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Plastics - Polymer dispersions - Determination of sieve residue

塑料 聚合物分散体 筛余物的测定

[ISO 4576:1996, Plastics - Polymer dispersions - Determination of sieve residue (gross particle and coagulum content), MOD]

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

The modification of this document adopts ISO 4576:1996 "Plastics - Polymer dispersions - Determination of sieve residue (gross particle and coagulum content)".

Compared with ISO 4567:1996, this document has many structural adjustments. See Annex A for a comparison list of structure number changes between the two documents.

The technical differences between this document and ISO 4576:1996 and their reasons are as follows:

- The provision for "particles whose particle size is much larger than the average particle size of other particles (such as 10 times or 100 times)" has been deleted (see Chapter 1 of this document) to adapt to the technical conditions of China and increase operability;

- Water of the same purity (see 5.1 of this document) has been deleted to adapt to the technical conditions of China;

- Replace ISO 3310-1:1990 (see 6.1 of this document) with normatively cited GB/T 6003.1-2022 to adapt to the technical conditions of China and increase operability;

- The temperature control accuracy of the test chamber has been added (see 6.6 of this document) to improve the accuracy of test results;

- The capacity of the 500 mL beaker has been added (see 6.8 of this document), and the 600 mL specification beaker in the original text has been deleted to adapt to the technical conditions of China;

- General laboratory instruments (see 6.10 of this document) have been added to facilitate operator use;

- Replace ISO 123:1985 and ISO 842:1984 (see 7.1 of this document) with normatively cited GB/T 3186-2006. There is no consistent correspondence between the two documents to adapt to the technical conditions of China and increase operability;

- Add requirements for coarse filtration of sampling (see 7.2 of this document) to improve the accuracy of test results;

- Add post-sampling test time (see 7.2 of this document) to improve the accuracy of test results;

Plastics - Polymer dispersions - Determination of sieve residue

1 Scope

This document describes a method for the determination of the mass fraction of sieve residues, i.e., coarse particles and coagulum, in polymer dispersions.

This document applies only to coagulated polymer dispersions.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 3186-2006, *Paints, varnishes and raw materials for paints and varnishes - Sampling*

GB/T 6003.1-2022, *Test sieves - Technical requirements and testing - Part 1: Test sieves of metal wire cloth* (ISO 3310-1:2016, MOD)

3 Terms and definitions

There are no terms or definitions to be defined in this document.

4 Method overview

Dilute the polymer dispersion with deionized water. Use metal mesh filtration with specific mesh size. Wash with deionized water. Dry and weigh its mass.

5 Reagents

5.1 Deionized water.

5.2 Surfactant: To stabilize the polymer dispersion during testing (if necessary), to be agreed upon by the parties involved.

(6.4) to weigh the mass of the specimen to the nearest 1 mg, recorded as m_0. The specimen mass can be increased according to the measurement accuracy, but shall not exceed 1000 g.

8.2 Dilute the specimen with twice the mass of the specimen in the deionized water (5.1). Stir with a glass rod or slowly rotating stirrer to mix thoroughly without disrupting existing agglomerates. If necessary, add an appropriate amount of surfactant (5.2) before dilution.

NOTE: Dilution with water is used to prevent film formation and promote flow, resulting in rapid and complete filtration. The purpose of the surfactant is to prevent further agglomeration or coagulation during testing.

8.3 When the test sieve is not clean, soak it in boiling water for 30 min. Then rinse with acetone. When boiling water cannot clean the screen, you can clean the screen by burning it at high temperature or use other appropriate cleaning methods. Rinse with acetone. Dry and set aside. For non-metal mesh test sieves, appropriate cleaning methods shall be used.

8.4 Place the clean test sieve (6.1) of appropriate size into the test chamber (6.6) and dry to constant weight. The temperature shall be 105℃±2℃. Other optional temperatures are 125°C or 140°C. The choice of temperature depends on the stability of the polymer and the additives it contains.

8.5 Place the test sieve after constant weight in the desiccator (6.7) to cool to room temperature. Use the balance (6.3) to weigh the test sieve to the nearest 0.1 mg, recorded as m_1.

8.6 Place the test sieve on the steel ring or glass funnel (6.2). Wet or wash the test sieve with deionized water (5.1) or a suitable surfactant (5.2). Pour the diluted sample into the center of the test sieve.

8.7 After filtration is completed, wash the residue on the test sieve with deionized water or an appropriate surfactant (5.2). Then wash with deionized water until a clear filtrate is obtained.

8.8 Dry the test sieve with residue at 105°C ±2°C or other temperature for 30 min. Place in a desiccator to cool to room temperature and weigh. Repeat drying for 15 min and weigh the mass until constant weight.

8.9 Weigh the test sieve with residue to the nearest 0.1 mg, recorded as m_2.

8.10 Repeat steps 8.1~8.8. Carry out the determination in duplicate.

9 Calculation and presentation of results

9.1 Calculate the sieve residue content W of test sieves of different specifications according to formula (1):

$$W = \frac{m_2 - m_1}{m_0} \times 100 \qquad \cdots\cdots(1)$$

Where,

W - Screen residue content of test sieve, %;

m_2 - The mass of test sieve and residue, in grams (g);

m_1 - The mass of the test sieve, in grams (g);

m_0 - The sample mass, in grams (g);

9.2 Calculate the arithmetic mean of the two measurements and keep it to one decimal place. The absolute difference between two independent test results shall not be greater than 5% of the average value. Otherwise, the measurement shall be re-measured until the requirements are met.

10 Precision

In the same laboratory, the same operator uses the same equipment, according to the same test method, and the same measured object is tested independently within a short period of time. The absolute difference between the two independent test results obtained is not greater than 8% of the arithmetic mean of the two measured values.

11 Test report

The test report shall include at least the following information:

a) Reference to this document;

b) Details of the specimen;

c) Test sieve specifications and models;

d) Test date;

e) Test temperature and other test condition information;

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