4213 Determination of Ethylene Glycol and Total Terphthaloyl Moieties for Plastic Containers

Method 1 Determination of Ethylene Glycol for Plastic Containers

This method applies to the determination of ethylene glycol in plastic containers produced mainly from polyethylene terephthalate (PET) or polyethylene terephthalate G (PET G).

Reagents

(1) Periodic acid solution: Dissolve 125mg of periodic acid in 10ml of water.

(2) Sulfuric acid solution: To 50ml of water slowly added, with constant stirring, 50ml of sulfuric acid, and allow to cool to room temperature.

(3) Sodium bisulfite solution: Dissolve 100mg of sodium bisulfite in 10ml of water. Use this solution within 7 days.

(4) Disodium chromotropate solution: Dissolve 100mg of disodium chromotropate in 100ml of sulfuric acid. Protect this solution from light and use within 7 days.

Preparation of reference solution: Dissolve a quantity of ethylene glycol CRS, accurately weighed, in water, and dilute quantitatively and stepwise if necessary to obtain a solution having a known concentration of about 1μg/ml.

Preparation of test solution: Fill a sufficient number of test samples to 90% of their labeled filling volume with water to obtain not less than 30ml. Fit the test samples with impervious seals such as aluminum foil and apply closures. Then incubate at 49□±2□ for 10 days. Take out, allow to cool to room temperature, and use as the test solution.

Preparation of blank solution: Add the same batch of water as the test solution to a clean glass container to prepare the blank solution in the same manner.

Determination: Transfer accurately 1.0ml of reference solution, test solution, and blank solution respectively to three 10ml volumetric flasks. To each of the three flasks, add 100μl of periodic acid solution, mix, and allow to stand for 60min. Add 1.0ml of sodium bisulfite solution to each flask, and mix. Add 100μl of disodium chromotropate solution to each flask, and mix. Add 6ml of sulfuric acid cautiously to each flask, mix, and allow the solutions to cool to room temperature.

Dilute each solution with sulfuric acid solution to volume, and mix. Concomitantly determine the absorbance of the solutions from the reference solution and the test solution in 1cm cells at the wavelength of 575nm (General Chapter 0401), using the solution from the blank solution as the method blank.

[Note] All solutions should be analyzed within 1 hour after the addition of disodium chromotropate solution.

Method 2 Determination of Total Terphthaloyl Moieties for Plastic Containers

This method applies to the determination of total terphthaloyl moieties in plastic containers produced mainly from polyethylene terephthalate (PET) or polyethylene

terephthalate G (PET G).

Extracting medium: 50% alcohol (for PET), 25% alcohol (for PET G) and *n*-heptane.

Preparation of test solution: Fill a sufficient number of test samples to 90% of their labeled filling volume with each extracting medium to obtain not less than 30ml. Fit the test samples with impervious seals such as aluminum foil and apply closures. Then incubate at 49□±2□ for 10 days. Take out, allow to cool to room temperature, and use as the test solution.

Preparation of blank solution: Add the same batch of each extracting medium as the test solution to clean glass containers respectively to prepare the corresponding blank solution in the same manner.

Determination: Determine the absorbance of the 50% alcohol or 25% alcohol test solutions in 1cm cells at the wavelength of 244nm (General Chapter 0401), using the corresponding blank solution as the method blank.

Determine the absorbance of the *n*-heptane test solutions in 1cm cells at the wavelength of 240nm (General Chapter 0401), using the *n*-heptane blank solution as the method blank.

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