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## Safety technical specifications for children's footwear

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## Foreword

All of the technical requirements in these standards are compulsory.

The standards are based on the rules in National Standard GB/T 1.1-2009.

Please be aware that these standards contain information that may relate to patents. The body issuing these standards takes no responsibility for the status or validity of these patents.

The standards were proposed by the China National Light Industry Council.

These standards have been produced under the management of the National Technical Committee 305 on Footwear - Part of the Standardisation Administration of China (SAC/TC305).

These standards were produced by: China Leather & Footwear Industry Research Institute; Bangdeng Shoes Ltd of Nanan City, Fujian, Kading (Fujian) Children's Product Co Ltd; Taizhou Feiying Shoes Ltd; Belle International Ltd (Shenzhen); Dordor Horse Ltd (Beijing); Beijing ECT Testing Co. Ltd.

Principal authors of these standards: Weijuan Zhang, Xiaoxia Qi, Jingguo Hou, Xiuxia Huang, Dinghai Li, Xiaowu Rong, Yu Chen, Cunjun Yu, Shuxian Yu,

Huiqun Wu.

# Safety requirements and standards for children's footwear

## 1. Scope of these standards

These standards specify the technical terms and definitions, product categories, technical requirements, testing methods and determining methods relating to the safety requirements for children's footwear.

These standards relate to footwear of all materials, designed for ordinary, daily wear by persons aged 14 or under (shoe size no bigger than 250mm).

These standards are not applicable to children's rubber shoes.

## 2. Normative references

The following documents are indispensable for the application of these standards: In the case of dated reference documents, only those versions which are dated shall apply to these standards.

In the case of undated reference documents, only the latest edition (including all amendments) shall apply to these standards.

GB/T 2703 Technical terms related to footwear

GB/T 2912.1-2009 Formaldehyde detection in textiles Part 1: free and hydrolysed formaldehyde (water extraction method)

(ISO 14184-1:1998, MOD)

GB 6675-2003 National technical safety regulations for children's toys

GB/T 17592-2011 Chemical testing for the detection of prohibited azo dyes in textiles.

GB/T 19941-2005 Chemical testing for formaldehyde levels in leather and suede.

GB/T 19942-2005 Chemical testing for the detection of prohibited azo dyes in leather and suede (ISO/TS 17234:2003 MOD)

GB/T 22807-2008 Chemical testing for hexavalent chromium levels in leather and suede.

GB/T 24153 - 2009 Nitrosamine detection in rubber and elastic materials

GB/T 26713-2011 Chemical testing method for the detection of Dimethyl fumarate (DMF) in footwear

GB 28011 Steel sole shank for use in footwear

GB/T 29292-2012 Restricted substances found in footwear and footwear components (GB/T 29292-2012 ISO/TR 16178:2010, IDT)

QB/T 4340-2012 Chemical testing method for measuring the level of heavy metal footwear using inductively coupled plasma optical emission spectrometry (ICP-OES)

ISO/TS 16181:2011 Restricted substances potentially present in footwear and footwear components. Determination of phthalates in footwear materials<sup>1</sup>

Critical substances potentially present in footwear and footwear components

Determination of phthalates in footwear materials •

### **3. Technical terms and definitions**

The terms and definitions in GB/T 2703 and the following are applicable to these standards.

#### **3.1**

##### **Accessories**

Components which have the function of joining, decorating or illustrating the use of footwear.

#### **3.2**

##### **Accessible sharp edge**

Any edge on the footwear or accessory where two sides meet in such a way as to create a sharp area more than 2mm in length which could harm a child.

#### **3.3**

##### **Accessible sharp point**

Any sharp point on the footwear or accessory which could harm a child.

#### **3.4**

##### **Children's footwear**

Footwear made for children between the age of three and 14 with a shoe size between 171-250mm.

#### **3.5**

##### **Infant's footwear**

Footwear made for infants less than three years old with a shoe size of 170mm or less.

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<sup>1</sup>) Listed as a designated national standard programme

### 3.6

#### Technical heel height

The height of the heel minus the thickness of the frontal sole where it is in contact with the ground.

### 4. Classification of products

Divided into two categories according to the wearer:

- a) Infant's footwear
- b) Children's footwear

### 5. Technical requirements

#### 5.1 Physical and mechanical safety properties

5.1.1 The sharp end of any fastener should not be exposed on the inside or outside of an item of footwear.

5.1.2 There should be no protruding sharp edges or sharp points on any part of the footwear (including any accessories and the heel).

5.1.3 There should be no broken needle within the footwear.

5.1.4 No part which could become detached from an item of infant's footwear should be able to fit completely into the small parts test cylinder designated in standard GB 6675-2003 (A.5.2).

Appendix A includes some examples of accessory classifications.

5.1.5 Accessories should be securely fastened. The tensile pull test value for an accessory attached to infant's footwear should be  $\geq 70$  N

5.1.6 The steel sole shank should conform to standard GB 28011.

5.1.7 The technical heel height should be 25mm or less.

#### 5.2 Unpleasant odours

The unpleasant odour rating should be two or less ( $\leq 2$ )

#### 5.3 Restricted substances

See table one for requirements related to restricted substances. Footwear components should be classified and tested according to the stipulations in GB/T 29292-2012.

Table 1 Restricted substances

No	Testing target			Acceptable amount
1	Hexavalent chromium in leather and suede			•10 mg/kg
2	Degradable toxic aromatic amines (in textiles)			•20 mg/kg
3	Degradable toxic aromatic amines (in leather and suede)			•30 mg/kg
4	Formaldehyde	Footwear for Infants	Textiles	•20 mg/kg
			Other materials	•75 mg/kg
		Footwear for children	Areas not in direct contact with skin	•75 mg/kg
			Areas in direct contact with skin	•150 mg/kg
5	Quantities of heavy metals present	Arsenic		•100 mg/kg
		Lead		•100 mg/kg
		Cadmium		•100 mg/kg
6	Dimethyl fumarate			•0.1 mg/kg
7	Nitrosamine quantities in rubber (used in footwear for infants)			Should not be traceable

8	Phthalates	Footwear for Infants	DINP, DIDP, DNOP	•0.1%
			DEHP, DBP, BBP	•0.1%
		Footwear for children	DEHP, DBP, BBP	•0.1%
<p>a. See appendix B for a list of N-nitrosamines which are banned in rubber.</p> <p>b. See appendix C for categories of restricted phthalate plasticisers.</p>				

## 6. Testing methods

### 6.1 Testing exposed sharp edges and points

Carry out tests according to the directions in appendices A.5.8 and A.5.9 of GB 6675-2003.

### 6.2 Testing for the presence of broken needles

Carry out test using a metal detector

### 6.3 Steel sole shank

Carry out test according to GB 28011.

### 6.4 Tensile pull test for accessories

Any components or parts of the shoe which can be gripped and pulled by a child using their hands or teeth must be tested. - see appendix D for details of testing.

### 6.5 Unpleasant odours

6.5.1 Testing apparatus: dryer with a diameter of 240mm for footwear 200mm or less in length, dryer with a diameter of 300mm for footwear between 201mm-250mm.

6.5.2 The test should be carried out in a clean, ventilated area which is free of strong odours.

6.5.3 Examiners: there should be at least three examiners. Examiners should be appropriately trained and selected specialists. Those with limited olfactory senses, smokers, wearers of strongly perfumed make-up or persons who have recently consumed alcohol are unsuitable examiners.

6.5.4 Number of samples: two sets of paired samples

### 6.5.5 Testing procedure

6.5.5.1 Clean the dryers to ensure they are dry and odour-free. Apply Vaseline evenly to the edges of the lids of the dryers.

6.5.5.2 Place one shoe into each dryer, put on the lid and use a gently turning movement to allow the Vaseline to form a seal. Allow to stand at room temperature for  $(24 \pm 0.5)$  hours.

6.5.5.3 When carrying out the unpleasant odour test, lift the lid, creating a gap of 20mm; the examiner then gets close to the container (approximately 15cm), wafts the air towards him or herself and slowly smells the odour in the container (this should not exceed 5 seconds).

6.5.5.4 Repeat the steps in 6.5.5.3 with the three remaining samples. Leave a five minute interval between each test.

### 6.5.6 Assessing the results

The grading of the unpleasant odour for each shoe should be carried out according to the stipulations in table 2. The rating for each shoe is that given by the assessor providing there is at least a 50% consistency rate.

The combined test result for the set of samples is the highest value.

**Table Two Grading unpleasant odours in footwear**

Grade	Description
1	No odour
2	A slight odour, but not enough to attract attention
3	Obvious odour, but not unpleasant.
4	Strong, unpleasant odour
5	Very strong unpleasant odour

## 6.6 Hexavalent chromium Cr (VI) in leather and suede

Carry out test according to GB/T 22807-2008.

#### **6.7 Quantities of degradable toxic aromatic amines**

6.7.1 The lining and upper are tested separately; different materials are also tested separately. If the lining and upper of the shoe cannot be tested separately, they should be tested together according to the method used for testing the lining.

6.7.2 Textile products should be tested according to GB/T 17592-2011; leather and suede should be tested according to GB/T 19942-2005.

#### **6.8 Quantity of formaldehyde present**

6.8.1 Sampling preparation as 6.7.1.

6.8.2 Textile products should be tested according to GB/T 2912.1-2009; leather and suede should be tested according to GB/T 19941-2005.

#### **6.9 Quantities of heavy metals present**

Carry out test according to QB/T 4340-2012.

#### **6.10 Dimethyl fumarate**

Carry out test according to GB/T 26713-2011.

#### **6.11 Quantity of nitrosamine in rubber components.**

Carry out test according to GB/T 24153-2009.

#### **6.12 Quantities of phthalates present**

Take samples of accessible parts and test according to ISO/TS 16181-2011.

### **7. Determining results**

Make a judgement based on the above technical requirements and classifications given in point five. A sample that meets the requirements in point five is considered "conforming", and a sample that does not "non-conforming".

## **Appendix A**

### **(Reference)**

#### **Types of accessories (not an exhaustive list)**

##### **A.1 Buttons**

Including buttons which are made of synthetic or natural material, or a mixture of the two; e.g. sew-through buttons, toggle shank buttons, button knots, velcro, buckles, covered buttons, engraved buttons and decorative buttons.

##### **A.2 Metal fasteners**

Including metal stud buttons (e.g. snaps and poppers), decorative metal fasteners (e.g. metal plate and decorative studs) and other metal fasteners (e.g. metal studs, logo tags, trademark tags, accessories).

##### **A.3 Zippers**

Including zippers with teeth made of metal, resin and nylon. e.g. open-ended zippers, closed-ended zippers and zippers with double sliders.

Zipper tapes are made of cotton, polyester or a mixture of the two.

##### **A.4 Cords**

String-like accessories which are made of textile materials and used for both fastening and decorative purposes.

##### **A.5 Trademark and logo tags**

Including trademarks and logos which are made of textile, paper, braid, grass and metal. Logo tags may specify details such as material, directions for use, specifications and place of origin.

##### **A.6 Other accessories**

Any other accessories. e.g. lace, beads and additional decorative items.

## Appendix B

### (Mandatory)

#### N-nitrosamines which are banned in rubber

See Table B.1 for N-nitrosamines which are banned in rubber.

**Table B.1 N-nitrosamines which are banned in rubber**

Item No	Name	CAN
1	N-nitrosodimethylamine (NDMA)	62-75-9
2	N-nitrosodiethylamine (NDEA)	55-18-5
3	N-nitrosodipropylamine (NDPA)	621-64-7
4	N-nitrosodibutylamine (NDBA)	924-16-3
5	N-nitrosopiperidine (NPIP)	100-75-4
6	N-nitrosopyrrolidine (NPYR)	930-55-2
7	N-nitrosomorpholine (NMOR)	59-89-2
8	N-nitroso N-methyl N-phenylamine (NMPHA)	614-00-6
9	N-nitroso N-ethyl N-phenylamine (NEPHA)	612-64-6

## Appendix C

### (Mandatory)

#### Restricted phthalate-based plasticisers

See Table C.1 for phthalate-based plasticisers whose use in material used in footwear is restricted

**Table C.1 Restricted phthalate-based plasticisers**

Item No	Name	CAN
1	dibutyl phthalate (DBP)	84-74-2
2	benzylbutyl phthalate (BBP)	85-68-7
3	3 di(2-ethylhexyl) phthalate (DEHP)	117-81-7
4	diisononyl phthalate (DINP)	28553-12-0
5	dioctyl phthalate (DNOP)	117-84-0
6	diisodecyl phthalate (DIDP)	26761-40-0

## Appendix D

### (Mandatory)

#### Tensile pull test for accessories

##### D.1 General provisions

Any components or parts of the shoe which can be gripped and pulled by a child using their hands or teeth must be tested.

##### D.2 Instruments

**D.2.1** Dynamometer, maximum capacity: 100 N or more, accurate to  $\pm 2$  N.

**D.2.2** Three-clawed clamp or any suitable clamp. The integrity of the shoe must not be affected when applying the clamp to the component which is to be tested.

**D.2.3** Timer

**D.2.4** Vernier calliper accurate to 0.1 mm.

##### D.3 Method

**D.3.1** Maintain a parallel position to the principal axis of the component that is being tested for five seconds, then pull horizontally with a constant and even force of  $70 \pm 2$  N for 10 seconds. Remove the force and wait for 10 seconds. Check whether the component has come apart from the shoe.

**D.3.2** Remove the clamp. Place another clamp which is suitable for testing vertical force on the component.

**D.3.1** Maintain a vertical position to the principal axis of the component that is being tested for five seconds, then pull horizontally with a constant and even force of  $70 \pm 2$  N for 10 seconds. Remove the force and wait for 10 seconds. Check whether the component has come apart from the shoe.

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