



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

GB 31604.24-2016

**National food safety standard - Food Contact Materials and
Articles - Determination of cadmium migration quantity
(English Translation)**

Issued on: October 19, 2016

Implemented on: April 19, 2017

Issued by: National Health and Family Planning Commission of the PRC

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Foreword

This standard instead 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 5009.72-2003 "Method for analysis of hygienic standard of aluminum-ware for food use", 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 ceramic", 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 2886-2011 2011 "Food contact materials for export - Determination of lead and cadmium in glass container simulant - Flame atomic absorption spectrometry method".

As compared with GB/T 5009.62-2003, the main changes of this standard are as follows.

- CHANGE the standard name into "National Food Safety Standard - Food Contact Materials and Articles - Determination of cadmium migration quantity";
- ADD the graphite furnace atomic absorption spectrometry;
- ADD the inductively coupled plasma mass spectrometry;
- ADD the inductively coupled plasma emission spectrometry;
- DELETE the dithizone colorimetric method.

National Food Safety Standard

Food Contact Materials and Articles -

Determination of cadmium migration quantity

1 Scope

This standard specifies the determination of cadmium migration quantity after immersion of food contact materials and articles in food simulants by graphite furnace atomic absorption spectrometry, inductively coupled plasma mass spectrometry, inductively coupled plasma emission spectroscopy, and flame atomic absorption spectrometry.

This standard applies to the determination of cadmium migration quantity in food contact materials and articles.

Method I. Graphite furnace atomic absorption spectrometry

2 Principles

USE the food simulant to soak the portion of the food contact materials and articles which is expected to contact with the food; MAKE the soaking solution be subjected to graphite furnace atomization; AND the absorbance value determined at 228.8 nm is proportional to the cadmium content within a certain concentration range; COMPARE it with the standard series for quantitation.

3 Reagents and materials

Unless otherwise noted, the reagents used in this method are excellent grade pure AND the water is level II water as specified in GB/T 6682.

3.2.1 Food simulant. PREPARE it in accordance with the provisions of GB 5009.156.

3.2.2 Nitric acid solution (1+9). MEASURE 10 mL of nitric acid; ADD it into 90 mL of water; MIX it uniformly.

3.2.3 Nitric acid solution (5+95). PIPETTE 50 mL of nitric acid into 950 mL of water; MIX it uniformly.

3.2.4 Ammonium dihydrogen phosphate solution (20 g/L). WEIGH 2.0 g of ammonium dihydrogen phosphate; USE water to dissolve it; MAKE its volume reach to 100 mL.

3.3 Standard substance

Cadmium chloride (, CAS number. 7790-78-5). Purity > 99.99%, OR the cadmium standard solution as certified nationally and awarded with standard substance certificate.

0.2032 g (accurate to 0.0001 g) of cadmium chloride; USE a small amount of nitric acid solution (1+9) to dissolve it; TRANSFER it into a 1000 mL volumetric flask; ADD water to the mark; MIX it uniformly.

3.4.2 Cadmium standard intermediate (100 µg/L). PIPETTE 1.00 mL of cadmium standard stock solution into a 1000 mL volumetric flask; ADD nitric acid solution (5+95) to the mark; MIX it uniformly.

4 Instruments and equipment

Note: All glassware need to be soaked in nitric acid solution (1+5) overnight, repeatedly rinsed with tap water, and finally washed clean with water.

5.1 Sample pre-treatment

According to the expected use and conditions of use of the sample to be tested, CONDUCT the migration test in accordance with the migration test method and test conditions as specified in GB 5009.156 and GB 31604.1.

5.2.1 Instrument reference conditions

The instrument reference conditions are as shown in Table A.

5.2.2 Standard curve making

In the order of concentration from low to high, respectively PIPETTE 10 µL of cadmium standard series solution and 5 µL of ammonium dihydrogen phosphate solution (20 g/L) (the optimum injection volume can be determined according to the instrument used);

6 Analysis results expression

OBTAIN the cadmium concentration from the standard curve; after deducting the blank value, CALCULATE the migration quantity in accordance with GB 5009.156,

7 Precision

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