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Plastics - Poly (phenylene ether) resin

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Plastics - Poly (phenylene ether) resin

1 Scope

This document specifies the technical requirements, test methods, inspection rules, marking, packaging, transportation, and storage of poly (phenylene ether).

This document is applicable to poly (phenylene ether) products produced by the polymerization of 2,6-xylenol with oxygen in the presence of a catalyst.

Note: Poly (phenylene ether) is also known as PPO.

2 Normative references

The contents of the following documents, through normative references in this text, constitute indispensable provisions of this Standard. Among them, for dated references, only the edition corresponding to that date applies to this Standard. For undated references, the latest edition (including all amendments) applies to this Standard.

GB/T 1632.1 Plastics - Determination of the viscosity of polymers in dilute solution using capillary viscometers - Part 1: General principles

GB/T 6678 General principles for sampling chemical products

GB/T 6679 General rules for sampling solid chemical products

GB/T 8170 Rules of rounding off for numerical values and expression and judgement of limiting values

GB/T 30514 Glass capillary kinematic viscometers - Specifications and operating instructions

JJG 694 Verification Regulation for Atomic Absorption Spectrophotometers

3 Terms and definitions

There are no terms and definitions that need to be defined in this document.

4 Product classification

According to its intrinsic viscosity, volatile matter, and copper content indicators, it is divided into superior and qualified products.

be equal to those of the Ubbelohde viscometer specified above. In case of dispute, it shall use the Ubbelohde viscometer.

6.2.2.2 Analytical balance: Accuracy is 0.1 mg.

6.2.2.3 Volumetric flask: 50 mL.

6.2.2.4 Glass sand core funnel: Micropore diameter is 40 μm~100 μm.

6.2.2.5 Timer: Accuracy is 0.01 s.

6.2.2.6 Constant-temperature water tank: The temperature can be controlled at (25.0±0.1)℃.

6.2.2.7 Trichloromethane: Analytically pure.

6.2.2.8 Chromic acid lotion.

6.2.3 Test procedure

6.2.3.1 Solution preparation

Weigh (0.250±0.002)g of dry specimen; transfer it to a 50 mL volumetric flask; add 15 mL of trichloromethane; shake to dissolve the specimen completely; then at 25 °C, use trichloromethane to dilute to the mark and shake well.

6.2.3.2 Test

6.2.3.2.1 Before the determination, use a glass sand core funnel to filter the solution; use a small amount of solution to rinse the filter device and the Ubbelohde viscometer. Add the filtered solution into the Ubbelohde viscometer so that the liquid level is between the filling marks. Install the Ubbelohde viscometer in the constant-temperature water bath of the Ubbelohde viscometer at (25.0±0.1)℃. Make sure that the viscosity tube is vertical; and the upper mark line is at least 30 mm lower than the surface of the water bath. After constant temperature for 15 min, measure the flow time of the specimen.

6.2.3.2.2 Repeat the measurement 3 times each; take the average value as the flow time. The range shall not be greater than 0.2 s.

6.2.3.2.3 Use the same Ubbelohde viscometer to measure the average flow time of the pure solvent by the same method; repeat the measurement 5 times. The range shall not be greater than 0.2 s. If the average flow time difference between two consecutive measurements is greater than 0.4 s, it shall use chromic acid lotion to clean the Ubbelohde viscometer.

6.2.4 Calculation

dry it at 120 ℃ for 1 h; then quickly move it into the desiccator; cool it for 45 min and weigh it, to an accuracy of 0.1 mg.

6.3.3 Calculation of volatile matter content

Volatile matter content is calculated according to formula (3).

$$w = \frac{m_1 - m_2}{m} \times 100\% \quad \cdots\cdots (3)$$

Where:

w - Volatile matter content;

m_1 - The mass of the specimen and weighing bottle before drying, in grams (g);

m_2 - The mass of the specimen and weighing bottle after drying, in grams (g);

m - The mass of the specimen, in grams (g).

6.4 Copper content

6.4.1 Instruments and reagents

6.4.1.1 Atomic absorption spectrophotometer: It shall be in line with the verification requirements of JJG 694; equipped with a copper element hollow cathode lamp. The wavelength is set at 324.7 nm. Use an air-acetylene flame to determine.

6.4.1.2 Analytical balance: Accuracy is 0.1 mg.

6.4.1.3 Volumetric flask: 100 mL and 50 mL.

6.4.1.4 Porcelain crucible: 100 mL.

6.4.1.5 Mass concentration of copper ion standard solution: 100 mg/L.

6.4.1.6 1 : 1 HNO_3 aqueous solution.

6.4.1.7 Graduated pipette: Minimum precision is 0.1 mL.

6.4.2 Sample treatment

6.4.2.1 Weigh (5.0±0.5)g of specimen in a porcelain crucible; place it on an electric furnace for carbonization until no smoke is emitted; then place it in a muffle furnace at (700±50)°C for ashing for 2 h; take it out and cool it.

6.4.2.2 Add 1.5 mL of 1 : 1 HNO_3 into the crucible; heat it to boiling on the electric furnace. After cooling, in a 50 mL volumetric flask, use deionized water to make up to

volume; shake well and set aside.

6.4.3 Preparation of standard solutions

Use a graduated pipette to pipette 0.5 mL, 1.0 mL, 1.5 mL, 2.0 mL, 2.5 mL and 3.0 mL of copper ion standard solution (6.4.1.5) into a set of 100 mL volumetric flasks, respectively. Add 3 mL of 1 : 1 HNO_3 aqueous solution to each of the above volumetric flasks. Use deionized water to dilute to the mark. Obtain copper ion standard solutions with mass concentrations of 0.5 mg/L, 1.0 mg/L, 1.5 mg/L, 2.0 mg/L, 2.5 mg/L and 3.0 mg/L, respectively.

6.4.4 Test procedure

6.4.4.1 Use an atomic absorption spectrometer and a copper element lamp at a wavelength of 324.7 nm; use an air-acetylene flame; use deionized water to adjust to zero; measure the absorbance of the standard solutions. Use copper ion concentration as the abscissa and absorbance as the ordinate; establish a standard working curve.

6.4.4.2 Use an atomic absorption spectrometer and a copper element lamp at a wavelength of 324.7 nm; use an air-acetylene flame; use deionized water to adjust to zero; measure the absorbance of the specimen. According to the standard working curve, measure the copper content in the specimen.

7 Inspection rules

7.1 Inspection lot

Use poly (phenylene ether) products of the same designation - produced on the same production line with the same raw materials and the same process - as the inspection lot. The maximum lot size shall not exceed 100 t.

7.2 Exit-factory inspection

The technical items specified in Clause 5 are all exit-factory inspection items. The sampling method and sampling quantity shall be carried out in accordance with the provisions of GB/T 6678 and GB/T 6679. The products of each production lot shall be inspected by the quality inspection department of the manufacturer. Only after passing the inspection, can they leave the factory. The exit-factory products shall be accompanied by a quality inspection conformity certificate.

7.3 Determination rules

The determination of the inspection results shall be carried out according to the rounding-off value comparison method in GB/T 8170. The grade of the lowest item shall be determined as the grade of the lot. If the inspection results are all conformity,

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