

भारतीय मानक

बिना अस्तर के संचकित रबड़ के जूते — विशिष्ट

Indian Standard

UNLINED MOULDED RUBBER BOOTS —
SPECIFICATION

UDC 685.315.4

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 3

FOREWORD

This Indian Standard 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.

Unlined rubber boots for general purpose are used in various fields frequently. Considering the importance of the product the Footwear Sectional Committee decided to formulate an Indian Standard on this subject.

In the preparation of this standard, considerable assistance has been derived from ISO 3910 : 1983 'Rubber boots, unlined moulded — Specification', published by the International Organization for Standardization, Geneva. This standard is technically equivalent to ISO 3910 : 1983. However, the temperature and humidity prescribed for conditioning of the samples for testing are $27 \pm 2^\circ\text{C}$ and 65 ± 5 percent relative humidity respectively in accordance with IS 196 : 1966 'Atmospheric conditions for testing'.

Composition of the committee responsible for formulation of this standard is given at Annex B.

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 : 1960 'Rules for rounding off numerical values (*revised*)'. 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

UNLINED MOULDED RUBBER BOOTS — SPECIFICATION

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for unlined rubber boots moulded in one piece for general purpose for men and women.

2 NORMATIVE REFERENCES

The Indian Standards listed below contain provisions which, through reference in this text, constitute provisions of this Indian Standard. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreements based on this Indian Standard are encouraged to investigate the possibility of applying the most recent editions of the Indian Standards indicated below:

<i>IS No.</i>	<i>Title</i>
2050 : 1991	Glossary of terms relating to footwear (<i>first revision</i>)
3400	Methods of test for vulcanized rubbers:
(Part 1) : 1987	Part 1 Tensile stress and strain properties (<i>second revision</i>)
(Part 4) : 1987	Part 4 Accelerated ageing test (<i>second revision</i>)
(Part 12) : 1971	Part 12 Tear strength-crescent test piece
5557 : 1995	Industrial and safety rubber lined boots (<i>second revision</i>)
6368 : 1971	Method for sampling of rubber and rubber combination footwear

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2050 : 1991 shall apply.

4 MATERIALS

4.1 Thickness

The thickness of the rubber components shall be not less than the value shown in Fig. 1 at the points indicated for the upper part of the boot, and the value shown in Table 1 for the soling and heel.

4.1.1 The thickness of the heel shall be measured on the outside edge along the length of the heel.

5 REQUIREMENTS

5.1 Physical Requirements

The boots shall be of the design, shape and size as agreed to between the purchaser and the supplier.

5.1.1 Tensile Requirements Before Ageing

Three test pieces shall be cut from both the soling and heels and then reduced to the required thickness by careful buffing, or any other suitable method, taking care to avoid an increase in temperature. The tensile strength and elongation at break shall then be determined according to the method specified in IS 3400 (Part 1) : 1987. The median of these results shall be at least the appropriate value given in Table 2. A smaller dumb-bell test piece may be used for the heels, if its size makes this necessary. The size of the dumb-bell shall be stated when expressing results. All three test pieces shall be free from visible defects.

If the median of the results is below, and the highest value is equal to or above, the appropriate value given in Table 2, two further pieces shall be tested. The material shall not be deemed to comply with the requirements unless the median of all five results is at least equal to the appropriate value given in Table 2.

5.1.2 Tensile Requirements After Ageing

After ageing for 168 h at a temperature of $70 \pm 1^\circ\text{C}$, the tensile strength and elongation at break of soling and heels determined as in 5.1.1 shall be in accordance with the values given in Table 3.

5.1.3 Tear Resistance of Upper

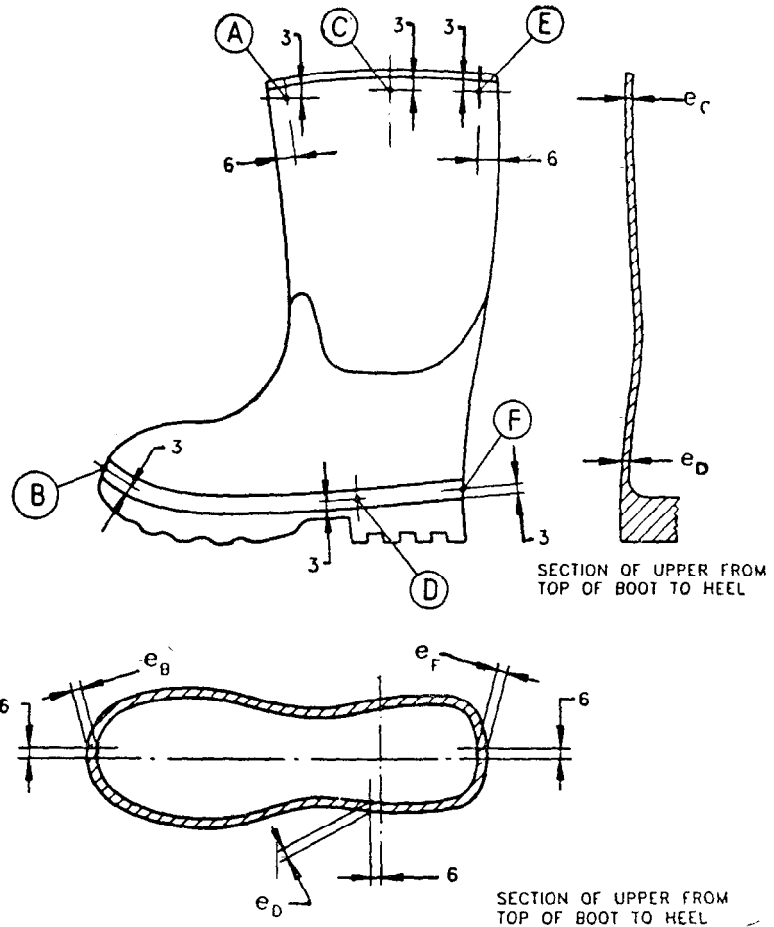
The tear resistance of the upper shall be not less than 80 N when tested in accordance with the method described in IS 3400 (Part 12) : 1971.

The grain of the sample tested shall be at right angles to the length of the sample.

5.1.4 Resistance to Dry Heat Ageing

When tested in accordance with IS 3400 (Part 4) : 1987, all rubber component parts shall be capable of withstanding, without developing any signs of brittleness or tackiness, exposure to air at a temperature of $100 \pm 1^\circ\text{C}$ and at atmospheric pressure for a period of 24 h in a suitable apparatus. For the purpose of this test, the test pieces may be entire articles or pieces cut from them.

Thickness at specified points	
e_A	2
e_B	5
e_C	2
e_D	4
e_E	2
e_F	5



All dimensions in millimetres.

FIG. 1 UNLINED MOULDED RUBBER BOOT

Table 1 Minimum Thicknesses of Soles and Heels
(Clause 4.1)

Sl No.	Thickness of	Dimensions in mm	
		Over Cleats (3)	Between Cleats (4)
(1)	(2)		
i)	Cleated soling, men's	13	8
ii)	Cleated soling, women's	11	7.5
iii)	Heel, men's	25	—
iv)	Heel, women's	20	—

Table 2 Tensile Strength and Elongation at Break Requirements Before Ageing
(Clause 5.1.1)

Requirements	Minimum Tensile Strength MPa	Minimum Elongation at Break percent
Soling and heel	8.0	200

Table 3 Tensile Strength and Elongation at Break Requirements After Ageing
(Clause 5.1.2)

Requirements	Tensile Strength Percent of Initial Value	Elongation at Break Percent of Initial Value
Soling and heel	± 20	+ 10 - 30

After heat exposure, test pieces shall receive a minimum of 2 days rest prior to further testing (see 5.1.5).

5.1.5 Flexing Resistance of Upper

When tested in accordance with the method described in Annex A, after having been submitted to the dry heat ageing test given in 5.1.4, the upper shall withstand not less than the number of continuous flexes given in Table 4

without the rubber face showing pinholes or any sign of cracking when viewed with the unaided eye. For this purpose only those parts of the test piece shall be observed which are under tension during the test, that is, the folds which form a diamond shape. Pinholes or cracking associated with machine damage shall be ignored.

The testing equipment shall be kept away from any source of ozone.

Table 4 Flexing Cycles for Upper
(Clause 5.1.5)

Sl No.	Thickness mm	Minimum Number of Flexes
i)	Up to and including 2.00	75 000
ii)	Over 2.00 up to and including 2.25	50 000
iii)	Over 2.25	40 000

5.1.6 Design

Design of the boots shall be conforming to 6.1.1 of IS 5557 : 1995.

5.1.7 Size

Size of the boots shall be conforming to 6.1.2 of IS 5557 : 1995.

6 MARKING

6.1 Each article of footwear shall be indelibly and legibly marked with the following particulars:

- a) Size;
- b) Manufacturer's identification;
- c) Reference number issued by the appropriate national standards organization; and
- d) Batch No., month and year of manufacture.

6.1.1 BIS Certification Marking

The product may also be marked with Standard Mark.

6.1.1.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7 SAMPLING

The method of sampling, for drawing representative samples of the boots and the criteria for conformity shall be as prescribed in IS 6368 : 1971.

ANNEX A

(Clause 5.1.5)

METHOD OF TESTING FOR RESISTANCE TO FLEXING

A-1 APPARATUS

A-1.1 The apparatus shall have the following essential features.

A-1.1.1 The machine shall have an adjustable stationary part provided with grips 25 mm across, for holding one end of each of the test pieces in a fixed position, and a similar reciprocating part for holding the other end of each of the test pieces.

A-1.1.2 The reciprocating part shall be arranged so that its motion is in the direction of, and in the same plane as, the centre line between the grips, and its travel shall be adjusted so that the two sets of grips approach each other to a distance of 13 mm and separate to a distance of 57 mm.

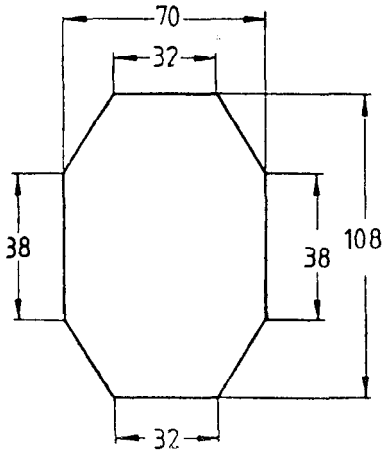
A-1.1.3 The eccentric which actuates the reciprocating part shall be driven by a constant

speed motor to give 340 to 400 flexing cycles per minute, with sufficient power to flex at least six and preferably twelve test pieces at one time.

A-1.1.4 The test pieces shall be arranged in two equal groups, so that one group is being flexed while the other group is being straightened, thus reducing the vibration in the machine. The grips shall hold the test pieces firmly, and shall enable individual adjustment to be made to the test pieces.

A-2 TEST PIECES

The test pieces shall have the dimensions shown in Fig. 2. Four test pieces shall be cut from the thinnest portion of the leg part of the upper. Care shall be taken to ensure that the test pieces are cut cleanly from the same material.



All dimensions in millimetres.

FIG. 2 TEST PIECE FOR FLEXING TEST

A-3 PROCEDURE

A-3.1 The test piece shall be folded symmetrically about its major axis. In the folded

condition one tapered end shall be inserted into the fixed central grip and pushed in until the test piece touches the grip pins.

A-3.2 This fixed grip shall then be tightened. The corresponding movable grip shall then be taken out to its fullest extent, the test piece inserted and pulled flat, and the grip tightened. It is recommended that clips be used to keep the edges together during the insertion of the test piece in the grips, but their removal is essential before flexing commences.

NOTE — The test piece shall not be under tension.

A-4 EXPRESSION OF RESULTS

A-4.1 A complete to-and-fro movement of the grip shall be counted as one flex cycle. The length of test shall be calculated in flex cycles and not in time units.

A-4.2 The flex cycles may be determined by using a trip-counter operated by one of the movable grips. The ambient temperature shall be $27 \pm 2^\circ\text{C}$, during the test.

ANNEX B
(Foreword)

COMMITTEE COMPOSITION

Footwear Sectional Committee, CHD 019

<i>Chairman</i>	<i>Representing</i>
SHRI S. K. BHADRA	Bata India Limited, Calcutta
<i>Members</i>	
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SHRI M. P. BAJPAI	Tannery & Footwear Corporation of India Ltd, Kanpur
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SHRI R. S. BALASUBRAMANIAN	Export Inspection Council of India, Madras
SHRI A. K. BASU (<i>Alternate</i>)	
SHRI J. BASAK	Bihar Rubber Company, Ranchi
SHRI J. CHAKRABORTI	Standing Committee of Safety in Steel Industry, Durgapur
SHRI SHIB KUMAR (<i>Alternate</i>)	
SHRI B. N. DAS	Central Leather Research Institute, Madras
SHRI B. DUTTA	Bengal Waterproof Ltd, Calcutta
SHRI D. DASS (<i>Alternate</i>)	
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SHRI S. R. SAHA (<i>Alternate</i>)	
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SHRI V. M. ASHDIR (<i>Alternate</i>)	
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Director (Chem)	

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Joint Director (Chem), BIS

(Continued on page 6)

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Amendments Issued Since Publication

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