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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 30157-2013

Textiles - Determination of the total content of lead and cadmium

纺织品 总铅和总镉含量的测定

Issued on: December 17, 2013 **Implemented on: October 15, 2014**

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Standardization Administration of the PRC

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard is proposed by the China Textile Industry Federation. This standard is under the jurisdiction of the Technical Committee on Basic Standards of the National Textile Standardization Technical Committee (SAC/TC209/SC1). This standard was drafted by: China Textile Standard (Beijing) Inspection & Certification Center Co., Ltd., National Textile Product Quality Supervision and Inspection Center, Chinese Republic of China Ningbo Entry-Exit Inspection and Quarantine Bureau. The main drafters of this standard. Zhang Hui, Jing Tingting, Zheng Yuxiu, Bao Qijun, Feng Yun, Fu Kejie. Determination of total lead and total cadmium content in textiles Warning. Persons using this standard should have

practical experience in regular laboratory work. This standard does not indicate all possible security issues. It is the user's responsibility to take appropriate safety and health measures and to ensure compliance with the conditions set by the relevant national laws and regulations.

1 Scope

China's national method for the total lead and total cadmium in textiles - the two heavy metals that reach a textile not through the fibre but through what is added to it: the pigments of a plastisol print, the stabilisers of a PVC coating, the metal trim, the zips and the badges, and that matter because the article is worn against the skin and, in the case of children's clothing, chewed. The standard specifies the method for the determination of the total lead and total cadmium content of textile products, and it applies to textile products of every kind. What distinguishes a total content determination from the extraction methods used elsewhere is the question being answered. An extraction asks how much metal would come out of the article under a simulated contact; a total content determination asks how much is there at all, and it is the figure a regulation or a purchaser's specification is normally written against, because it does not depend on the extraction conditions chosen. The sample is therefore digested completely, so that the metal is brought into solution regardless of the form in which it was bound, and the solution is then measured by atomic spectrometry against calibration solutions prepared in a matching acid matrix, with the laboratory water meeting GB/T 6682. The standard sets the preparation and homogenisation of the sample, which is where a non-uniform article such as a printed garment can produce almost any answer, the digestion procedure and the reagents, the instrumental conditions, the blank and the recovery checks, and the calculation and expression of the results. It carries the warning that the user must have practical laboratory experience and is responsible for the appropriate safety and health measures. Issued on 17 December 2013 and in force since 15 October 2014, it is held by SAC/TC 209/SC 1.

This standard specifies the method for the determination of total lead and total cadmium in textile products. This standard applies to all kinds of textile products.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 6682 Analysis Laboratory Water Specifications and Test Methods

3 Principle

The sample is digested with concentrated acid, and the digested solution is diluted to

volume and then inductively coupled plasma emission spectrometer (ICP-AES) is used. The emission intensity of lead and cadmium is measured under the conditions, or the absorbance of lead and cadmium is measured with an atomic absorption spectrophotometer. Determine the concentration of various metal ions and calculate the total amount of heavy metals in the sample.

4 Reagents and materials

Unless otherwise stated, use only reagents of analytical grade or above and water of Grade 2 or above specified in GB/T 6682.

4.1 Concentrated nitric acid 4.2 3% (volume fraction) nitric acid Take 3mL of concentrated nitric acid (4.1) and dilute to 100mL with secondary water.

4.5 Hydrogen peroxide

4.6 standard stock solution Standard stock solutions for each element can be prepared using standard materials or as follows:

4.6.1 Lead (Pb) Standard Stock Solution (1000μg/mL) Weigh

0.160 g of lead nitrate [Pb(NO3)2], dissolve with 10 mL of nitric acid (1 9), transfer to a 100 mL volumetric flask and dilute to the mark.

4.6.2 Cadmium (Cd) Standard Stock Solution (1000μg/mL) Weigh 0.203g of cadmium chloride (CdCl2· 2H2O), dissolve with 10mL nitric acid (1 9), transfer to 100mL volumetric flask, dilute to Scale.

Note. Unless otherwise specified, the standard stock solution has a shelf life of 6 months at room temperature (15°C~25°C). When turbidity, precipitation or color change occurs, etc. It should be re-prepared.

4.7 standard working solution (50μg/mL) Accurately pipette

2.50 mL from the standard stock solution into a volumetric flask and dilute to 50 mL with 3% nitric acid (4.2).

Note. The standard working solution is generally valid for two weeks at room temperature (15°C~25°C). If turbidity, sedimentation, or color change occurs, it should be renewed. preparation.

5 Equipment and Instruments

5.1 Inductively Coupled Plasma Optical Emission Spectrometer (ICP-AES) or Atomic Absorption Spectrophotometer.

5.2 microwave digestion instrument. with program temperature control function.

5.3 digestion container.

5.4 disposable blade.

5.5 Volumetric flask. 50 mL, 100 mL.

0.5 mL,

5.7 Aqueous filtration membrane. 0.45 μm pore size.

5.8 Balance. The accuracy is 0.01mg.

6.1 Preparation and Processing of Samples

6.1.1 Preparation Take a representative sample, cut the sample to a small piece of 5mm x 5mm, weigh about 0.2g sample, accurate to 0.0001g.

6.1.2 Resolution Add

5.0 mL of concentrated nitric acid (4.1) to the digestion vessel containing the sample and blank to be tested, and wait for the reaction of the sample and acid at room temperature. Afterwards, the digestion vessel was sealed and placed in a microwave digestion apparatus (5.2), warmed to (175±5) °C in 10 min, and maintained at (175±5) °C. Hold for 5 min and allow the sample to cool for at least 5 min before removing it from the microwave digestion apparatus. Before opening the digestion vessel, microwaves should be introduced in the fume hood Digest the tank to cool to room temperature or cool for at least 30 minutes.

Note 1. Due to the different types of digester, different laboratories can use different digestion procedures, as long as the sample digestion is complete.

Note 2. For coating samples that are difficult to digest such as PU, appropriate amounts of fluoroboric acid, hydrofluoric acid, and hydrogen peroxide may be added.

Note 3. If hydrofluoric acid is used during the test, add 30 mL of 4% boric acid to each container and complex it with hydrofluoric acid to protect the quartz plasma rectangular tube.

6.1.3 sample solution to volume Transfer the digested solution to a 50 mL volumetric flask (5.5). Rinse the digestion vessel with a small amount of water 3 times. Combine the eluent in the volume. In the volumetric flask, make up to volume with water, mix, pass the aqueous phase filter membrane (5.7), the filtrate should be used as soon as possible for inductively coupled plasma emission spectrometer (ICP-AES) or atomic absorption spectrophotometer (5.1) analysis.

Note. Refer to Appendix A for pretreatment methods for accessories and decorative parts for textile products.