

ICS 61.060

QB

**LIGHT INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

QB/T 4340-2012

**Footwear. Chemical test method. Total heavy metal content.
Inductively coupled plasma emission spectroscopy
(English Translation)**

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1 Scope

This standard specifies the test method for the total content of heavy metals in footwear products and footwear components - The measurement method for the content of nine heavy metals: lead (Pb), cadmium (Cd), nickel (Ni), chromium (Cr), cobalt (Co), copper (Cu), antimony (Sb), arsenic (As), mercury (Hg), by inductively coupled plasma emission spectrometry¹).

This standard applies to all footwear and footwear components.

Table 1 of GB/T 29292-2012 specifies the materials, which contain this substance.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB/T 6682 -2008 Water for analytical laboratory use - Specification and test methods

GB/T 22049 Footwear - Standard atmospheres for conditioning and testing of footwear and components for footwear

GB/T 29292-2012 Footwear - Critical substances potentially present in footwear and footwear components

3 Principle

After the sample is digested by microwave, the volume of the digestion solution is made to reach to the mark. The concentration of heavy metals, such as lead (Pb), cadmium (Cd), nickel (Ni), chromium (Cr), cobalt (Co), copper (Cu),

1) Inductively coupled plasma emission spectroscopy is generally referred to as ICP-OES. flask. Dilute to the mark.

4.4.7 Lead (Pb) standard stock solution (100 µg/mL): Weigh 0.160 g of lead

nitrate $[(\text{Pb}(\text{NO}_3)_2)]$. Use 10 mL of nitric acid solution (1 + 9) to dissolve it.

Transfer it to a 1000 mL volumetric flask. Dilute to the mark.

4.4.8 Antimony (Sb) standard stock solution (100 µg/mL): Weigh 0.274 g of

potassium antimony tartrate ($\text{C}_4\text{H}_4\text{KO}_7\text{Sb} \cdot 1/2\text{H}_2\text{O}$). Dissolve it in 10% hydrochloric acid solution. Transfer it into a 1000 mL volumetric flask. Use 10% hydrochloric acid solution to dilute it to the mark.

4.4.9 Mercury (Hg) standard stock solution (100 µg/mL): Weigh 0.1354 g of

mercury chloride (HgCl_2). Put it into a 100 mL beaker. Add 20 mL of nitric acid solution (1 + 1). Heat it at low temperature to dissolve it. Cool it down. Transfer it into a 1000 mL volumetric flask. Add 40 mL of nitric acid solution (1 + 1), 20 mL of 5.0% potassium dichromate solution. Use distilled water to make its volume reach to the mark. Shake it well. This solution is 100 µg/mL mercury standard stock solution.

4.5 Standard working solution: Prepare the standard working solution of each

heavy metal. The standard working solution is stored at 15 °C ~ 25 °C in the dark. The validity period is 7 days.

5 Instruments and equipment

5.1

Analytical balance, which has an accuracy of 0.1 mg.

5.2 The inductively coupled plasma emission spectrometer: The purity of argon

gas used is not less than 99.9%.

5.3 The microwave digester, which has temperature or pressure control system.

6 Specimen preparation and environmental

conditioning

Use a standard cutter 2) to cut 10 g of sample, into a small test piece, which has a size of about 5 mm x 5 mm. Perform environmental conditioning, according to the requirements of GB/T 22049. The conditioning time is 24 h.

When the thickness of the sample exceeds 5 mm, it shall be processed to be within 5 mm.

2) Information about standard cutters can be obtained from the SAC/TC 305 Secretariat. This information is given for the convenience of users of this standard. It does not indicate an endorsement of the product. If other equivalent products have the same effect, these equivalent products can be used.

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