



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

GB 31604.63-2025

**National food safety standard - Food contact materials and
articles - Determination of the migration of 4,4'-biphenol and of
1,1'-sulfonylbis(4-chlorobenzene)**

食品安全国家标准 食品接触材料及制品 4,4'-联苯二酚和1,1'-磺酰基二 (4-氯苯)
迁移量的测定

Issued on: September 2, 2025

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and Quarantine of the People's Republic of China, National Health
Commission of the People's Republic of China**

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Foreword

This document was issued on 2 September 2025 by the the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, National Health Commission of the People's Republic of China and takes effect on 2 March 2026.

It is a GB standard without the /T suffix: compliance is mandatory in China.

The document runs to 15 pages in translation. The identification, the dates, the table of contents and the clauses reproduced on this page are taken from the standard itself.

GB 31604.63-2025 National food safety standard- Food contact materials and products - Determination of migration of 4,4'- biphenol and 1,1'- sulfonyl bis (4-chlorobenzene)
English, Anglais, Englisch, Inglés, ???

National Food Safety Standard - Food Contact Materials and Articles - Determination of migration of 4,4'- biphenol and 1,1'- sulfonyl bis (4-chlorobenzene)

Determination of migration of 4,4'- biphenol and 1,1'- sulfonyl bis (4-chlorobenzene)

1 Scope

GB 31604.63-2025 is the Chinese national food safety method for the migration of 4,4'-biphenol and 1,1'-sulfonylbis(4-chlorobenzene) from food contact materials. Both are monomers of polysulfone and polyethersulfone, the high temperature engineering plastics used where a food contact article has to be steam sterilised or run hot: baby bottles, medical and dairy tubing, membrane housings, coffee machine parts and reusable service ware. Their heat resistance is the reason they are used and the reason migration has to be checked, because migration testing for them is done at temperatures at which most plastics would not survive. The standard describes the determination of the migration by liquid chromatography, and covers the principle, the reagents and materials, the apparatus, the food simulants and the migration test conditions, the preparation of the test and standard solutions, the analytical procedure, the calculation of results, the precision and the limit of

quantification. It is a new method, effective September 2025.

This standard specifies the method for determining the migration of 4,4'-diphenol and 1,1'-sulfonylbis(4-chlorophenyl) in food contact materials and articles.

This standard applies to the determination of migration levels of 4,4'-dihydroxybenzene and 1,1'-sulfonyldi(4-chlorophenyl) in plastic and coated food contact materials and articles.

2 Principle

After migration testing of food contact materials and articles, food simulants in water, 4% (v/v) acetic acid, 10% (v/v) ethanol, 20% (v/v) ethanol, and 50% (v/v) ethanol are filtered and directly injected; Chemical substitute solvents (95% ethanol, iso-octane) are nitrogen-flushed, redissolved in acetonitrile-water solutions, filtered, and injected. Corn oil food simulants are extracted with acetonitrile followed by solid-phase column extraction. Detection is performed by liquid chromatography with external standard quantification.

Part I Determination of Migration Levels of 4,4'-Dibenzophenol and 1,1'-Sulfonylbis(4-chlorophenyl) in Water-Based Food Simulants and Chemical Substitute Solvents

3 Reagents and Materials

Unless otherwise specified, reagents used in this method are analytical grade. Water complies with Grade 1 water as defined by GB/T 6682.

3.1 Reagents

3.1.1 Glacial acetic acid ($C_2H_4O_2$).

3.1.2 Anhydrous ethanol (C_2H_6O).

3.1.3 95% ethanol (C_2H_6O).

3.1.4 Isooctane (C_8H_{18}).

3.1.5 Methanol (CH_4O): Chromatography grade.

3.1.6 Acetonitrile (C_2H_3N): Chromatography grade.

3.1.7 Dimethyl sulfoxide (C_2H_6OS).

3.1.8 Acetone (C_3H_6O).

3.2 Reagent Preparation

3.2.1 Preparation of 4% acetic acid solution, 10% ethanol solution, 20% ethanol solution, and 50% ethanol solution shall follow GB 5009.156.

3.2.2 Acetonitrile-water solution (1+1): Mix acetonitrile and water uniformly in a 1:1 volume

ratio.

3.3 Reference Standards

3.3.1 4,4'-Dihydroxybenzene (C₁₂H₁₀O₂, CAS No.: 92-88-6): Purity ≥98%, or a reference material/standard sample certified by a national authority and issued with a Certificate of Analysis.

3.3.2 1,1'-Sulfonylbis(4-chlorophenyl) (C₁₂H₈Cl₂O₂S, CAS No.: 80-07-9): Purity ≥98%, or a national certified reference material/standard sample granted a certificate of analysis.

3.4 Standard Solution Preparation

3.4.1 Standard Stock Solution (1000 mg/L)

Accurately weigh 50 mg each of 4,4'-dihydroxybenzene and 1,1'-sulfonylbis(4-chlorophenyl) standard substances (accurate to 0.1 mg). Dissolve each in methanol and transfer to two 50 mL volumetric flasks. Dilute to the mark with methanol and mix thoroughly. Transfer the solutions to brown glass containers. Store tightly closed in the dark at 4°C. Shelf life: 6 months.

3.4.2 4,4'-Dihydroxybenzene Standard Intermediate Solution A (50 mg/L)

Transfer 5.0 mL of the 4,4'-Dihydroxybenzene standard stock solution (1000 mg/L) to a 100 mL volumetric flask. Dilute to the mark with acetone, mix thoroughly to obtain 4,4'-Dihydroxybenzene Standard Intermediate Solution A with a mass concentration of 50.0 mg/L. Transfer the solution to a brown glass container, store tightly closed in the dark at 4°C, with a shelf life of 3 months.

3.4.3 Prepare a mixture of standard intermediate solution A (5 mg/L)

Pipette 0.5 mL each of the 4,4'-Dihydroxybenzene and 1,1'-Sulfonylbis(4-chlorophenyl) standard stock solutions (1000 mg/L) into a 100 mL volumetric flask. Dilute to the mark with acetone, mix thoroughly, to obtain Mixed Standard Intermediate Solution A. with a mass concentration of 5.0 mg/L for each substance. Transfer the solution to a brown glass container, store it tightly closed at 4°C protected from light, and use within 3 months.

3.4.4 Standard Series Working Solutions

3.4.4.1 Standard Series Working Solutions (Applicable to Water, 4% Acetic Acid, 10% Ethanol, 20% Ethanol, 50% Ethanol Food Simulants)

Pipette 50 uL, 100 uL, 200 uL, 400 uL, and 1000 uL of mixed standard intermediate solution A (5 mg/L) into five 10 mL volumetric flasks. Then pipette 200 uL, 400 uL, 1000 uL, 2000 uL of 4,4'-Dihydroxybenzene standard intermediate solution A (50 mg/L) into four 10 mL volumetric flasks. Dilute each to the mark with acetonitrile-water solution (1+1) and mixed thoroughly to obtain a series of 4,4'-dihydroxybenzene standard working solutions with concentrations of 0.025 mg/L, 0.050 mg/L, 0.10 mg/L, 0.20 mg/L, 0.50 mg/L, 1.0 mg/L,

2.0 mg/L, 5.0 mg/L, 10.0 mg/L. Prepare the 1,1'-sulfonylbis(4-chlorophenyl) standard series working solutions with concentrations of 0.025 mg/L, 0.050 mg/L, 0.10 mg/L, 0.20 mg/L, and 0.50 mg/L. Prepare fresh solutions as needed.

3.4.4.2 Standard Series Working Solutions (Applicable to Chemical Substitute Solvents)

Pipette 50 μ L, 100 μ L, 200 μ L, 400 μ L, and 1000 μ L of mixed standard intermediate solution A (5 mg/L) into five 10 mL volumetric flasks. Then add 200 μ L, 400 μ L, 1000 μ L, and 2000 μ L of 4,4'-Dihydroxybenzene standard intermediate solution A (50 mg/L) into four 10 mL volumetric flasks. Dilute each to the mark with the corresponding chemical substitute solvent (95% ethanol or iso-octane), and mixed thoroughly to obtain a series of 4,4'-dihydroxybenzene standard working solutions with concentrations of 0.025 mg/L, 0.050 mg/L, 0.10 mg/L, 0.20 mg/L, 0.50 mg/L, 1.0 mg/L, 2.0 mg/L, 5.0 mg/L, 10.0 mg/L, 1,1'-sulfonyl di(4-chlorophenyl) standard series working solutions have mass concentrations of 0.025 mg/L, 0.050 mg/L, 0.10 mg/L, 0.20 mg/L, 0.50 mg/L. Prepare fresh before use. Prior to instrument operation, process simultaneously with the chemical substitute solvent immersion solution according to 5.1.2.2.

3.5 Materials

3.5.1 Cartridge Filter: Equipped with hydrophilic polytetrafluoroethylene (PTFE) microporous membrane, pore size 0.45 μ m.

4 Instruments and Equipment

4.1 High-Performance Liquid Chromatograph: Equipped with a UV detector or diode array detector.

4.2 Balance: Sensitivity of 0.1 mg.

4.3 Nitrogen Concentrator.

5 Analytical Procedure

5.1 Test Solution Preparation