (Part 1), the shoes shall conform to the requirements prescribed in **6.2.3.1** of IS 15298 (Part 4).

4.5.7 *Cold Insulation of Sole Complex*

When tested in accordance with **5.13** of IS 15298 (Part 1), the shoes shall conform to the requirements prescribed in **6.2.3.2** of IS 15298 (Part 4).

4.5.8 *Energy Absorption of Seat Region*

When tested in accordance with **5.14** of IS 15298 (Part 1), the energy absorption of the seat region shall not be less than 20 J.

4.6 Upper

4.6.1 *Material*

The upper shall be made of finished grain leather of bovine origin with minimum thickness of 1.2 mm.

In addition to the requirements of upper leather specified in this standard, the upper leather shall also meet the requirements prescribed in IS 5677. If, for

a particular characteristic, the requirement prescribed in IS 5677 differs from that prescribed in this standard, the requirement prescribed in this standard shall apply.

4.6.2 *Tear Strength*

When tested in accordance with **6.3** of IS 15298 (Part 1), the leather upper shall meet the requirement for leather given in **5.4.3** of IS 15298 (Part 4).

4.6.3 *Water Vapour Permeability and Coefficient*

When tested in accordance with **6.6** and **6.8** of IS 15298 (Part 1), the water vapour permeability shall not be less than 0.8 mg/(cm^2.h) and the water vapour coefficient shall not be less than 15 mg/cm^2.

4.6.4 *Water Penetration and Water Absorption*

When tested in accordance with **6.13** of IS 15298 (Part 1), the water penetration and absorption requirements of the footwear shall conform to **6.3** of IS 15298 (Part 4).

4.7 Lining Material

4.7.1 *Material*

The lining for all parts except vamp shall be made of combination tanned lining leather conforming to type 1 of IS 3840, with minimum thickness of 0.7 mm. If, for a particular characteristic, the requirement prescribed in IS 3840 differs from that prescribed in this standard, the requirement prescribed in this standard shall apply. Vamp lining shall be made of textile (non-woven).

4.7.2 *Tear Strength*

When the lining is tested in accordance with **6.3** of IS 15298 (Part 1), it shall satisfy the requirements prescribed for leather and textile in **5.5.1** of IS 15298 (Part 4).

4.7.3 *Abrasion Resistance*

When tested in accordance with **6.12** of IS 15298 (Part 1), the lining shall not develop any holes before 25 600 cycles in dry condition and 12 800 cycles in wet condition.

4.7.4 *Water Vapour Permeability and Coefficient*

When tested in accordance with **6.6** of IS 15298 (Part 1), the water vapour permeability shall not be less than 2.0 mg/(cm^2h).

When tested in accordance with **6.8** of IS 15298 (Part 1), the water vapour coefficient shall not be less than 20 mg/cm^2.

4.8 Insole

4.8.1 *Material*

The insole shall be made of fabric/cloth (woven or non-woven) of minimum thickness 2.0 mm for Strobel construction.

4.8.2 *Abrasion Resistance*

When insoles are tested in accordance with **7.3** of IS 15298 (Part 1), the abrasion damage shall not be more severe than that illustrated by the reference test pieces for the same family of materials before 400 cycles [*see* **7.3.6** of IS 15298 (Part 1)].

4.8.3 *Water Absorption and Desorption*

When tested in accordance with **7.2** of IS 15298 (Part 1), the water absorption shall be not less than 70 mg/cm^2 and the water desorption shall be not less than 80 percent of the water absorbed.

4.9 Insocks

One pair of detachable in - socks having minimum thickness of 3.0 mm at toe and 5.0 mm at heel with arch support shall be provided with each pair of boots.

4.9.1 *Material*

Insocks shall be made out of rubber/polymer/elastomer compound with drill/twill/suitable textile as top covering.

4.9.2 *Water Absorption and Desorption*

When tested in accordance with **7.2** of IS 15298 (Part 1), the water absorption shall be not less than 70 mg/cm^2 and the water desorption shall be not less than 80 percent of the water absorbed.

4.9.3 *Abrasion Resistance*

When insocks are tested in accordance with **6.12** of IS 15298 (Part 1), the wearing surface shall not develop any holes before the following number of cycles has been performed:

a) 25 600 cycles when dry; and

b) 12 800 cycles when wet.

4.10 Toe Puff and Counter Stiffener

The toe puff and counter stiffener shall be made of thermoplastic material with minimum thickness of 1 mm and 1.4 mm, respectively.

4.11 Tongue

4.11.1 *Material*

The tongue shall be made of finished grain leather of bovine origin with minimum thickness of 1.2 mm.

4.11.2 *Tear Strength*

When determined in accordance with **6.3** of IS 15298 (Part 1), the tear strength of the tongue shall not be less than 36 N.

4.12 Closing Thread

The sewing thread used for upper closing shall be 3 ply nylon with minimum breaking load of 35 N when tested according to the method prescribed in IS 4910 (Part 3).

4.13 Outsole

4.13.1 *Material*

The outsole shall be made of PU midsole and rubber outsole. The sole fixation process for midsole shall be direct moulding process, and the outsole shall be direct vulcanized rubber.

4.13.2 *Thickness*

When tested as per method given in **8.1** of IS 15298 (Part 1), the thickness (d_1) shall not be less than 4 mm and the cleat height (d_2) shall not be less than 2.5 mm. The outsole shall satisfy the requirement for energy absorption test as prescribed in **4.5.8**.

4.13.3 *Moulded Density*

The density of the direct moulded PU midsole shall be 0.40 g/cm^3 to 0.50 g/cm^3 when measured as per method given in Annex A of IS 6664; and the rubber outsole density shall be maximum 1.2 g/cm^3, when measured as per Method A of IS 3400 (Part 9).

4.13.4 *Hardness*

The hardness of midsole shall be 45 ± 5 (Shore A) and outsole shall be 65 ± 5 IRHD, when tested in accordance to the methods described in IS 13360 (Part 5/Sec 11) and IS 3400 (Part 2), respectively.

4.13.5 *Ageing Test*

The change in initial hardness of rubber sole shall be in the range of + 5 and - 2 IRHD [tested according to IS 3400 (Part 2)] after ageing test at 100 ºC ± 1 ºC for 24 hours in accordance with IS 3400 (Part 4). On completion of test, the rubber sole shall not develop any sign of tackiness or brittleness.

4.13.6 *Tear Strength*

When tested in accordance with **8.2** of IS 15298 (Part 1), the tear strength shall not be less than 5 kN/m for midsole and 8 kN/m for the outsole.

4.13.7 *Abrasion Resistance*

When outsoles are tested in accordance with **8.3** of IS 15298 (Part 1), the relative volume loss shall not be greater than 150 mm^3.

4.13.8 *Flexing Resistance*

When soles are tested in accordance with **8.4** of IS 15298 (Part 1), the cut growth shall not be greater than 4 mm before 30 000 flex cycles.

Spontaneous cracks are accepted in the following circumstances:

a) Only the centre of the tread area shall be assessed for cracking, that is, cracks under the toecap zone shall be ignored;

b) Superficial cracks up to 0.5 mm deep shall be ignored; and

c) Soles shall be deemed to be satisfactory if cracks are not deeper than 1.5 mm, not longer than 4 mm and not more than five in number.

4.14 Eyelet

Shoes shall have 4 male female type eyelets. The eyelets are recommended to be made of materials specified in **4** of IS 5041. The minimum force required to pull out the eyelets shall be 250 N, when tested as per the method given in Annex B.

The eyelet and lace assembly shall also be tested as per the method given in Annex C. After 5 000 cycles, there shall not be any change in colour of the eyelet.

4.15 Laces

4.15.1 *Material*

The laces shall be round shaped nylon with minimum length of 80 cm.

4.15.2 *Breaking Load and Tag Retention*

The minimum breaking load of the laces shall be 400 N when tested as per the method given in IS 1969 (Part 1) or IS 1969 (Part 2). The minimum tag retention load shall be 140 N when tested as per the method given in Annex H of IS 15844.

5 CHEMICAL REQUIREMENTS

All the components of shoes for services shall comply with the Table 1 of IS 17011 for critical substances Category I and Category II as specified under **3.6** of IS 17011.

6 SAMPLING

6.1 Scale of Sampling

6.1.1 Samples shall be selected and examined from each lot for ascertaining the conformity of the footwear to the requirements in this standard.

6.1.2 For the purpose of formation of lots, footwear shall be considered to be different, if they differ in any of the ways enumerated below:

a) Method of preparation;

b) Type and material of components; and

c) Size, shape and design.

6.1.3 The number of footwear pairs to be selected from any lot shall depend upon the size of the lot and shall be in accordance with col (2) and (3) of Table 4. Whenever the lot size is more than 20 000 pairs, the quantity above 20 000 pairs shall be treated as another lot and samples shall be drawn as per col (3) of Table 4 corresponding to the lot size, and so on.

Table 4 Scale of Sampling and Permissible Number of Defectives for Tests on Whole Footwear

(*Clause* 6.1.3, 6.2.4, 6.3.1.3, 6.3.1.4, 6.3.2, 6.3.3.1)

Sl No.	No. of Footwear Pairs in the Lot	Sample Size	Permissible No. of Defective Pairs for Major Defects	Permissible No. of Defective Pairs for Minor Defects	Samples Size for Physical and Destructive Tests
	(N)	(n)			(m)
(1)	(2)	(3)	(4)	(5)	(6)
i)	Up to 50	8	0	0	3
ii)	51 to 90	13	0	1	3
iii)	91 to 150	20	0	1	3
iv)	151 to 280	32	1	2	5
v)	281 to 500	50	1	3	5
vi)	501 to 1 200	80	2	5	5
vii)	1 201 to 3 200	125	3	7	8
viii)	3 201 to 10 000	200	5	10	8
ix)	10 001 to 20 000	315	7	14	10

6.2 Methods of Selecting Footwear

6.2.1 Footwear to be selected from the lot shall be chosen at random. In order to ensure the randomness of selection a random number table may be used. For guidance to the use of random number table, IS 4905 may be referred.

6.2.2 In the absence of a random number table, the footwear pairs may be selected from the lot in the following manner: Starting from any footwear pair in the lot, the pairs shall be counted as 1, 2, 3, etc, up to r and so on, in one order. Every r^{th} pair thus counted shall be withdrawn to constitute the sample where r is the integral part of N/n (N and n being the lot size and sample size respectively). This procedure may be stopped as soon as the required number of pairs is obtained.

6.2.3 When the footwear pairs in the lot are packed in a number of cases, a suitable number of cases (not less than 30 percent of the total in the lot) shall be first chosen at random. From each of the cases so chosen, an approximately equal number of pairs shall be picked up from its different parts so as to obtain the required number of pairs.

6.2.4 For example, if a lot consists of 1 200 pairs of footwear packed in 50 cases, each containing 24 pairs, not less than 15 cases shall be chosen. If it is decided to open 20 cases, then 4 pairs shall be picked up from different parts of each of the 20 cases, so as to give a total of 80 pairs as specified against the lot of 1 200 in Table 4.

6.3 Number of Tests and Criteria for Conformity

6.3.1 *Visual and Tactile Examination*

The lot shall be first subjected to detailed visual and tactile examination. The defects usually observed on such examination have been broadly divided into two classes, namely, major defects and minor defects. The list of major and minor defects is given below. It is not exhaustive but covers those which are commonly met with during inspection.

6.3.1.1 Major defects commonly observed during visual inspection of finished footwear:

a) Difference in shape, design and colour;
b) Incorrect size/wrong size packing/odd pairing;
c) Distortion of shape;
d) Faulty joining and adhesion of sole, insole and upper;
e) Insole cut short;
f) Under gauge or over gauge components;
g) Excessive pitting or air pocket or bulging of the sole or any other component;
h) Missing or defective eyelets;
j) Crooked imitation stitches and broken stitches; and
k) Substandard lace.

6.3.1.2 Minor defects commonly observed during visual inspection of finished footwear:

a) Stains and dirt in lining and insole/insocks;
b) Stiffeners not centrally placed;
c) Slight variation in positioning of eyelets;
d) Illegible marking on the insole/insocks; and
e) Slight variation in height of quarter and leg.

6.3.1.3 *Inspection for major defects*

The sample size for this examination is given in col (3) of Table 4. All the selected footwear pairs shall be examined for major defects. Defective footwear under this clause shall be one which contains one or more of major defects and it may or may not show minor defects. A pair is termed defective if one or both of the constituent footwear are defective. The number of defective footwear pairs shall not exceed the permissible number given in co1 (4) of Table 4 if the lot is to be accepted.

6.3.1.4 *Inspection for minor defects*

The lot which passes the test under **6.3.1.3** shall be subjected to scrutiny for minor defects. The sample size is the same as in **6.3.1.3**. These sample pairs may be drawn from among those found satisfactory under **6.3.1.3** along with the required number of fresh pairs to give the prescribed sample size. Under this clause defective footwear may contain one or more of minor defects but shall not show any major defect. A pair is termed defective if one or both of the constituent footwear are defective. The number of defective pairs found on this examination shall not exceed the permissible number given in col (5) of Table 4.

6.3.1.5 The lot shall be declared to conform to the requirements for visual and tactile characteristics if **6.3.1.3** and **6.3.1.4** are satisfied. If however, the number of defective pairs exceeds the permissible number, the lot shall be deemed as not conforming to the requirements for these characteristics.

6.3.1.6 In case of those lots which have been found unsatisfactory for visual and tactile characteristics, all footwear pairs in the lot may be inspected and defective ones replaced.

6.3.2 *Dimensional Characteristics*

The lot which has been found satisfactory as in **6.3.1** shall next be tested for dimensional characteristics (**4.2** to **4.4**) without opening up of the footwear. The sample size for this examination is given in col (3) of Table 4. These sample pairs may be drawn from among those found satisfactory under **6.3.1.4** along with the required number of fresh pairs to give the prescribed sample size. If the number of pairs failing to satisfy the requirements for these characteristics is less than or equal to the corresponding number given in col (4) of Table 4, the lot shall be declared to have met the requirements for these characteristics, otherwise not.

6.3.3 *Physical and Destructive Tests*

6.3.3.1 *Tests for physical requirements*

The lot found satisfactory for dimensional characteristics (*see* **6.3.2**) shall be next tested for physical characteristics given in Table 1. For this purpose the pairs shall be selected at random from the samples which have been tested and found satisfactory for **6.3.2**. The number of pairs to be selected is prescribed in col (4) of Table 4. These pairs shall be opened up and subjected to required physical tests. The lot shall be declared as satisfactory with respect to these characteristics if all the sample pairs pass the prescribed tests.

6.3.3.2 *Tests for chemical requirements*

The lot which has been found satisfactory as per **6.3.3.1** shall be finally tested for chemical properties of the components by opening up of the footwear. For this purpose, two pairs shall be drawn at random from the samples already tested and found satisfactory for **6.3.2**. These two pairs shall then be opened up and tested for chemical requirements of the components as specified in **5**. For chemical analysis, the test samples may be prepared by mixing the cuttings from both the units in a pair. The lot shall be declared to have satisfied the requirements for these characteristics if both the sample pairs are found satisfactory.

6.3.3.3 Sometimes it is not possible to carry out tests by taking component from the finished footwear. In those cases, the component sample has to be collected from the manufacturer/supplier. Table 1 gives a list of requirements to be tested and on which part the tests are to be carried out.

6.3.3.4 For tests to be carried out on material sample (designated by O in Table 1), following sampling plan is to be followed:

a) Insole material: 3 pieces of minimum size 15 cm × 15 cm;

b) Closing thread (5 m);

c) Outsole material: 2 pieces slab of minimum size 15 cm × 15 cm of thickness between 1.8 mm to 2.8 mm, but preferably 2.0 mm ± 0.2 mm; and

d) Midsole material: 2 pieces slab of minimum size 10 cm × 10 cm of thickness between 1.8 mm to 2.8 mm, but preferably 2.0 mm ± 0.2 mm.

6.4 The lot shall be deemed as conforming to the standard if it satisfies the requirements of the visual, tactile, dimensional, physical and chemical characteristics as given in **6.3**.

7 MARKING

7.1 Each boot shall be permanently marked with the following:

a) Size;

b) Manufacturer's name and brand;

c) Year and month of manufacture;

d) Shelf life (1 year from month of manufacture);

e) Number and year of the standard, based upon which the boots are produced; and

f) Any other statutory marking.

7.2 BIS Certification Marking

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations made thereunder. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7.3 All markings shall be made inside of tongue or at top outer face of the boot so that least damage is done during working.

8 INFORMATION TO BE SUPPLIED

Each pair of boot shall be supplied with the following information in Hindi and English:

a) Name and full address of manufacturer;

b) Details of customer care service provider;

c) Instruction for storage and maintenance;

d) Drying procedure for wet boots and proper cleaning of boots;

e) Time period for obsolescence;

f) Wherever applicable, declaration to be made stating footwear is not for use in fire hazard/explosion prone areas and in hot contact areas; and

g) The footwear is not a GREEN footwear and not bio-degradable.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
IS 1638 : 1969	Specification for sizes and fitting of footwear (*first revsision*)
IS 1969	Textiles — Tensile properties of fabrics:
(Part 1) : 2018/ ISO 13934-1 : 2013	Determination of maximum force and elongation at maximum force using the strip method (*fourth revision*)
(Part 2) : 2018/ ISO 13934-2 : 2014	Determination of maximum force using the grab method (*fourth revision*)
IS 2050 : 1991	Glossary of terms relating to footwear (*first revision*)
IS 3400	Methods of test for vulcanized rubber:
(Part 2/Sec 2) : 2023	Methods of test for rubber, vulcanized or thermoplastic: Part 2 Determination of hardness, Section 2 Hardness between 10 IRHD and 100 IRHD
(Part 4) : 2012/ ISO 188 : 2011	Accelerated ageing and heat resistance (*third revision*)
(Part 9) : 2020/ ISO 2781 : 2018	Rubber, vulcanized or thermoplastic — Determination of density (*fourth revision*)
IS 3840 : 2011	Lining leather — Specification (*third revision*)
IS 4910 (Part 3) : 2023	Tyre yarns, cords and tyre cord fabrics made from man-made fibres — Methods of test: Part 3 Load and elongation characteristics (*second revision*)
IS 5041 : 1978	Specification for footwear and stationery eyelets (*first revision*)
IS 5677 : 1986	Specification for shoe upper leather for direct moulding processes (*first revision*)
IS 6664 : 1992	Rubber microcellular sheets for soles and heels — Specification (*first revision*)
IS 13360 (Part 5/ Sec 11) : 2013/ ISO 868 : 2003	Plastics — Methods of testing: Part 5 Mechanical properties, Section 11 Determination of indentation hardness by means of durometer (shore hardness) (*first revision*)
IS 15298	Personal protective equipment:
(Part 1) : 2015/ ISO 20344 : 2011	Test methods for footwear (*second revision*)
(Part 4) : 2017/ ISO 20347 : 2012	Occupational footwear (*second revision*)
IS 15844 : 2010	Sports footwear — Specification
IS 17011 : 2018	Chemical requirements for footwear and footwear materials

ANNEX B

(*Clause* 4.14)

PULL OUT TEST FOR EYELETS

B-1 This method is used for the determination of the strength of eyelet attachment to the footwear upper.

B-2 PRINCIPLE

A piece of footwear facing containing the eyelet is clamped in a universal tensile testing machine and a long, thin conical plunger is inserted into the eyelet from the reverse side of the facing. Force is applied until the plunger detaches the eyelet from the base material. The force at which the eyelet detaches is recorded as the pull out force of the eyelet.

B-3 APPARATUS

B-3.1 Tensile testing machine capable of measuring 1 kN force to an accuracy of 2 percent, and capable of moving its jaws at a rate of 100 mm/min ± 10 mm/min (*see* Fig. 2).

B-3.2 Compression jig (*see* Fig. 3) to be fitted with the tensile testing machine such that the conical plunger is vertical. The conical plunger should be capable of fitting into eyelets of various sizes. A plunger of length approximately 80 mm with the diameter tapering from 12 mm to 3 mm is generally suitable. A hole is provided on the lower platform of the jig. The test specimen can be positioned and clamped such that the eyelet aligns with the hole and the plunger can pass through the eyelet and the hole.

B-3.3 Sharp knife is used for preparation of specimen.

B-4 PREPARATION OF TEST SPECIMENS

Use the knife to cut at least three sections of footwear facing such that the eyelet is at the centre. It is recommended that each section is circular with at least 23 mm ± 5 mm of material at all points around the eyelet. In order to ensure these dimensions, it may be necessary to remove the eyelet adjacent to the one to be tested. Conditioning of test specimen is not required and test can be conducted at room temperature.

B-5 PROCEDURE

Fit the compression jig on the universal tensile testing machine. Clamp the test specimen on the platform of the jig such that the eyelet is aligned with the hole. For standard eyelets, the clenched side shall face the plunger and for blind eyelets, the flanged side shall face the plunger (*see* Fig. 4). Operate the universal tensile testing machine so that the plunger is inserted into the eyelet at a rate of 100 mm/min ± 10 mm/min. Record the force in N required to detach the eyelet from its base material or damage the assembly without complete detachment. Stop the tensile testing machine and return the plunger to its starting position. Repeat the procedure for all test specimens. Calculate the arithmetic mean of the values as the pull out force of the eyelets.

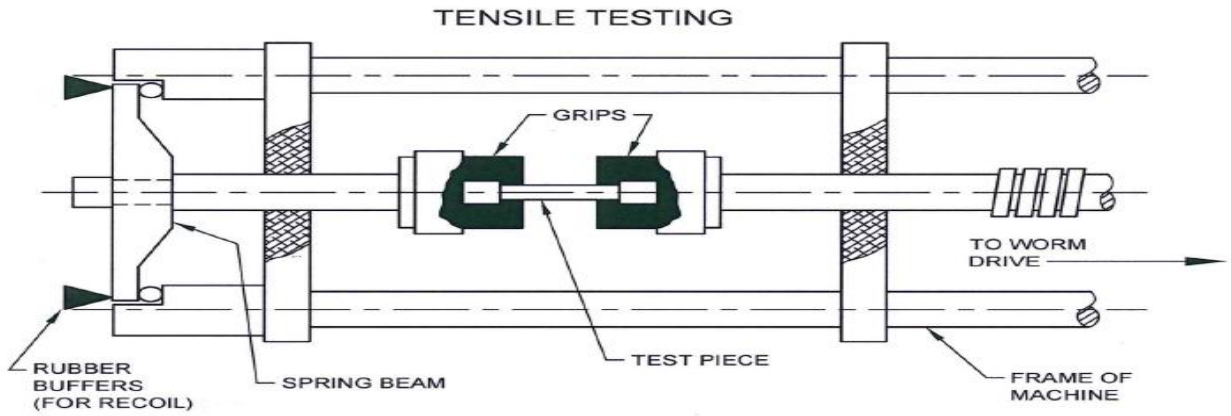


FIG. 2 SCHEMATIC DIAGRAM OF TENSILE TESTING MACHINE

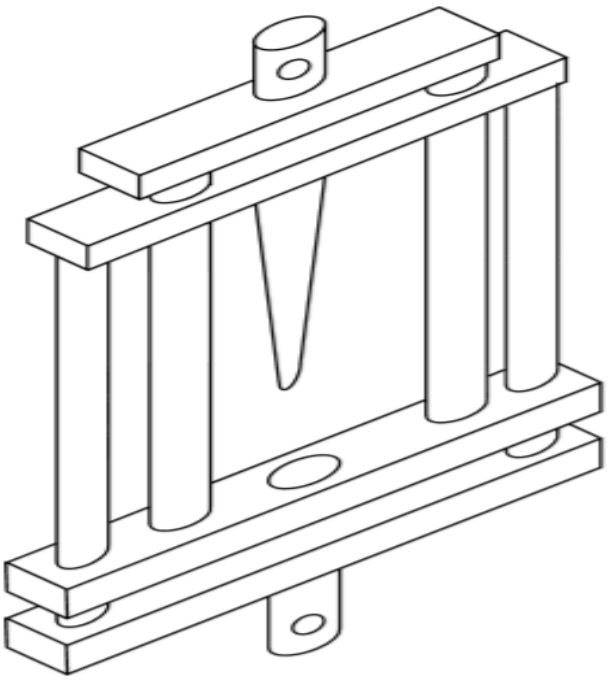


FIG. 3 COMPRESSION JIG WITH CONICAL PLUNGER AND HOLE ON THE PLATFORM

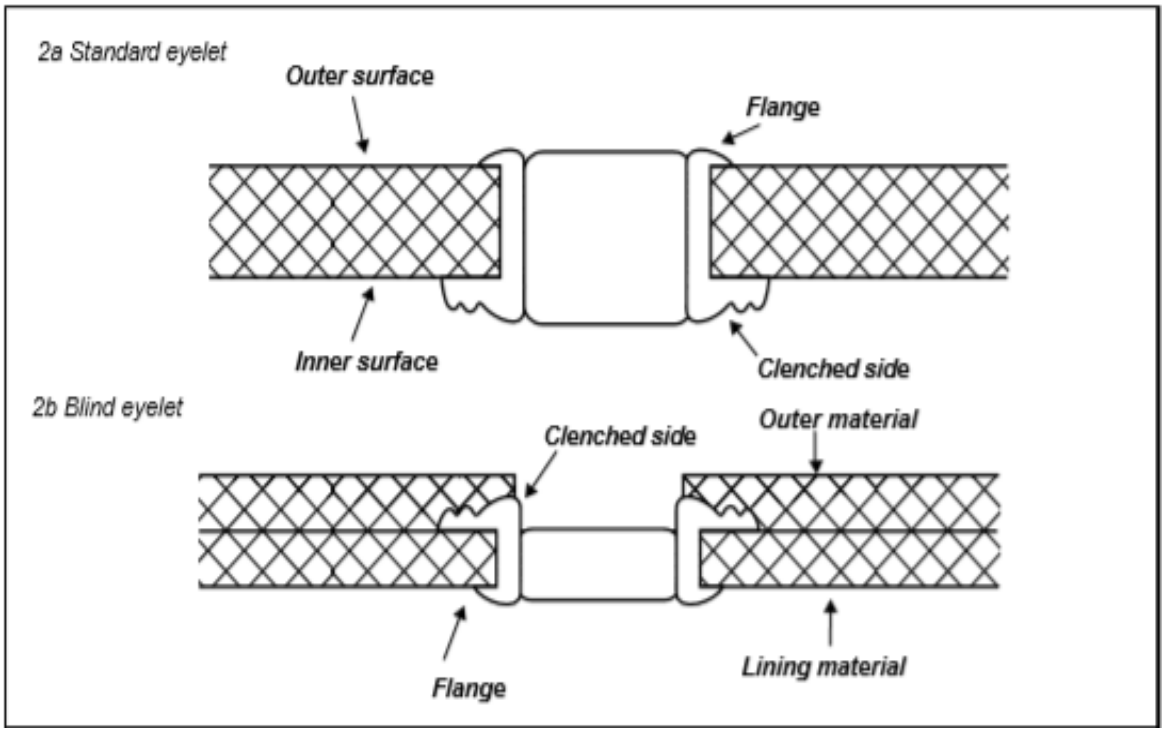


FIG. 4 TYPES OF EYELETS AND THEIR ATTACHMENT TO FOOTWEAR

ANNEX C

(*Clause* 4.14)

COLOUR PEEL OFF TEST FOR EYELETS

C-1 This method is used for the determination of resistance to change in colour of eyelets during the course of use of shoes.

C-2 PRINCIPLE

The shoe lace is threaded through the eyelet and bent to a fixed acute angle at the point of contact with eyelet. The lace is then held under a standard tension while it is repeatedly drawn back and forth through the eyelet.

C-3 APPARATUS

C-3.1 A test machine with one or more test stations (*see* Fig. 5). Each test station should have the following:

C-3.1.1 A moveable clamp which has a means of firmly holding one end of the metal strip.

C-3.1.2 A stationary clamp which is mounted in the same horizontal plane as the moveable clamp (**C-3.1.1**) and is capable of holding one end of the shoe lace. The stationary clamp should be 280 mm ± 50 mm from the moveable clamp when the clamps are at their minimum separation, this distance will subsequently be referred to as D.

C-3.1.3 A tensioning device with a method of holding the other end of shoe lace at a point 35 mm ± 5 mm to one side of, and in the same horizontal plane as, the stationary clamp and applying a tensioning force of 2.45 N ± 0.03 N (*see* Fig. 5) This can be achieved by passing the shoe lace over a pulley and suspending a mass of 250 g ± 3 g from its end.

C-3.1.4 A means of moving the moveable clamp with a simple harmonic reciprocating motion through a distance of 35 mm ± 2 mm and back to the original starting position at a rate of 60 ± 6 cycles per minute.

C-3.1.5 A mechanical/electrical means for counting the number of cycles.

C-4 MATERIALS

C-4.1 Shoe lace from the footwear.

C-4.2 Sample of shoe facing having the eyelet to be tested.

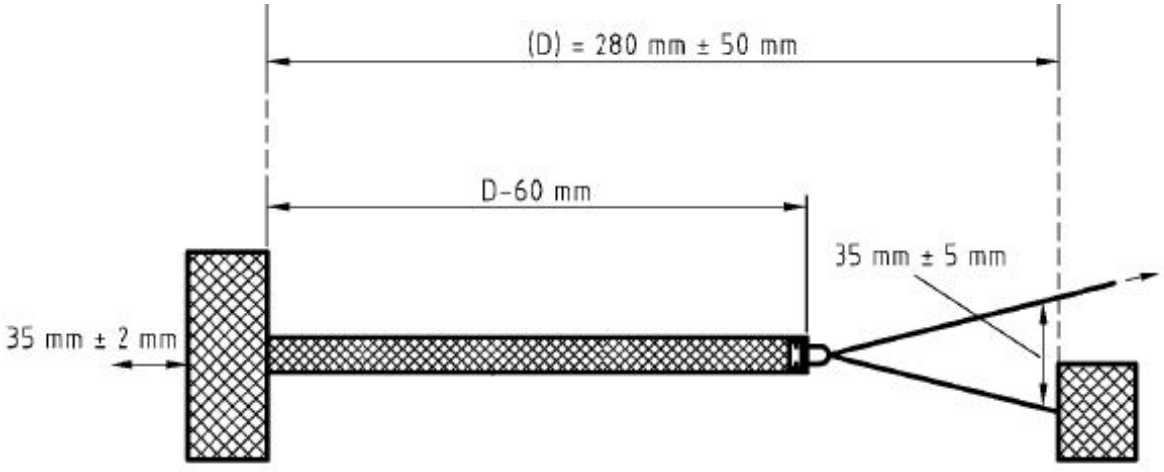


FIG. 5 SCHEMATIC DIAGRAM OF TESTING MACHINE

C-5 CONDITIONING

Store the shoe lace and eyelet sample in standard atmospheric conditions, that is, 27 °C ± 2 °C and (65 ± 5) percent relative humidity for at least 48 hours before testing and carry out the test in this atmosphere.

C-6 PROCEDURE

C-6.1 Fix the shoe sample having eyelet (**C-4.2**) to one end of the metal strip such that the relative orientation between the eyelet and the metal strip is the same as the orientation between the eyelet and shoe facing.

C-6.2 Clamp the other end of the metal strip into the moveable clamp so that the eyelet is approximately 60 mm away from the moveable clamp.

C-6.3 Secure one end of the shoe lace (**C-4.1**) to the stationary clamp (**C-3.1.2**).

C-6.4 Thread the free end of the lace through the eyelet secured to the moveable clamp.

C-6.5 Apply a tensioning force of 2.45 N ± 0.03 N to the free end of the lace (*see* **C-3.1.3**) and start the test machine.

C-6.6 Carry out the test for the required number of cycles.

C-6.7 Observe the eyelet for any change in colour.

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Footwear Sectional Committee, CHD 19

Organization	*Representative(s)*
In Personal Capacity, (*Flat F1, Bhoopathy Apartment, 10, Ethiraj Street, Palipattu, Chennai-600113*)	DR B. N. DAS **(*Chairperson*)**
Agra Footwear Manufacturers and Exporters Chamber (AFMEC), Agra	SHRI PURAN DAWAR SHRI SHYAM BANSAL (*Alternate*)
Atharva Laboratories Private Limited, Noida	MS APARNA PARVATIKAR SHRI J. BASAK (*Alternate*)
Bata India Limited, Kolkata	SHRI HITESH KAKKAR SHRI GOVINDARAJU (*Alternate*)
Central Reserve Police Force, New Delhi	SHRI SANJEEV KUMAR SINGH SHRI D. P. UPADHYAY (*Alternate*)
Confederation of Indian Footwear Industries, New Delhi	SHRI RAJ KUMAR GUPTA SHRI V. NOUSHAD (*Alternate*)
Council for Leather Exports, Chennai	SHRI R. SELVAM SHRI SANJAY LEEKHA (*Alternate*)
CSIR - Central Institute for Mining and Fuel Research, Dhanbad	DR J. K. PANDEY
Defence Research and Development Organization, Defence Institute of Physiology and Allied Science, New Delhi	DR MADHUSUDAN PAL
Directorate General Factory Advice Service and Labour Institutes, Mumbai	DR BRIJ MOHAN SHRIMATI M. K. MANDRE (*Alternate*)
Directorate General of Mines Safety, Dhanbad	SHRI SAIFULLAH ANSARI SHRI A. RAJESHWAR RAO (*Alternate*)
Directorate General of Quality Assurance, Ministry of Defence, Kanpur	SHRI SANJAY VERMA SHRI S. CHAKRABORTY (*Alternate*)
Footwear Design and Development Institute, Noida	SHRI SHAILENDAR SAXENA SHRI SAROJ KUMAR PANDA (*Alternate*)
Indian Footwear Components Manufacturers Association, Noida	SHRI SHARAD KANT VERMA SHRI SANJAY GUPTA (*Alternate*)
Laghu Udyog Bharati, New Delhi	SHRI JATINDER PAUL CHUGH SHRI AMIT SANCHETI (*Alternate*)
Lancer Footwear India Private Limited, New Delhi	SHRI SAURABH GUPTA
Liberty Shoes Limited (P.U. Division), Karnal	SHRI SHRI S. S. LAHIRI SHRI ADESH GUPTA (*Alternate*)
Mangla Plastic Industries, Bahadurgarh	SHRI ANIL KUMAR MANGLA
M B Rubber Private Limited, Delhi	SHRI VIPAN MEHTA

Organization	*Representative(s)*
Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade, New Delhi	SHRI NAND LAL
MSME Technology Development Centre (PPDC), Meerut	SHRI ADITYA PRAKASH SHARMA SHRI TULARAM BHARTI (*Alternate*)
Pinza Footwear, New Delhi	SHRI PREM MEHANI
Prolific Engineers, Noida	SHRI G. P. KEDIA
SGS India Private Limited, Gurugram	SHRI P. VENKATESAN SHRI K. PACHAIYAPPAN (*Alternate*)
Top Lasts, Agra	SHRI ANURIA SHARMA SHRI DEEPAK MANCHANDA (*Alternate*)
Xo Footwear Private Limited, Delhi	SHRI NALIN GUPTA SHRI MANOJ KUMAR (*Alternate*)
BIS Directorate General	SHRI AJAY KUMAR LAL, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD, (CHEMICAL) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
MS PREETI PRABHA
SCIENTIST 'C'/DEPUTY DIRECTOR
(CHEMICAL), BIS

Bureau of Indian Standards

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Review of Indian Standards

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