

ICS 71.100.40



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

GB/T 11275-2007

**Surface active agents -- Determination of water content
(English Translation)**

Issued on: February 27, 2026

Implemented on: September 1, 2026

Issued by: State Administration for Market Regulation

Table of Contents

Foreword...	3
1 Scope...	5
2 Normative references...	5
3 Terms and definitions...	5
4 Method A -- Karl Fischer volumetric titration...	6
5 Method B -- Karl Fischer coulometric titration...	11
6 Method C -- Xylene azeotropic distillation...	16
7 Test report...	17

1 Scope

This document describes methods for the determination of the water content of surface active agents.

This document applies to the determination of water content in powdered, paste-like, and liquid surface active agents.

Method A - Karl Fischer volumetric titration - is suitable for samples with a water content (mass fraction) greater than 2%. Method B - Karl Fischer coulometric titration

- is suitable for samples with a water content (mass fraction) of less than 0.1%. Both methods are applicable to samples with a water content between 0.1%~2%. When the specimen contains basic compounds such as silicates, carbonates, hydroxides and borates, they can react with Karl Fischer reagent, causing the measured value to be higher than expected. Therefore, it is necessary to analyze the basic compounds in the sample before measurement.

Method C - Xylene azeotropic distillation - is suitable for samples with a water content (mass fraction) greater than 5%, but it is not suitable for products containing water- soluble volatiles, such as products containing ethanol.

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 6372, Surface active agents and detergents -- Methods of sample division (GB/T 6372-2006, ISO607.1980, IDT)

GB/T 6682, Water for analytical laboratory use -- Specification and test methods (GB/T 6682-2008, ISO 3696.1987, MOD)

GB/T 21297, Laboratory glassware -- Interchangeable conical ground joint (GB/T 21297-2007, ISO383.1976, IDT)

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

water content

The amount of free water, water of crystallization, adsorbed water, or retained water in the specimen.

NOTE: It is calculated based on the amount of Karl Fischer reagent used, expressed as a mass fraction.

4.1 Principle

The water in the specimen reacts with iodine and sulfur dioxide in the Karl Fischer reagent, which has been pre-calibrated by titration with a known accurate amount of water. The mass fraction of water content is calculated from the amount of reagent used.

4.2 Reagents and materials

WARNING. Inhalation or ingestion of chloroform or dichloromethane is harmful to humans. It may irritate the skin and cause permanent damage. Long-term exposure poses a serious risk of health damage.

4.2.1 Distilled water or water of equivalent purity, meeting the requirements for Grade

II water in GB/T6682.

4.2.2 Anhydrous methanol. analytically pure. If anhydrous methanol is known to interfere with the determination (e.g., the determination of water in aldehydes or ketones), chloroform or dichloromethane may be used, and this shall be noted in the test report.

4.2.3 Karl Fischer reagent uses commercially available pyridine-free Karl Fischer

reagent. Alternatively, pyridine-containing reagents may be prepared according to the method described in Annex C. If pyridine-free reagents are used, this shall be noted in the test report.

4.2.4 Sodium tartrate dihydrate or oxalate dihydrate. analytically pure.

4.3.1 Trace moisture analyzer, fully automatic or semi-automatic, consisting of the

following parts.

- a) Double platinum electrode titration apparatus;
- b) Piston burette. 20 mL;
- c) Drying tube containing activated silica gel, calcium chloride, or magnesium perchlorate;
- d) Titration cell;
- e) Magnetic stirring device.

4.3.2 Microsyringe. 50 μ L.

4.3.3 Volumetric flask. 100 mL.

4.3.4 Graduated pipette. 20 mL.

4.3.5 Balance. sensitivity is 0.1 mg.

4.4.1 Sampling

Test samples of surface active agents shall be prepared and stored in accordance with GB/T 6372.

4.4.2 Calibration of water equivalent of reagents using the Karl Fischer method

Calibrate the water equivalent of each new bottle of Karl Fischer reagent. Thereafter, calibrate at least once a week.

Add a certain volume (immersing the electrode 2 mm~3 mm) of anhydrous methanol to the titration cell. Titrate with Karl Fischer reagent while stirring until the reading remains stable for 30 s (do not record the volume of Karl Fischer reagent consumed).

Inject 0.04 g (accurate to 0.0001 g) of distilled water or 200 mg~250 mg (accurate to 0.0001 g) of sodium tartrate dihydrate or oxalate dihydrate into the titration cell using a microsyringe. Retitrate until the reading remains stable for 30 s, which is the endpoint.

Record the volume of Karl Fischer reagent used.

Calculate the value of water equivalent T using formula (1) or formula (2).

Where,

T - Water equivalent of Karl Fischer reagent, in milligrams per milliliter (mg/mL);

m1 - Mass of water, in grams (g);

V1 - Volume of Karl Fischer reagent consumed in titration, in milliliters (mL);

m0 - Mass of sodium tartrate or oxalic acid, in milligrams (mg);

w - Water content of sodium tartrate dihydrate (15.66) or oxalic acid dihydrate (28.57), expressed as a mass fraction;

100, 1000 - Unit conversion factors.

4.4.3 Specimen preparation

If the water content (mass fraction) of the specimen is less than 1%, then weigh 5 g~10 g (accurate to 0.0001 g) which is equivalent to a specimen containing 10 mg~50 mg of water.

If the water content (mass fraction) in the specimen is higher than 1%, weigh 1 g~5 g (accurate to 0.0001 g) into a volumetric flask. Add anhydrous methanol and dilute to the mark. Shake vigorously to dissolve the water in the sample. Let stand. Use a pipette to pipette the supernatant equivalent to 10 mg~50 mg of water.

When the water content (mass fraction) of the specimen is higher than 1%, titrate the water in the solvent according to the procedure given in 4.4.4.2. The water content of the solvent shall be deducted from the specimen result.

4.4.4.1 General rules

Based on the characteristics of the test sample, choose one of the following two methods.

the general method or the dissolution method.

The general method is suitable for samples that are homogeneous and easy to disperse in a titration cell.

The dissolution method is suitable for samples with poor homogeneity and/or those that are difficult to disperse in a titration cell.

Moisture in the atmosphere is the biggest source of interference in Karl Fischer titrations. Special care shall be taken to thoroughly dry the apparatus used and to quickly process the test samples and solvents.

The method of using a moisture meter shall follow the instructions of the instrument manufacturer.

4.4.4.2 General method

4.4.4.2.1

Determination