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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Testing method for the wettability of dispersible powders of
pesticides**

(English Translation)

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1 Scope

This Standard is applicable to the determination for the wettability of dispersible powders of pesticides.

2 Method summary

Pour a certain amount of wettable powder from a specified height into a beaker containing a certain amount of standard hard water. Determine the time it takes for complete wetting.

3 Instruments and equipment

Volumetric flasks: 100 mL, 1000 mL.

Pipette: 10 mL.

Polyethylene bottle: 1000 mL.

Thermometer: graduation value is 1°C; range is 0°C ~50°C or 0°C ~100°C.

Beakers: 250 mL (inner diameter is 6.5 cm ± 0.5 cm, height is 9.0 cm ± 0.5 cm), 100 mL, 800 mL, 1000 mL.

Stopwatch.

Graduated cylinders: 20 mL, 100 mL±1 mL, 500 mL.

Watch glass (diameter is 9.0 cm ± 0.5 cm).

Constant temperature water bath.

pH meter.

4 Reagents and solutions

Calcium carbonate: bake at 400°C for 2 h before use.

Magnesium oxide: bake at 105°C for 2 h before use.

Anhydrous calcium chloride.

Magnesium chloride with crystal water ($\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$).

Ammonia: $c(\text{NH}_3 \cdot \text{H}_2\text{O})=1 \text{ mol/L}$ solution.

Hydrochloric acid: $c(\text{HCl})=2 \text{ mol/L}$ solution, $c(\text{HCl})=1.0 \text{ mol/L}$ solution and $c(\text{HCl})=0.1 \text{ mol/L}$ solution.

Methyl red: $\rho(\text{methyl red})=5 \text{ g/L}$ solution.

Sodium hydroxide: $c(\text{NaOH})=0.1 \text{ mol/L}$ solution.

5 Preparation of standard hard water [$\rho(\text{Ca}^{2+} + \text{Mg}^{2+})=342$

mg/L]

The following three methods are optional.

5.1.1.1 Solution A -- Preparation of $c(\text{Ca}^{2+}) = 0.04 \text{ mol/L}$ solution

Accurately weigh 4.000 g of calcium carbonate and place it in an 800 mL beaker. Add a little water to moisten. Then slowly add 82 mL of 1.0 mol/L hydrochloric acid. Stir thoroughly to combine. After all the calcium carbonate is dissolved, add 400 mL of water. Boil to remove carbon dioxide. After cooling to room temperature, add 2 drops of methyl red indicator solution. Neutralize with 1 mol/L ammonia until orange.

Transfer this solution to a 1000 mL volumetric flask. Bring to the volume with water.

Shake well. Store in polyethylene bottles until later use.

5.1.1.2 Solution B -- Preparation of $c(\text{Mg}^{2+}) = 0.04 \text{ mol/L}$ solution

Accurately weigh 1.613 g of magnesium oxide and place it in an 800 mL beaker. Add a little water to moisten. Then slowly add 82 mL of 1.0 mol/L hydrochloric acid. Stir well to combine and heat gently. After all the magnesium oxide is dissolved, add 400 mL of water. Boil to remove carbon dioxide. After cooling to room temperature, add 2 drops of methyl red indicator solution. Neutralize with 1 mol/L ammonia until orange.

Transfer this solution to a 1000 mL volumetric flask. Bring to the volume with water.

Shake well. Store in polyethylene bottles until later use.

5.1.2 Preparation of standard hard water

Pipette 68.5 mL of solution A and 17.0 mL of solution B into a 1000 mL beaker. Add

Annex A (standard)

Determination method for total hardness of hard water

A1 Reagents and solutions

Ammonium chloride.

Concentrated ammonia.

Buffer solution (pH=10): Weigh 67.5 g of ammonium chloride and 570 mL of concentrated ammonia water. Dilute to 1 L with distilled water. Mix well.

Acid chrome blue R.

Naphthol green.

Potassium sulfate.

Calcium magnesium mixed indicator: Weigh 1.0 g of acid chromium blue R, 2.0 g of naphthol green and 100.0 g of potassium sulfate. Place them in an agate mortar. Grind finely and mix well. Store in brown bottles to prevent water absorption and light.

EDTA disodium.

Pure zinc (or zinc oxide).

Concentrated hydrochloric acid.

Methyl orange.

Preparation of EDTA disodium standard titration solution: Weigh 7.44 g of disodium

EDTA. Dissolve in distilled water and dilute to 1000 mL.

Calibration of EDTA disodium standard titration solution: Weigh approximately 0.016 g of pure zinc (or 0.024 g of zinc oxide), accurate to 0.00002 g. Add concentrated hydrochloric acid to dissolve. Use methyl orange as indicator. Neutralize with concentrated ammonia to neutrality. Add 1 mL of buffer solution. Add about 0.1 g of calcium and magnesium mixed indicator. Titrate with EDTA disodium solution to a greenish color. Do a blank test under the same conditions.

The concentration c (EDTA disodium) of the EDTA disodium standard titration solution is calculated according to formula (A1) or formula (A2):

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