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Indian Standard

SPECIFICATION FOR MOULDED SOLID RUBBER SOLES AND HEELS

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 1

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0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 April 1970, after the draft finalized by the Footwear Sectional Committee had been approved by the Chemical Division Council.

0.2 In this standard, the requirements for rubber soles and heels which are intended for the manufacture of footwear as well as repair of footwear have been specified. The design aspect of soles and heels and the composition of the rubber mix have been kept out of the scope of the standard, prescribing only the essential physical requirements. The sizes of soles and heels have not been specified but it is hoped that helpful guidance will be drawn from IS : 1638-1970* while deciding about the sizes.

0.3 This standard contains clauses **4.3.1**, **4.4** and **5.2** which call for agreement between the purchaser and the supplier.

0.4 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†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for rubber full-soles with or without heels, half-soles and heels sold as finished products.

1.1.1 This standard does not cover resin rubber soling (neolite sole sheet), and very soft moulded rubber sole or heel normally used for canvas or all rubber footwear.

*Sizes and fittings of footwear (*first revision*).
†Rules for rounding off numerical values (*revised*).

1.1.2 Top lifts and ladies high heel unit sole are also not covered in this standard.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2050-1967* shall apply.

3. TYPES

3.1 This standard prescribes two grades of rubber for full-soles, half-soles and heels as follows:

Grade 1 — Rubber of hardness 70 IRHD†, and

Grade 2 — Rubber of hardness 65 IRHD†.

4. REQUIREMENTS

4.1 Material — The rubber used for soles and heels shall be compounded from natural or synthetic rubbers or their blend, with or without the use of reclaimed rubber.

4.1.1 The rubber shall be vulcanized. The vulcanized rubber shall be homogeneous and free from sulphur bloom. The surface shall be free from blemishes and defects. All cured spew and moulding flashes shall be neatly trimmed from the rubber so as to have clean edges.

4.2 The soles and heels shall be cleated or non-cleated with stippled or other background pattern, as agreed to between the purchaser and the supplier.

4.3 The nail holes and washer nail holes in heels shall be suitably spaced so that the heel may be securely attached to the boot or shoe. There shall not be less than 7 holes and not more than 11 holes along the edge of the heel and between the cleats where cleats exist, situated at a distance of approximately 20 mm. Each nail hole shall have a suitable steel washer approximately midway between the two surfaces.

4.3.1 The provision for holes in the soles shall be optional and shall be subject to agreement between the purchaser and the supplier.

4.4 The size and thickness of the soles and heels shall be as agreed to between the purchaser and the supplier.

4.4.1 The thickness at the waist or seat of full-sole may be less than the substance of the fore-part by the amount not exceeding 1·5 mm subject to the substance of waist and seat being not less than 2 mm.

*Glossary of footwear terms.

†International Rubber Hardness Degree.

4.5 Physical Requirements — The material shall comply with the physical requirements given in Table 1.

TABLE 1 PHYSICAL REQUIREMENTS FOR SOLES AND HEELS

Sl. No.	Characteristic	Requirements		Methods of Test, Ref to IS:
		Type 1	Type 2	
(1)	(2)	(3)	(4)	(5)
i)	Relative density, *Max*	1·35	1·50	3400 (Part IX)-1968*
ii)	Hardness (IRHD), *Min*	70	65	3400 (Part II)-1965†
iii)	Abrasion index, *Min*	85	70	3400 (Part III)-1965‡
iv)	Flexing resistance: Number of cycles:			Appendix A
	a) Initial crack, *Min*	60 000	60 000	
	b) 600 percent cut growth, *Min*	120 000	120 000	
v)	Change in initial hardness after ageing at 100° ± 1°C for 24 hours	+5 — 0	+5 — 0	3400 (Part IV)-1965§ and 3400 (Part II)-1965†

Note — Footwear standard reference, compound 'D' as prescribed in IS : 3400 (Part III) - 1965‡ shall be used while testing for abrasion index.

*Methods of test for vulcanized rubbers : Part IX Relative density and density.
†Methods of test for vulcanized rubbers : Part II Hardness.
‡Methods of test for vulcanized rubbers : Part III Abrasion.
§Methods of test for vulcanized rubbers : Part IV Accelerated ageing.

5. MARKING AND PACKING

5.1 Each sole and heel shall be indelibly marked with the name of the manufacturer or trade-mark, if any; size of the footwear for which it is intended and the type.

5.2 The material shall be packed as agreed to between the purchaser and the supplier. Each package shall contain soles and heels of one size only.

5.2.1 The material may also be marked with the ISI Certification Mark.

Note — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer has the further safeguard that the products as actually

marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. SAMPLING

6.1 For the purpose of ascertaining the conformity of soles and heels in a consignment to this standard, the scale and sampling and criteria for conformity shall be as prescribed in Appendix B.

7. TEST METHODS

7.1 Unless otherwise agreed to between the purchaser and the supplier, all tests shall be carried out within 3 months from the date of receipt of the material by the purchaser.

7.2 Test pieces for physical tests shall be prepared, where possible, directly from the representative sample selected in accordance with **6.1** except in the case of small heels, when suitable sheets of the material of the same composition, vulcanized under identical conditions as the article shall be provided by the supplier.

7.3 All physical tests shall be carried out as specified in col 5 of Table 1.

7.4 Measurement of Thickness

7.4.1 *Full-Soles* — Measure the thickness at any point along the edge of the sole, excluding any raised or sunk pattern which covers a minor portion of the surface area of the fore part or any thickening at the toe. Measure the substance from the top of the pattern with stippled or any other background pattern not exceeding 0·5 mm in depth.

7.4.2 *Half-Soles* — Measure the thickness at any point along the edge of the sole, excluding any raised or sunk pattern which covers a minor portion of the surface area and excluding any level at the waist or thickening at the toe. Measure the substance from the top of the pattern with stippled or any other background pattern not exceeding 0·5 mm in depth.

7.4.3 *Heels* — Measure the substance at the back of the heel including any chevrons or protuberances at that point but excluding nail holes around and disregarding any recess on the reverse side of the heel.

APPENDIX A

[*Clause* 4.5, and *Table* 1, *Sl No.* (iv)]

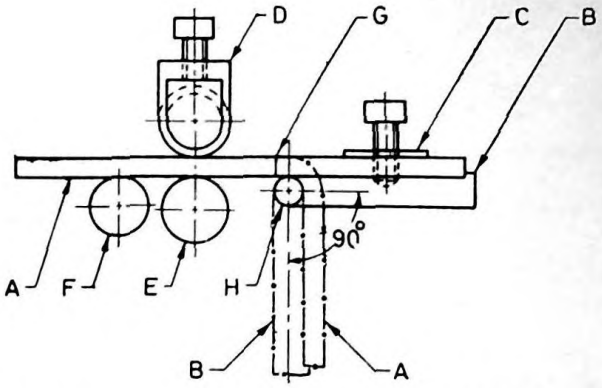
TEST METHOD FOR FLEXING RESISTANCE OF SOLES AND HEELS

A-1. OUTLINE OF THE METHOD

A-1.1 This method of test determines resistance to initial cracking and percent cut growth of rubber soles and heels of footwear, cut out directly from the material, by the Ross flexing machine.

A-2. APPARATUS

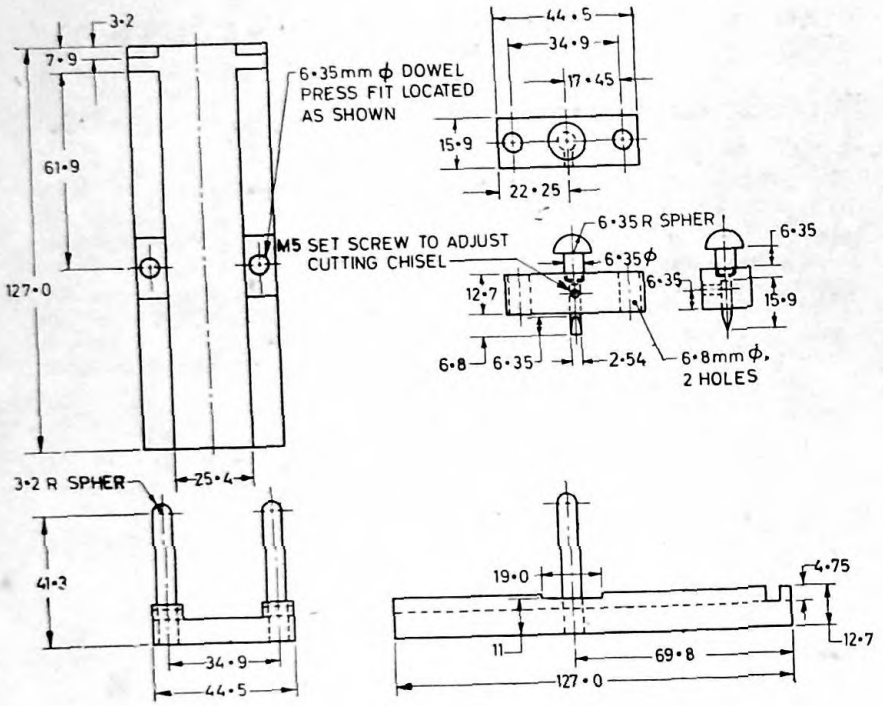
A-2.1 Ross Flexing Machine — A schematic diagram of Ross flexing machine is given in Fig. 1. The machine allows the flexed area of the specimen to bend freely over a rod, approximately 9·5 mm in diameter, through an angle of 90°.



A = Test specimen
B = Holder arm
C = Holder arm adjustment
D = Adjustable roller
E = Fixed lower roller
F = Supporting fixed holder
G = Pierced section
H = Rod over which specimen bends freely through a 90° angle

FIG. 1 ROSS FLEXING MACHINE (SCHEMATIC)

A-2.1.1 *Piercing Tool and Holder* — A suitable form of piercing tool and holder is shown in Fig. 2.



All dimensions in millimetres.

FIG. 2 PIERCING TOOL AND HOLDER

A-2.1.2 *Rule* — A rule of suitable length, graduated in steps of 0·25 mm is used for measuring the length of cut growth.

A-2.2 Procedure

A-2.2.1 *Test Specimens* — Cut out directly from the outer soles test specimens of dimensions 25±1 mm width and a minimum of 150 mm in length by the standard knife for cutting specimens for Ross flexing machine.

A-2.2.2 Procedure — Separate the inner layer of the sole carefully without damaging the skin of the sole layer. Pierce one of the test specimens by the use of piercing tool. For this, adjust the piercing tool in the holder with the cutting edge projecting 7·25±0·25 mm from the base of the holder so that piercing tool will pierce completely through the test specimens when tapped. Before piercing the test specimen, lubricate the test specimen with the solution of soap, that does not react with the compound. Place the test specimen with the designed surface of the sole on the top and cut by the piercing tool parallel to the width of the test specimen, at a right angle to and across the longitudinal centre line of the specimen at a point 61·9±0·1 mm from the clamped end.

A-2.2.2.1 Clamp un-pierced test specimens to the holder arm of the flexing machine in such a position that the designed surface of the sole could be flexed at 90° angle. The holder arm shall be in a horizontal position when the test specimens are attached. Let down the adjustable top rollers until they just touch the holder and lock in this position by means of the wing nuts, permitting free travel of the test specimens between the rollers during the bending movement.

A-2.2.2.2 After the test specimens have been attached as described, start the machine at 100±5 cycles per minute. Make frequent observations, recording the number of cycles and increase in the cut length for the purpose of determining the rate of increase in the cut length. While observing the cut growth, the holder arm shall be at an angle approximately 45° vertically. Continue the test until the cut length has increased 500 percent, that is, until the combined length of the cut and crack has increased to a total of 18·25 mm.

NOTE — In some cases the cut growth is not in a straight line as the continuation of the cut made by the piercing tool, and 'star shaped' cracking may develop. In the event, the cut growth shall be measured as the length of the longest continuous crack regardless of its direction.

A-2.3 Report — Report the results from observation of at least two test specimens averaged and reported as the number of cycles for the initial crack and also for 600 percent cut growth.

APPENDIX B

(*Clause* 6.1)

SAMPLING OF RUBBER SOLES AND HEELS

B-1. SCALE OF SAMPLING

B-1.1 Lot — All rubber soles or heels in a consignment belonging to the same size, pattern, type and batch of manufacture shall constitute a lot.

B-1.2 Samples shall be selected and examined from each lot separately for ascertaining the conformity of the material to the requirements of the specification.

B-1.3 The number of rubber soles or heels to be selected from any lot shall depend on the size of the lot and shall be in accordance with col 1 and 2 of Table 2.

TABLE 2 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES

No. of Rubber Soles or Heels in the Lot	Visual Characteristics		Dimensional Characteristics	
	Sample Size	Permissible No. of Defectives	Sample Size	Permissible No. of Defectives
(1)	(2)	(3)	(4)	(5)
Up to 500	13	1	6	0
501 " 1 000	20	1	10	1
1 001" 3 000	32	2	16	1
3 001" 5 000	50	3	25	2
5 001 and above	80	5	40	3

B-1.3.1 The rubber soles of heels shall be selected at random from the lot.

B-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 Visual Characteristics — All the soles or heels drawn under **B-1.3** shall be first examined for the pattern and finish as given in **4.1**, **4.2** and **4.3**. If the number of samples failing to satisfy any one or more of the requirements is less than or equal to the corresponding permissible number of defectives given in col 3 of Table 2, the lot shall be declared to have satisfied the requirements for these characteristics, otherwise not.

B-2.2 Thickness and Other Dimensional Characteristics — The lot which has been found satisfactory under **B-2.1** shall be examined for dimensional requirements. For this purpose, the number of samples to be chosen from among those selected under **B-2.1**, is given in col 4 of Table 2.

If the number of defectives found under this test is less than or equal to the permissible number given in col 5 of Table 2, the lot shall be considered to have satisfied the dimensional requirements, otherwise not.

B-2.3 Physical Requirements—The lot accepted under **B-2.1** and **B-2.2** shall be examined for physical requirements. For this purpose test pieces shall be taken from samples or from specially prepared test sheets required in **7.2.** For each physical requirement, two samples shall be taken for physical tests if the lot size is 1 000 and below and three samples if it is above 1 000. There shall be no failures, if the lot is to be accepted under this clause.

INDIAN STANDARDS

ON

Footwear and Footwear Auxiliaries

IS :		Rs
Footwear		
583-1954	Ammunition boots for general purposes	1·50
584-1964	Chaplis, frontier pattern for general purposes (*revised*)	2·00
1638-1960	*Sizes and fittings of footwear*	1·00
1989-1967	Miners' safety leather boots and shoes (*revised*)	9·00
2050-1967	Glossary of footwear terms	15·00
2051-1962	*Methods for sampling of leather footwear*	1·50
2060-1962	Gents' leather shoes	4·50
3735-1966	Canvas shoe, rubber sole	3·00
3736-1966	Canvas boot, rubber sole	3·50
3737-1966	Leather safety boots for workers in heavy metal industries ...	3·50
3738-1966	Rubber knee boots	3·50
3976-1967	Safety rubber-canvas boots for miners	6·50
4128-1967	Fireman's leather boots	5·50
4585-1968	Football boots	4·00
5259-1969	Girls' and maids' school shoes	4·00
5332-1969	Boys' and youths' school shoes	5·50
5333-1969	Leather cricket boots	4·00
Footwear Materials		
177-1965	Cotton drills (*revised*)	2·50
178-1965	Cotton twills (*revised*)	2·00
179-1965	Dosuti (*revised*)	2·00
576-1954	Glazed kid for shoe uppers	1·00
578-1964	Full-chrome upper leather (*revised*)	1·50
579-1962	Sole leather (*revised*)	1·50
622-1956	Russet leather	1·00
1636-1960	*Chrome waxed shoe leather*	1·50
1720-1960	Cotton sewing thread, bleached or dyed	2·00
1746-1960	Shoe polish	2·50
1895-1961	Cotton, tape, *Newar*, grey or dyed	2·00
2276-1962	Vegetable and aluminium tanned snakeskins	4·00
2422-1963	Cotton fabric dyed, water resistant	2·00
2545-1963	Vegetable tanned lizardskins	2·50
2961-1964	Chrome retan upper leather	2·50
3297-1965	Water-resistant vegetable tanned sole leather	1·50
3840-1966	Lining leather	6·00
4512-1967	Footwear lasts, wooden	11·00