GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB 31604.16-2016

National Food Safety Standard - Food contact materials and articles - determination of styrene and ethylbenzene

Issued on: October 19, 2016 **Implemented on: April 19, 2017**

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

Table of Contents

Foreword

This Standard replaces “Part 4.4 - Ethylbenzene compounds” of GB/T 5009.98-2003 “Method for analysis of hygienic standard of unsaturated polyester resin and glass fibre reinforced plastics used as food containers and packaging materials”, “Part 6 - Styrene, ethylbenzene, and other volatile components” of GB/T 5009.59-2003 “Method for analysis of hygienic standard of polystyrene resin for food packaging”.

As compared with “Part 6 - Styrene, ethylbenzene, and other volatile components” of GB/T 5009.59-2003, the main changes of this Standard are as follows:

- CHANGE the Standard’s name to “National Food Safety Standard - Food contact materials and articles - determination of styrene and ethylbenzene”;

- MODIFY the type of chromatographic column;

- ADD the method for determination of insoluble samples.

National Food Safety Standard - Food contact materials and articles - determination of styrene and ethylbenzene

1 Scope

This Standard specifies the gas chromatography method for determination of styrene and ethylbenzene in food contact materials and articles.

This Standard applies to the determination of styrene and ethylbenzene in polystyrene products, unsaturated polyester resin, and its glass fiber reinforced plastic products.

2 Principles

After extracting the sample with carbon disulfide, INJECT the sample into gas chromatography. Styrene, ethylbenzene, internal standard n-dodecane, and other components are separated in the chromatographic column. USE hydrogen flame ionization detector to detect; and USE internal standard method to quantify.

3 Reagents and materials

3.1 Reagent

Carbon disulfide (CS_2, CAS Number: 75-15-0): chromatographically pure.

3.2 Standards

3.2.1 Styrene (C_8H_8, CAS Number: 100-42-5): The purity shall be greater than 99.5%. Or the reference material certified by the state and awarded a Certificate of Reference Material.

3.2.2 Ethylbenzene (C_8H_{10}, CAS Number: 100-41-4): The purity shall be greater than 99.5%. Or the reference material certified by the state and awarded a Certificate of Reference Material.

3.2.3 N-dodecane ($C_{12}H_{26}$, CAS Number: 112-40-3): The purity shall be greater than 99%. Or the reference material certified by the state and awarded a Certificate of Reference Material.

5 mL of carbon disulfide; then ADD 1.0 mL of internal standard intermediate solution of n-hexane into each volumetric flask; USE carbon disulfide to dilute them; and SHAKE well to obtain a working solution. The concentration of styrene and ethylbenzene is 1.0 μg/mL, 5.0 μg/mL, 10.0 μg/mL, 20.0 μg/mL, 50.0 μg/mL, 100.0 μg/mL, respectively. The internal standard concentration is 50 μg/mL. The storage conditions of the solution are the same as those under 3.3.1.

4 Instruments and equipment

4.1 Gas chromatograph: Equipped with hydrogen flame ionization detector (FID).

4.2 Analytical balance: sensitivity is 0.0001 g.

4.3 Ultrasonic cleaning machine.

4.4 Cryogenic lapping instrument.

4.5 Conical flask: 25 mL.

5 Analytical procedures

5.1 Sample processing

The samples that are soluble in carbon disulfide shall be weighed directly. The samples that are insoluble in carbon disulfide shall be first crushed by cutting tools such as a cryogenic lapping instrument or scissors, and then weighed after being smaller than 1 mmX1 mm. When cutting a sample, do not heat or soften it.

5.2 Preparation of sample solution

For samples that are soluble in carbon disulfide, WEIGH 0.5 g (accurate to 0.001 g) of the sample into a 25 mL volumetric flask; TRANSFER 10 mL of carbon disulfide to the volumetric flask and ADD 1.0 mL of internal standard intermediate solution. Let stand until the sample is dissolved, USE carbon disulfide to dilute it to volume. For samples that are insoluble in carbon disulfide, WEIGH 0.5 g (accurate to 0.001 g) of the sample into a 25 mL conical flask and TRANSFER 10 mL of carbon disulfide to the conical flask. After capping, USE an ultrasonic cleaning machine to extract for 20 min and TAKE the supernatant into a 25 mL volumetric flask. Then, by the same method, USE 10 mL of carbon disulfide to extract again; COMBINE the two supernatants in the 25 mL volumetric flask; and ADD 1.0 mL of internal standard intermediate solution to

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------