



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

GB 1886.232-2016

Replacing GB 1904-2005

**National Food Safety Standard -- Food Additives -- Sodium
Carboxymethyl Cellulose**

食品安全国家标准 食品添加剂 羧甲基纤维素钠

(English Translation)

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Foreword

This standard replaces GB 1904-2005 "food additive sodium carboxymethyl cellulose." this standard compared with GB 1904-2005, the main changes are as follows.

- Increased content of sodium and the indicator ethanol sodium;
- Modify the drying loss, viscosity, chloride (as NaCl) and the indicator of lead;
- Remove the index requirements of iron, heavy metals.

National Food Safety Standard Food additives Sodium carboxymethyl cellulose

1 Scope

This standard applies to cellulose, sodium hydroxide and monochloroacetic acid or its sodium salt as the main raw material, the food additive sodium carboxymethyl cellulose.

2 Molecular formula, relative molecular mass and structural formula

Formula 2.1

$[C_6H_7O_2(OH)_x(OCH_2COONa)_y]_n$ n. degree of polymerization x. 1.5 ~ 2.8 y. the degree of substitution of 0.2 to 1.5 $xy = 3.0$

2.2 Formula

R = H or CH_2COONa

2.3 Relative molecular mass

n is about 100, > 17,000 (according to 2013 international relative atomic mass)

3.1 Sensory requirements

Sensory requirements shall comply with the requirements of Table 1.

Table 1 Sensory requirements

Project requires test methods White or slightly yellow color Status fibrous or granular powder the sample is placed in the appropriate uniform white porcelain plate, under the natural light Observe its color and status

3.2 Physical and Chemical Indicators

Physical and chemical indicators should be consistent with the provisions of Table 2.

Table 2. Physical and chemical indicators

Item Index Test Method Carboxymethylcellulose sodium content, w /% ≥ 99.5 Appendix A A.3 Viscosity (mass fraction of 2% aqueous solution) η /(mPa · s) ≥ 5.0 Appendix A A.4 the degree of substitution of 0.20 to 1.50 in Appendix A A.5 pH (10g/L aqueous solution) 6.0-8.5 A, Appendix A.6 Loss on drying, w /% ≤ 8.0 GB 5009.3 direct drying b Sodium ethanol, w /% ≤ 0.4 Appendix A A.7 Chloride (as NaCl), w /% ≤ 0.5 Appendix A A.8 Sodium, w /% ≤ 12.4 A.9 in Appendix A Arsenic (As)/(mg/kg) ≤ 2.0 GB 5009.76 Lead (Pb)/(mg/kg) ≤ 2.0 GB 5009.75 when a viscosity (mass fraction of 2% aqueous solution) ≥ 2000 mPa · s should use the mass fraction of 1% aqueous solution measured.

b drying temperature of $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, drying time is 2h.

Appendix A

Testing method

A.1 General Provisions Unless otherwise specified in this standard, the purity of the reagents used should be analytically pure, the standard titration solution, impurity measurement standard solution, preparations and Products, should be GB/T 601, GB/T 602, preparation, test water should be consistent with GB/T 6682 provisions prescribed in the three water GB/T 603's.

Solution was used in the tests did not indicate what is formulated with solvent, it refers to an aqueous solution.

A.2 Identification Test A.2.1 Reagents and materials A.2.1.1 hydrochloric acid.

A.2.1.2 potassium iodide - iodine solution. Take 0.5g of iodine and potassium iodide 1.5g dissolved in 25mL water.

A.2.1.3 copper sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) solution. 20g/L.

A.2.2 Preparation of test solution Take 2g sample was placed in 100mL of warm water, stir, and continue stirring until jelly, cooled to room temperature.

A.2.3 Identification method A.2.3.1 about taking the test solution 30mL, add 2 drops to 3 drops of potassium iodide - iodine solution, does not appear blue.

A.2.3.2 about taking the test solution 50mL, 10mL copper sulfate solution was added, resulting in a fluffy pale blue precipitate.

A.2.3.3 with hydrochloric moist platinum wire, the first burning flame on colorless to colorless, then dipped a little test solution, colorless flame burning in fire that flame was bright yellow.

A.3 Determination of sodium carboxymethyl cellulose content Sodium carboxymethyl cellulose sodium content equal to 100% minus the mass fraction of alcohol (w1) and chloride content (w2).

A.4 Determination of viscosity A.4.1 Instruments and Equipment A.4.1.1 viscometer. Value or Analog.

A.4.1.2 glass. diameter of about 90mm, a height of about 122mm, in diameter from top to bottom, capacity of about 500mL.

A.4.1.3 water bath.

A.4.1.4 mechanical stirrer. stainless steel or glass, connected to the load at a different energy to 900r/min $\pm$ 100r/min of the rotation becomes Speed motor on.

A.4.2 Analysis step

Weigh 5.0g (formulated mass fraction of 1% of the test solution) or 10.0g (formulated mass fraction of 2% of the test solution) sample accurate to 1mg. Join them in the glass 495.0g (formulated mass fraction of 1% of the test solution) or 490.0g (formulated mass fraction of 2% Test solution) of water, put the blender to the glass, stirred the leaves around 10mm from the bottom of the cup, stirring was initiated and slowly added to the sample, adjusting the stirring Speed to 900r/min $\pm$ 100r/min, stirring 2h, as the sample is not completely dissolved, then continue stirring 0.5h, remove stirrer, glass Cups were placed in a water bath at 25 °C $\pm$ 0.2 °C 1h, if not permanent solution to 25 °C $\pm$ 0.2 °C, the need to continue after the thermostat to 25 °C $\pm$ 0.2 °C, Removed manually stirred 10s, with a viscosity measured viscosity. First viscometer rotor immersed in the sample solution, and then start the viscometer rotation about 1min, Stable value to be displayed after the reading.

A.4.3 Calculation Results A.4.3.1 value viscometer Direct reading, is the viscosity value of the sample.

A.4.3.2 pointer viscometer Viscosity eta, the value in mPas (mPa $\cdot$ s) said, according to the

formula (A.1) Calculated.

$$\eta = S \times k \text{ (A.1)}$$

Where.

S --- rotational viscometer pointer readings in milli-Pascal seconds (mPa · s);

And the rotational speed of the rotor coefficient chosen k --- when measured.

The test results should indicate the concentration of the test solution and the number of rotor and rotor speed.

The test results of the arithmetic mean of the parallel determination results shall prevail, the two independent determination results under repeatability conditions measured absolute difference Value must not exceed 5% to 10% of the arithmetic mean.

A.5 Determination of the degree of substitution A.5.1 Method summary the sample was washed with ethanol to remove soluble salts, dried and burned at high temperature, and the residue of sodium oxide, sodium hydroxide dissolved in water to generate, plus excess Sulfuric acid standard titration solution, titration with sodium hydroxide standard solution titrate the excess sulfuric acid, obtained by calculating each anhydrous glucose unit carboxylase the average value of methyl groups, that is, the degree of substitution.

A.5.2 Reagents and materials A.5.2.1 ethanol.

A.5.2.2 ethanol. amount of ethanol 90mL, diluted with water to 100mL.

A.5.2.3 sulfuric acid standard titration solution. $c(12H_2SO_4) = 0.1mol/L$.

A.5.2.4 sodium hydroxide standard titration solution. $c(NaOH) = 0.1mol/L$.

A.5.2.5 methyl red indicator solution. 1g/L.

A.5.3 Instruments and Equipment A.5.3.1 sintered glass crucible. filter plate aperture $15\mu m \sim 40\mu m$.

A.5.3.2 porcelain crucible. 20mL ~ 25mL.

A.5.4 Analysis step

Weigh about 1.5g sample was placed in a glass sand crucible, washed with pre-heated to $50^\circ C \sim 70^\circ C$ in ethanol several times (each time to fill Glass sand crucible) until add 1 drop of potassium chromate solution and the filtrate 1 drop of silver nitrate solution was brick red for the completion of washing, on the contrary should continue to wash Polyester, generally washed 5 times. Finally a wash with absolute ethanol, the sample is moved after washing the sand core crucible, at $120^\circ C \pm 2^\circ C$ drying 2h (At around 1h, the sand core sample crucible gently knock loose). Stamped within a desiccator, cool to room temperature. Weigh about 1g sample to the nearest 0.0002g, placed in a porcelain crucible in the furnace charring not to smoke, add $300^\circ C$ high temperature furnace, heated to $700^\circ C$