



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB 31604.34-2016

**National food safety standard - Food Contact Materials and
Products - Determination of Lead and Its Migration
(English Translation)**

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Foreword

This Standard replaces the determination of lead of its migration of GB/T 5009.62-2003, Method for analysis of hygienic standard of ceramics for food containers, GB/T 5009.63-2003, Method for analysis of hygienic standard of enamel for food containers, GB/T 5009.72, Method for analysis of hygienic standard of aluminum-ware for food use, GB/T 5009.78-2003, Method for analysis of hygienic standard of papers for food packaging, GB/T 5009.81-2003, Method for analysis of hygienic standard of stainless steel food containers and table wares, GB/T 3534-2002, Standard testing methods for lead and cadmium release from domestic ceramics, GB 8058-2003, Standard permissible limits and testing method for release of lead or cadmium from ceramic cookware, GB/T 21170-2007, Glass hollowware - Test method for lead and cadmium release, SN/T 2597-2010, Determination of lead, cadmium, chromium, arsenic, antimony, germanium migration quantity in polymer for food contact materials -Inductively coupled plasma atomic emission spectrometry method, SN/T 2829-2011, Food contact materials for export - Metal materials - Determination of migrant heavy metals in food simulant - Inductively coupled plasma atomic emission spectrometric method, SN/T 2886, Food contact materials for export - Determination of lead and cadmium release in glass container simulants, and SN/T 2594-2010, Food contact materials - Determination of lead, cadmium, chromium, and arsenic in cork stoppers by inductively coupled plasma mass spectrometry.

Compared with GB/T 5009.62-2003, the main changes of this Standard are as follows.

- it changes the name of the standard into "National Food Safety Standard - Food Contact Materials and Products - Determination of Lead and Its Migration";
 - it adds the determination of lead;
 - it adds the graphite furnace atomic absorption spectrometric method;
 - it adds the inductively coupled plasma mass spectrometric method;
 - it adds the inductively coupled plasma atomic emission spectrometric method;
- and
- it deletes the dithizone colorimetric method.

National Food Safety Standard - Food Contact Materials and Products - Determination of Lead and Its Migration

1 Application Scope

This Standard specifies the graphite furnace atomic absorption spectrometric method, inductively coupled plasma mass spectrometric method, inductively coupled plasma atomic emission spectrometric method and flame atomic absorption spectrometric method for the

determination of lead in paper products and cork stoppers and lead migration after being soaked in the food simulants.

This Standard applies to the determination of lead in paper products and cork stoppers and lead migration in food contact materials and products.

Part I - Determination of Lead Method I - Graphite Furnace Atomic Absorption Spectrometric Method

2 Principle

Grind the paper products or cork stoppers; use the dry method for digestion; atomize the digestion solution in a graphite furnace; determine absorbency by comparing with the standard series (the absorption value measured at 283.3 nm within a certain concentration range is in direct proportion to the lead content).

3 Reagents and Materials

Unless specified otherwise, all reagents used for this method are guaranteed reagents and the water is water grade II specified in GB/T 6682.

3.2 Preparation of reagents

3.2.1

Nitric acid solution (5 + 95). measure 50 mL of nitric acid; add to 950 L of water; and mix up.

3.2.2

Nitric acid solution (1 + 9). measure 50 mL of nitric acid; add to 450 L of water; and mix up.

3.3 Standard substance

Lead nitrate [Pb(NO₃)₂, CAS no.. 10099-74-8]. purity > 99.99% or the lead standard solution of a certain concentration which has been certified by a national certification institution and awarded the certificate of standard substance.

3.4.1 Lead standard stock solution (1 000 mg/L). weigh accurately 1.598 5 g

(accurate to 0.000 1 g); use a small amount of nitric acid solution (1 + 9) to dissolve; transfer to a 1000 mL volumetric flask; add water to scale and mix up.

4 Apparatus

NOTE All glass wares shall be soaked in nitric acid (1 + 5) overnight, washed with tap water repeatedly and washed clean in the end.

4.1

Atomic absorption spectrometer. equipped with graphite furnace atomizer and attached with lead hollow cathode lamp.

4.2

Adjustable electric hot plate.

5.1 Digestion of sample

Take an appropriate amount of sample, grind and mix up. Weigh 1 g to 5 g (accurate to 0.001 g) of sample to place into a crucible; first use soft fire to carbonize to smokeless on an adjustable electric hot plate; transfer to muffle furnace at 500°C for ashing for 6 h to 8 h and then cool down.

5.2.1 Apparatus testing conditions

See Table A.1 for the reference conditions.

5.2.2 Establishment of standard curve

In accordance with the sequence of concentrations from low to high, put 10 µL of lead standard serial solution and 5 µL of palladium nitrate solution-ammonium dihydrogen phosphate solution (the sample size can be decided in accordance with the apparatus used) respectively into the graphite furnace at the same time;

5.2.3 Determination of sample

Place 10 µL of blank solution or sample solution and 5 µL of palladium nitrate solution-ammonium dihydrogen phosphate solution (the sample size can be decided in accordance with the apparatus used) into a graphite furnace at the same time;

6 Expression of Analytical Results

The lead content in the sample is calculated in accordance with the following equation.

7 Accuracy

The absolute difference between the results obtained from two independent determinations under repeatable conditions shall not exceed 20% of the arithmetic mean value.