

भारतीय मानक

पालीविनायल क्लोराइड जूते, रसायन प्रतिरोधी — विशिष्ट

( पहला पुनरीक्षण )

*Indian Standard*

POLYVINYL CHLORIDE BOOTS, RESISTANT  
TO CHEMICALS — SPECIFICATION

( *First Revision* )

UDC 685·315·4 [ 678·743·22 ] : 620·193·471·2

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

## 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.

The boots covered under this standard may be manufactured either by single or by double injection moulding process. The boots are extensively worn by workers in chemicals and allied industries. It is recommended that the boots which come into contact with chemicals during use should be washed daily and examined for any development of cracks. In case of chemicals other than those specified by the manufacturer, advice of the manufacturer of the footwear should be sought for use of such boots.

This standard was first published in 1992. Subsequently, in order to harmonize this standard with ISO 6110 : 1982 Plastic moulded footwear --- Lined or unlined polyvinyl chloride industrial boots with general purpose resistance to chemicals published by the International Organization for Standardization ( ISO ), Geneva, the Footwear Sectional Committee CHD 019 decided to revise this standard.

In this revision, a reference has been made to IS 12254 : 1993 PVC industrial boots — Specification for the general requirements and the earlier has been harmonized with the corresponding international standard; as a result of which this draft standard is now technically equivalent with ISO 6110 : 1982. However the following requirements have been included in this revision in addition to those given in ISO 6110 : 1982:

- a) relative density;
- b) lead content;
- c) leakage resistance; and
- d) performance ( optional ).

The Committee responsible for the formulation of this standard is given at 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 : 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***POLYVINYL CHLORIDE BOOTS, RESISTANT  
TO CHEMICALS — SPECIFICATION***( First Revision )***1 SCOPE**

This standard prescribes requirements, method of sampling and test for lined and unlined polyvinyl chloride boots, resistant to chemicals, of styles like ankle boots with minimum four eyelets at each face, half knee, short knee and knee boots for men and women and thigh boot for men.

**2 REFERENCES**

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

**3 TERMINOLOGY**

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

**4 MATERIALS****4.1 Fabric ( For Lined Boots )**

In the case of lined boots, the fabric shall be knitted and free from visible defects. The breaking strength of the natural/synthetic fabric shall be not less than 150 N in both warp and weft direction when tested in accordance with the method given in IS 1969 : 1985.

**4.2 Eyelets and Laces ( Applicable for Ankle Boots )**

**4.2.1** Brass coated steel or aluminium eyelets of size ( collar diameter ) 10 mm as given in Table 1 of IS 5041 : 1978 shall be used.

**4.2.2** The laces shall conform to the requirements given below when tested in accordance with IS 4778 : 1982:

Length	65 ± 5 cm
Breaking load	23 kg, <i>Min</i>

**4.2.3** The black laces shall also be free from sulphur dyes when tested in accordance with Annex B.

**4.3 Steel Toe Caps**

Protective steel toe caps conforming to type 2 of IS 5852 : 1992 shall be used.

**5 REQUIREMENTS**

**5.1** The boots shall comply with the requirements given in 5 of IS 12254 : 1993 (*first revision*).

**5.2 Resistance to Specified Chemicals**

The boots shall pass the test for resistance to chemicals when tested in accordance with the method given in Annex C.

**6 MARKING AND PACKING****6.1 Marking**

The following particulars shall be marked inside of each boot.

- Indication of the source of manufacture,
- Size No.,
- Batch No.,
- The words 'Chemicals resistance', and
- Month and year of manufacture.

The manufacturer shall also declare the chemicals from which the boots are supposed to provide protection to the wearer.

**6.2 Packing**

Each boot may be wrapped in tissue paper and packed as agreed to between the purchaser and the manufacturer.

**7 SAMPLING**

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

## ANNEX A

( Clause 2 )

## LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
252 : 1991	Caustic soda, pure and technical ( <i>third revision</i> )	5852 : 1992	Protective steel toe caps for footwear industry — Specification
265 : 1987	Hydrochloric acid ( <i>third revision</i> )	6368 : 1971	Methods for sampling of rubber and rubber combination footwear
266 : 1977	Sulphuric acid ( <i>second revision</i> )	12240	Methods for tests for polyvinyl chloride boots:
1969 : 1985	Method of determination of breaking load and elongation at break of wooven textile fabrics ( <i>second revision</i> )	( Part 2 ) : 1988	Durometer hardness, Shore A
2050 : 1991	Glossary of terms relating to footwear ( <i>first revision</i> )	( Part 6 ) : 1988	Determination of tensile strength and elongation at break
4778 : 1982	Specification for cotton laces for footwear ( <i>first revision</i> )	12254 : 1993	Polyvinyl chloride industrial boots — Specification ( <i>first revision</i> )
5041 : 1979	Specification for footwear and and stationery eyelets ( <i>first revision</i> )		

## ANNEX B

( Clause 4.2.3 )

## METHOD OF TEST FOR FREEDOM FROM SULPHUR DYES

**B-1 PROCEDURE**

**B-1.1** Boil the laces in alkaline hydrosulphite solution for one minute. If the shade is reduced to pale brown or yellow colour and on oxidation restored to the original colour, sulphur dyes shall be suspected to be present.

**B-1.2** For confirmation, boil the laces in acid stannous chloride solution in a test tube covered with a piece of filter paper moistened with lead acetate. A blackish/brown stain with metallic lustre confirms the presence of dyes.

## ANNEX C

( Clause 5.2 )

## METHOD OF TEST FOR RESISTANT TO CHEMICALS

## C-1 PROCEDURE

**C-1.1** The test pieces cut from the boots shall be tested in accordance with the test methods prescribed in IS 12240 ( Part 2 ) : 1988 and IS 12240 ( Part 6 ) : 1988 before and after treatment specified in C-1.2. Where it is necessary to use different test pieces, such as for tensile strength test, those tested after the treatment shall be from the same area of the same boot as those tested without being submitted to the treatment.

**C-1.2** The test pieces shall then be immersed suitably for a period of  $72 \pm 2$  h at  $27 \pm 2^\circ\text{C}$  and  $65 \pm 5$  percent relative humidity in the following reagents which shall be technically pure:

- a) Sulphuric acid — 3.7 k mol of 30 percent, ( m/m ) ( see IS 266 : 1977 );
- b) Hydrochloric acid — 6.0 k mol of 20 percent ( m/m ) ( see IS 265 : 1987 ); and
- c) Sodium hydroxide — 6.1 k mol of 20 percent, m/m ( see IS 252 : 1991 ).

NOTE — Separate test pieces shall be used for each reagent as mentioned above.

**C-1.3** After immersion for the specified period, the test pieces shall be tested in accordance with the method prescribed in IS 12240 ( Part 6 ) : 1988. When the results are compared with those from test pieces which have not undergone the treatment:

- a) The decrease in tensile strength shall not exceed 15 percent;
- b) The change in elongation at break shall not exceed 20 percent;
- c) The change in mass of any test piece shall not exceed 2 percent; and
- d) The increase in hardness shall not exceed 10 shore A.

**C-1.4** For the footwear to comply with the values prescribed in this standard, the requirements of C-1.3 (a), (b), (c) and (d) shall be met for each of the three reagents specified in C-1.2.

## ANNEX D

( Foreword )

### COMMITTEE COMPOSITION

Footwear Sectional Committee, CHD 019

<i>Chairman</i>	<i>Representing</i>
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<i>Members</i>	
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SHRI B. B. DAS ( <i>Alternate</i> )	
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SHRI J. CHAKRABORTI	Standing Committee for Safety in Steel Industry, Durgapur
SHRI SHIB KUMAR ( <i>Alternate</i> )	
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Director ( Chem )	
<i>Member Secretary</i>	
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Joint Director ( Chemical ), BIS	

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## Composition of Industrial Safety and Special Purposes Footwear Subcommittee, CHD 019 : 04

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**AMENDMENT NO. 1 APRIL 1994**  
**TO**  
**IS 13292 : 1993 POLYVINYL CHLORIDE BOOTS,**  
**RESISTANT TO CHEMICALS — SPECIFICATION**

( *Foreword, Paras 3 and 4* ) — Substitute the following for the existing text:

‘This standard was first published in 1992. Subsequently, in order to harmonize the standard with ISO 6110 : 1982 Plastic moulded footwear — Lined or unlined polyvinyl chloride industrial boots with general purpose resistance to chemicals, published by the International Organization for Standardization (ISO), Geneva, the Footwear Sectional Committee, CHD 019 revised this standard. In the process of revision, the requirements prescribed in this standard have been harmonized with the corresponding requirements laid down in ISO 6110 : 1982. However, in view of the trend in the domestic market, certain additional requirements, namely, relative density, lead content, leakage resistance and performance (optional) have been included in this standard.’

( *Page 2, Annex A, col 1, line 18* ) — Substitute ‘5041 : 1978’ for ‘5041 : 1979’.

( *Page 3, Annex C, Title* ) — Substitute ‘Resistance’ for the word ‘Resistant’.

( CHD 019 )

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