

Preliminary draft

**All Rubber / Polymer Gum Boots and Ankle Boots for Children -
IS 5557 Part 3**

FOREWORD

This Indian Standard was prepared by the Bureau of Indian Standards, after the draft finalized by the Footwear Sectional Committee had been approved by the Chemical Division Council.

There is no Indian standard available in the country for gum boot and ankle boot for the children, keeping in mind also there are quite a number of the state governments procuring for their school children and also domestic requirement. It is a very much essential to develop the standard for the country to get quality and durable gum boot and ankle boot to be used in school students community and domestic consumers for children.

Realizing the need of standard of gum boot and ankle boot in the country, the Footwear Sectional Committee decided to develop the standard in line with the recent technological developments that have taken place in developing this standard and also the standard was prescribed constructional and functional performance requirements of school shoes, domestic consumer children community and more importantly committee incorporated the wearer of this boot shall protect hazardous chemicals while manufacturing the shoe and also prevent environmental impact were also taking care while developing this these boots standard.

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.

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All Rubber / Polymer Gum Boots and Ankle Boots for Children- IS 5557 Part 3

1.0 Scope

This standard prescribes requirements, methods of sampling and tests for all rubber /polymer gum boots and ankle boot for children.

2.0 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 revisions, and parties to agreement based on this Indian Standard are encouraged to investigate the possibility of applying the most recent editions of the Indian Standards indicated in **Annex A**.

3.0 Terminology

For the purpose of this standard, the definitions given below along with definitions of terms, symbols, and units given in IS 2050 shall apply.

4.0 Sampling and conditioning

Wherever, possible test pieces shall be taken from the whole footwear unless otherwise stated.

If it is not possible to obtain test pieces from footwear large enough to comply with tests requirements, then samples may be taken from the raw material from which the component has been manufactured. However, this should be reported in the test report.

All test shall be conditioned at $27\pm 2^{\circ}\text{C}$ and $65\pm 5\%$ Relative Humidity (RH)

5.0 Classification

This standard covers the following two types of gum boots and ankle boots:

- a) Type 1: All rubber gum boots and ankle boot.
- b) Type 2: All polymer gum boot and ankle boot.

6.0 REQUIREMENTS

Design

The boots shall be made of rubber/polymer with fabric lining as shown in Fig. 1 for type 1 Fig. 2 and Fig. 3 for Type 2 respectively (as given in IS 5557:2018 for reference only). The sole and heel shall be of made of rubber or polymer and anti -slip design to prevent slip or as agreed to between the purchaser and the supplier. Design shown in the drawings are recommendatory only.

6. Size and fittings

The recommended size and fittings of gum boot and ankle children Boys and Girls is given below and will be guided in accordance with IS 1638

CATEGORY	GROUPS	AGE	SIZE
Category 1	Kids Group	4- 8 years	9,10,11
Category 2	Children Group	8-11 years	12, 13, 1
Category 3	Boys and Girls Group	11 – 12 years	2,3,4,5
Category 4	Youth Group	Above 13 years	6,7,8,9,10

7. Construction

The footwear shall be manufactured by injection/ casting/compression and conventional assembly, as suitable through the process of vulcanization of rubber and can be with or without lining. The footwear manufactured in conventional assembly from single texture rubberized fabric and vulcanized, is an unlined footwear. The edges of the upper and tongue may be binded with coated/**uncoated** binding material.

The sole attachment may be made direct moulding /vulcanization process. The outsole may be use single or multilayer sole.

8.0 Material

Material used in the gum boot and ankle boost shall be made as given under

S. No	Components of the Gum boot and ankle boot	Material
1	Leg Inner Outer	Fabric (Natural/ synthetic) Rubber/ Polymer
2	Vamp Inner Outer	Fabric (Natural/Synthetic) Rubber/Polymer
3	Counter	Rubber/polymer
4	Inner reinforcement at vamp	Rubberized fabric
5	Heel	Rubber/Polymer
6	Outer toe cap	Rubber/Polymer
7	Foxing strip	Rubber/Polymer
8	Top Binding	Rubber/Polymer
9	Insole Inner	Rubber/polymer

	Outer	Fabric (Natural /Synthetic)
10	Full Below Tongue	Single texture rubberized/Polymerized fabric

Upper requirement shall conform as given in the Table 1

S. No.	Properties	Requirement	Test Methods
1	Thickness, mm Rubber Polymer	Min 1.5 Min 1.0	IS 15298 Part 1 Clause 6.1
2	Rubber Breaking Force, N Polymer Tensile strength, N/mm ² (Modulus at 100 % Elongation)	Min 180 1.4 - 4.6	IS 15298 Part 1 Clause 6.4
3	Elongation at Break, % Polymer	Min 250	
4	Flexing Resistance Rubber Polymer	No crack at 125000 No crack at 150000	IS 15298 Part 1 Clause 6.5
2	Abrasion resistance, (Conducted on fabric surface inner side of the upper) Dry 25,600 cycles 12800 Cycles Wet 12,800 cycles 3200 Cycles Ref IS 6721:2023 Amdt. 1	No hole formed No hole formed	IS 15298 Part 1 Clause 6.4

Sole requirement shall confirm as given in Table 2

S. No.	Properties	Requirement		Test Methods
		Fore part	Heel	
1	Thickness, mm			IS 15298 Part 1 Clause 8.1 Ref taken from Tamilnadu Tender specification.
	Fore part With cleat	Min 10.0 Min 6.0	Min 15.0 Min 9.0 Min 13.0	
	Cleat Height, mm	Min 2.5	Min 2.5	
2	Tear strength, N/mm	Min 5		IS 15298 Part 1 Clause 8.2
3	Abrasion resistance, mm ³ Volume loss	Max 250		IS 15298 Part 1 Clause 8.3
4	Flexing resistance, mm (Cut growth at 30,000 flexes)	Max 4.0		IS 15298 Part 1 Clause 8.4
5	Bond strength, N/mm	Min 4.0 Or Min 3.0 Material tear		IS 15298 Part 1 Clause 5.2 / ISO 4649:2017

Physical requirement of rubber components as given in the Table 3

S. No.	Properties	Requirement		Test Methods
		Body	Sole	
1	Hardness, IRHD or Shore A (Reading from 30 to 90 IRHD are approximately same as those of the Shore durometer, Type A. Ref Taken from IS 3735 clause 4.1.6 note 2)	50± 5	60± 5	IS 3400 (Part 2)

2	Change in hardness after accelerating ageing 100 ⁰ C±2 for 24 hours	+5 -2	+5 -2	IS 3400 (Part 2)
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Insole requirement shall confirm as given in Table 4

S. No.	Properties	Requirement	Test Methods
1	Thickness, mm	Min 2.0	IS 15298 Part 1 Clause 7.1
2	Abrasion resistance, (Conducted on fabric surface of insole) Dry 25,600 cycles 12800 Cycles Wet 12,800 cycles 3200 Cycles Ref IS 6721:2023 Amdt. 1	No hole formed No hole formed	IS 15298 Part 1 Clause 6.12

9.0 Test on complete footwear

9.1 Height of Upper

The boots shall conform to design B, C, D, or E given in Fig. 3 in IS 15298 (Part 4) and the height of upper, when tested in accordance with 6.2 of IS 15298 (Part 1), shall conform to requirements prescribed in 5.2.2 of IS 15298 (Part 4).

Or as agreed between manufacturer and purchaser.

9.2 Leak Proof Test

For Type 2 Fig. B,C,D,E when the whole footwear is tested in accordance with 5.7 of IS 15298 (Part 1), there shall not be any leakage of air.

For Type 1 Fig. 1 when the whole footwear is tested in accordance with 5.18 of IS 15298 (Part 1) :2024, there shall not be any leakage.

9.3 Adhesion Test for Rubberized Textile Upper

Representative samples of width 25 ± 5 mm are cut out from the whole footwear along the length of the boot. The rubber and fabric plies are separated by breaking the bond. Test on 2 specimens are carried out in accordance with IS 3400 (Part 5). There shall be no separation at a load of 1.5 kg.

9.4 Chemical test

All the components of gum boot and ankle boot which are in direct contact of with foot shall comply with Table 1 of IS 17011 for critical substances **Category I and Category II as specified under 3.6 of IS 17011.**

9.5, Lead content(pb):

The gum boot and ankle boot lead content shall be maximum of 2.0 ppm when tested in accordance with IS 12240 (part 5). Lead content is applicable only PVC polymer if used.

10.0 Marking and Packing

10.1 Marking

The shoes shall be marked legibly with the following:

- a) Size;
- b) Type;
- c) Identification of the source of manufacturer or brand name;

10.2 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 license for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Packing The shoes shall be packed as agreed to between the purchaser and the manufacturer. Each individual package shall contain shoes of one size only and may be marked with the name of the item, size, colour, and type, best before date, identification of the source of manufacture and batch number and any other marking if so desired.

Annex 'A'-LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>
IS 15298 (Part 1): 2015	Personal Protective Equipment Part 1 Test Methods for Footwear (<i>second revision</i>)
IS 15298 (Part 4): 2017	Personal Protective Equipment Part 4 Occupational Footwear (<i>second revision</i>)

IS 17011: 2018	Chemical requirements for footwear and footwear materials
IS 3400 (Part 3): 2021/ISO 4649:2016 ISO 4649: 2017	Methods of Test for Vulcanized Rubbers Part 3 Abrasion Resistance using a Rotating Cylindrical Drum Device (Third Revision) Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device
IS 5557: 2018	All rubber gum boots and ankle boots- Part 2 occupational purposes
IS 1638:1969	Sizes and fitting of the footwear
IS 2050: 1991	Glossary of terms related to footwear
IS 3400: 2014: Part 2	Methods of test for vulcanized rubber: (Part 2): 2014 Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)
IS 3400: 2012: Part 4	Accelerated ageing and heat resistance (first revision)
IS 3400: 2012: Part 5	Adhesion of rubbers to textile fabrics (second revision)
IS 12240: Part 5:1988	Method of test for Polyvinyl chloride Boots. Determination of Lead content