



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

GB 1886.214-2016

**National food safety standard - Food additives - Calcium
carbonate (including light and heavy calcium carbonate)
(English Translation)**

Issued on: August 31, 2016

Implemented on: January 1, 2017

Issued by: National Health and Family Planning commission of PRC

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1 Scope

This standard applies to food additives light calcium carbonate, crushed limestone, calcite as made through precipitation as well as the food additive heavy calcium carbonate as made from oyster shell.

2.1 Molecular formula

CaCO₃

2.2 Relative molecular mass

100.09 (according to the international relative atomic mass in 2013)

3.1 Sensory requirements

Sensory requirements shall comply with Table 1.

Table 1 -- Sensory requirements

Item Requirements Testing methods

Color White or grey white Take an appropriate amount of specimen in a 50 mL beaker, to observe the color and state in natural light State Powder

3.2 Physical-chemical indicators

Physical-chemical indicators shall meet the requirements of Table 2.

Table 2 -- Physical-chemical indicators

Item Indicators Testing methods

Content of calcium carbonate (CaCO₃) (on a dry basis), w/% 98.0 ~ 100.5 A.4 in Appendix A

Insoluble of hydrochloric acid, w/%, ≤ 0.2 A.5 in Appendix A

Free base Pass the test A.6 in Appendix A

Appendix A

Testing method

A.1 Warning

Some of the reagents used in the test methods of this standard are toxic or corrosive, so during operation, it shall take appropriate safety and protective measures.

A.2 General requirements

The reagents and water used in this standard refer to, when no other requirements are indicated, the analytical pure reagents and the grade-3 water as specified in GB/T 6682. The standard solution, standard solution for determination of impurities, reagents and preparations as required in the test of this standard, when no other requirements are indicated, shall be prepared according to the provisions of GB/T 601, GB/T 602, GB/T 603. When the reagents which are used to prepare the solution used are not specified, the solution refers to aqueous solution.

A.3.1 Identification of calcium

Take a small amount of specimen. Add hydrochloric acid solution (1 + 2) to dissolve it. Use phenolphthalein solution (10 g/L) as an indicator solution. Use ammonia solution (1 + 3) to adjust to neutral. Add ammonium oxalate solution (35 g/L) to produce a white precipitate, which is soluble in the hydrochloric acid solution (1 + 2) but insoluble in glacial acetic acid.

A.3.2 Identification of carbonate

Take a small amount of specimen. Add hydrochloric acid solution (1 + 2) to generate a gas. Lead this gas into calcium hydroxide solution (3 g/L). A white precipitate is produced.

A.4.1 Reagents and materials

A.4.1.1 Hydrochloric acid solution: 1 + 1.

A.4.1.2 Sodium hydroxide solution: 100 g/L.

A.4.1.3 Triethanolamine solution: 1 + 3.

(CaCO_3) = 100.09];

m1 - Mass of the specimen, in grams (g);

25 - Volume of the specimen solution as pipetted, in milliliters (mL);

250 - Volume of the volumetric flask, in milliliters (mL);

1000 - Conversion factor.

The test results are based on the arithmetic mean of the parallel determination results. The absolute difference between the two independent determinations as obtained under repetitive conditions is not more than 0.2%.

A.5.1 Reagents and materials

A.5.1.1 Hydrochloric acid solution: 1 + 1.

A.5.1.2 Silver nitrate solution: 10 g/L.

A.5.2 Instruments and equipment

High-temperature furnace: It can control the temperature at $800\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$.

A.5.3 Analytical procedures

Weigh approximately 5 g of the specimen, accurate to 0.01 g. Place it in a tall beaker. After adding water to wet it, slowly add 25 mL of hydrochloric acid solution. Heat to boil it. When it is still hot, use medium-speed quantitative filter paper to filter it. Use hot water to rinse the beaker. Rinse the filter paper until the filtrate has no chloride ions (use silver nitrate solution to check it). Transfer the filter paper together with the insoluble into a porcelain crucible which had been burned at $800\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$ to a constant mass. After ashing it on an electric furnace, burn it at $800\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$ until the mass is constant.

A.5.4 Calculation of results

The mass fraction of hydrochloric acid insoluble, w_2 , is calculated according to formula (A.2):

Where:

m_3 - The mass of hydrochloric acid insoluble and crucible, in grams (g);

In a water bath, heat it for 1 h. After cooling it, transfer it all into a 100 mL volumetric flask. Add water to the mark. Shake it uniformly. Place it overnight.

Perform dry filtration. Pipette 50 mL of the filtrate. Place it in a porcelain crucible that has been burned at $800\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$ to a constant mass. Add 0.5 mL of sulfuric acid. Evaporate it dry. Burn it at $800\text{ }^{\circ}\text{C} \pm 25\text{ }^{\circ}\text{C}$ until the mass is constant.

A.7.4 Calculation of results

The mass fraction of magnesium and alkali metal content, w_3 , is calculated according to formula (A.3):

Where:

m5 - The mass of the crucible and residue, in grams (g);

m6 - The mass of the empty crucible, in grams (g);

m7 - The mass of the specimen, in grams (g);

50 - The volume of the specimen solution as pipetted, in milliliters (mL);

100 - The volume of the volumetric flask, in milliliters (mL).

The test results are based on the arithmetic mean of the parallel determination results. The absolute difference between the two independent determinations as obtained under repetitive conditions is not more than 0.2%.

A.8.1 Instruments and equipment

A.8.1.1 Electrothermal drying oven: The temperature can be controlled at $200\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

A.8.1.2 Weighing bottle: $\Phi 40\text{ mm} \times 25\text{ mm}$.

A.8.2 Analytical procedures

Use a weighing bottle which had been dried to constant weight at $200\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ to weigh about 2 g of the specimen, accurate to 0.0002 g. Dry it at $200\text{ }^{\circ}\text{C} \pm$

$5\text{ }^{\circ}\text{C}$ for 4 h. Cool it to room temperature. Weigh it, accurate to 0.0002 g.

A.8.3 Calculation of results

The mass fraction of the loss on drying, w_4 , is calculated according to the

A.10.1 Summary of method

After the specimen is treated, the cadmium ions are led into the atomic absorption spectrometer in the acidic solution. After atomization, the 228.8 nm resonance line is absorbed, the absorption amount is proportional to the cadmium content, which is compared with the standard series for quantification.

A.10.2 Reagents and materials

A.10.2.1 Hydrochloric acid solution: 1 + 4.