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General methods on determination of cosmetics -

Determination of relative density

化妆品通用检验方法 相对密度的测定

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Table of Contents

Foreword	3
1 Scope	4
2 Method I: Density bottle method.....	4
3 Method II: Density meter method	5
4 Method III: Instrument method	6

General methods on determination of cosmetics - Determination of relative density

1 Scope

This Part of GB/T 13531 specifies the test methods for the relative density of liquid and semi-solid cosmetics.

The Method I and Method II of this Part are applicable to the determination of relative density of liquid cosmetics.

The Method III of this Part is applicable to the determination of relative density of liquid and semi-solid cosmetics.

2 Method I -- Density bottle method

2.1 Principle

Respectively measure the mass of the sample and distilled water of the same volume at a certain temperature. The ratio of the mass of the sample to the mass of distilled water is the relative density.

2.2 Instruments

2.2.1 Density bottle: A 25 mL density bottle with a thermometer. The division value of the thermometer is 0.5 °C.

2.2.2 Constant temperature water bath: The temperature control accuracy is ± 0.5 °C.

2.2.3 Analytical balance: The division value is 0.0001 g.

2.3 Procedure

TAKE a clean density bottle and PLACE it in a drying cabinet at 100 °C ~ 105 °C to dry to a constant weight; MEASURE its mass (accurate to 0.0001 g). Then ADD the distilled water that has just been boiled and cooled to about 2 °C lower than the specified temperature; FILL the density bottle; INSERT a thermometer. Then PLACE the bottle in a constant temperature water bath at the specified temperature for 20 min. After the distilled water reaches the specified temperature, USE filter paper to wipe off the water overflowing the capillary;

to formula (3):

$$\rho = A \times P^2 - B \quad \dots\dots\dots (3)$$

where:

ρ - the liquid density, in grams per cubic centimeter (g/cm³);

A - the U-shaped tube constant, in grams per cubic centimeter quadratic microseconds (g/cm³ · μ s²);

P - the oscillation period, in microseconds (μ s);

B - the U-shaped tube constant, in grams per cubic centimeter (g/cm³).

4.2 Instrument

4.2.1 Digital density meter: with automatic viscosity correction and temperature heat balance functions, such as DMA4100M, or equivalent.

4.2.2 Accuracy of digital density meter:

- Temperature ± 0.05 °C (0 ~ 50 °C);
- Density ± 0.0001 g/cm³ (0 ~ 3 g/cm³).

If an autosampler is used, the viscosity of the sample at t °C of the instrument is not more than 35 Pa · s.

4.3 Procedure

4.3.1 CALIBRATE the instrument according to the requirements of the instrument instructions before test.

4.3.2 SET the temperature of the instrument to the temperature for test.

4.3.3 USE a syringe to inject the sample and fill a clean and dry measuring cell.

4.3.4 CONFIRM that the measuring cell is free of bubbles through the bubble detection function or through the observation window.

4.3.5 When the instrument steadily displays the density value or relative density value, record the value.

4.4 Result representation

Take the average of the two determinations as the final result.

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Accountable person and shareholder: Wayne Zheng

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

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