GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

GB 1886.1-2021

National food safety standard - Food additives - Sodium carbonate

食品安全国家标准

食品添加剂 碳酸钠

Issued on: February 22, 2021 **Implemented on: August 22, 2021**

Issued by: National Health Commission of the People's Republic of China; State Administration for Market Regulation.

Table of Contents

National food safety standard -

Food additives - Sodium carbonate

1 Scope

This Standard is applicable to anhydrous sodium carbonate as a food additive produced by the Hou-Soda method, ammonia-soda method or trona processing method. At the same time, it is also applicable to the food additive sodium carbonate decahydrate produced by recrystallization of food additive anhydrous sodium carbonate.

2 Molecular formula and relative molecular mass

2.1 Molecular formula

Anhydrous sodium carbonate: Na_2CO_3

Sodium carbonate decahydrate: $Na_2CO_3 \cdot 10H_2O$

2.2 Relative molecular mass

Anhydrous sodium carbonate: 105.99 (according to 2018 international relative atomic mass)

Sodium carbonate decahydrate: 286.14 (according to 2018 international relative atomic mass)

3 Technical requirements

3.1 Sensory requirements

The sensory requirements shall meet the requirements of Table 1.

Table 1 -- Sensory requirements

3.2 Physical and chemical indicators

Annex A

Inspection methods

WARNING: Some reagents used in the test method in this Standard are toxic or corrosive. Be careful when operating! If splashed on the skin, rinse immediately with water. Severe cases shall be treated immediately. For reagents containing highly toxic drugs, management shall be strictly in accordance with relevant regulations. Avoid inhalation or contact with skin when using. It shall be carried out in a fume hood if necessary. People with wounds in the exposed area shall not be touched. When using volatile acid, it shall be carried out in a fume hood. When using flammable products, it is strictly forbidden to use an open flame for heating.

A.1 General

The reagents and water used in this Standard refer to analytically-pure reagents and grade three water specified in GB/T 6682 when other requirements are not indicated. All standard solutions, preparations and products for the determination of impurities used in the test, when no other requirements are specified, are prepared according to GB/T 601, GB/T 602, GB/T 603. The solution used refers to aqueous solution when it is not specified which solvent is used for preparation.

A.2 Identification test

A.2.1 Reagents and materials

A.2.1.1 Hydrochloric acid.

A.2.1.2 Magnesium sulfate solution: 120g/L.

A.2.1.3 Calcium oxide saturated solution. Preparation: Weigh about 3g of calcium oxide, to the nearest of 0.1g. Place in a reagent bottle. Add 1000mL of water. Cap it. After shaking vigorously, place it for clarification. Take the supernatant when using.

A.2.1.4 Glass rod with platinum wire ring.

A.2.2 Identification methods

A.2.2.1 Preparation of test solution: Weigh about 20g of specimen, to the nearest of 0.1g. Place in a beaker. Add 100mL of water. Make it dissolved.

A.2.2.2 Use hydrochloric acid to wet the platinum wire ring. Burn to colorless

Where,

m_1 - The mass of the specimen and the porcelain crucible before burning, in grams (g);

m_2 - The mass of the specimen and the porcelain crucible after burning, in grams (g);

m - The specimen mass, in grams.

The test results are based on the arithmetic mean of the parallel determination results. The absolute difference between two independent determination results obtained under repeatability conditions is not more than 0.04%.

A.4 Determination of total alkali content (as Na_2CO_3)

A.4.1 Method summary

Take bromocresol green-methyl red mixed solution as indicator liquid. Use hydrochloric acid standard titration solution to titrate.

A.4.2 Reagents and materials

A.4.2.1 Hydrochloric acid standard titration solution: c(HCl)=1mol/L.

A.4.2.2 Bromocresol green-methyl red mixed indicator solution.

A.4.3 Analysis steps

A.4.3.1 Determination of total alkali content (on dry basis)

Weigh about 1.7g of specimen that has been burnt to a constant mass according to A.3, to the nearest of 0.0002g. Place in an Erlenmeyer flask. Use 50mL of water to dissolve the specimen. Add 10 drops of bromocresol green-methyl red mixed indicator solution. Use hydrochloric acid standard titration solution to titrate till the solution is from green to dark red. Boil 2min. After cooling, continue to titrate to dark red as the end point. Conduct blank test at the same time.

In the blank test, except for not adding the specimen, the other operations and the type and number of reagents added (except the standard titration solution) are the same as the determination test.

A.4.3.2 Determination of total alkali content (based on wet basis)

Weigh about 1.7g of anhydrous sodium carbonate or about 4.6g of sodium carbonate decahydrate specimen, to the nearest of 0.0002g. Place in an Erlenmeyer flask. Use 50mL of water to dissolve the specimen. Add 10 drops

A.5.2.1 Hydrochloric acid solution: 1+3.

A.5.2.2 Anhydrous sodium carbonate solution: 100g/L.

A.5.2.3 Phenolphthalein indicator solution: 10g/L.

A.5.2.4 Pickling asbestos: Take an appropriate amount of pickled asbestos and place it in a beaker. Add hydrochloric acid solution. Boil 20min. Use a Buchner funnel to filter and wash till it is neutral. Take out and soak in sodium carbonate solution. Boil 20min. Use the Buchner funnel to filter. Use water to wash till it is neutral (use phenolphthalein solution to inspect). Take it out and place it in a beaker. Add water to make a paste for future use.

A.5.2.5 Asbestos filter paper.

A.5.3 Instruments and equipment

A.5.3.1 Gooch crucible: Capacity is 30mL.

A.5.3.2 Electric heating constant temperature drying oven: temperature control range is 110°C±5°C.

A.5.4 Analysis steps

A.5.4.1 Laying of ancient crucible

A.5.4.1.1 Ancient crucible method for pickling asbestos

Place the Gooch crucible on the suction-filtration flask. Spread a layer of pickled asbestos evenly on the top and bottom of the sieve. During suction-filtration, use a flat glass rod to press it tightly. Each layer is about 3mm thick. Use 50°C±5°C water to wash till there is no asbestos fiber in the filtrate. Place the Gooch crucible in an electric heating constant temperature drying box. Dry at 110°C±5°C. Weigh. Repeat washing and drying until the mass is constant.

A.5.4.1.2 Asbestos filter paper ancient crucible method

Place the Gooch crucible on the suction-filtration flask. Lay a layer of asbestos filter paper under the sieve. Lay two layers of asbestos filter paper on the sieve. During suction-filtration, use a flat glass rod to press it tightly. Use 50°C±5°C water to wash to the filter paper. Place the Gooch crucible in an electric heating constant temperature drying box. Dry at 110°C±5°C. Weigh. Repeat washing and drying until the mass is constant.

A.5.4.2 Determination

Weigh about 40g of specimen, to the nearest of 0.01g. Put in a beaker. Add 400mL of water at about 40°C to make it dissolved. Keep the solution at

dilute to the scale mark. Shake well.

A.6.1.2.5 Silver nitrate standard titration solution: c($AgNO_3$)=0.05mol/L.

a) Preparation: Weigh 8.75g of silver nitrate, to the nearest of 0.01g. Dissolve it in 1000mL of water. Shake well. The solution is stored in a brown bottle.

b) Calibration: Use a pipette to take 5mL of sodium chloride standard solution. Place in a 100mL beaker. Add 40mL of water. Put the electromagnetic stirrer into it. Place the beaker on the electromagnetic stirrer. Turn on the stirrer. Add 2 drops of bromophenol blue indicator solution. Add nitric acid solution dropwise to just yellow. Insert the measuring electrode and reference electrode into the solution. Connect the potentiometer wiring. Adjust the potentiometer zero point. Record the starting potential value. Use silver nitrate standard titration solution to titrate. Add 4.00mL first. Add 0.10mL successively. Record the total volume and the corresponding potential value E after each addition of silver nitrate standard titration solution. Calculate the difference ΔE_2 between the continuously increasing potential value ΔE_1 and the increasing potential value ΔE_1. The maximum value of ΔE_1 is the end point of the titration. After the end point, continue to record a potential value E.

For the record format, see Annex C of GB/T 3050-2000.

The volume of the silver nitrate standard titration solution consumed by the titration to the end point V1 is expressed in milliliters (mL). Calculate according to formula (A.4).

$$V_1 = V_2 + \frac{b}{B} \times V_3 \qquad \cdots\cdots (A.4)$$

Where,

V_2 - The value of the volume of the silver nitrate standard titration solution added before the potential increment value ΔE_1 reaches the maximum value, in milliliters (mL);

b - The last positive value of ΔE_2;

B - The sum of last positive value of ΔE_2 and the absolute value of the first negative value;

V_3 - The value of the volume of the silver nitrate standard titration solution added for the last time before the potential increment ΔE_1 reaches the maximum, in milliliters (mL).

c) Calculation: The concentration c_1 of the silver nitrate standard titration

preparation of reference solution, in milliliters (mL);

1000 - The conversion factor;

M_1 - The molar mass of sodium chloride, in grams per mole (g/mol) [M (NaCl)=58.44];

m_7 - The specimen mass, in grams (g);

w_0 - The mass fraction of ignition reduction measured in A.3.

The test results are based on the arithmetic mean of the parallel determination results. The absolute difference between two independent determination results obtained under repeatability conditions is not more than 0.02%.

A.7 Determination of iron (Fe) (on dry basis)

A.7.1 Method summary

Same as Chapter 3 of GB/T 3049-2006.

A.7.2 Reagents and materials

Same as Chapter 4 of GB/T 3049-2006.

A.7.3 Instruments and equipment

Same as Chapter 5 of GB/T 3049-2006.

A.7.4 Analysis steps

A.7.4.1 Preparation of specimen solution

Weigh about 10g of specimen, to the nearest of 0.01g. Place in a beaker. Add a small amount of water to moisten. Cover with a watch glass. Drop 35mL of hydrochloric acid solution (1+1). Boil 3min~5min. Cool down (filter if necessary). Transfer all into a 250mL volumetric flask. Use water to dilute to the scale mark. Shake well.

A.7.4.2 Preparation of blank test solution

Measure 7mL of hydrochloric acid solution (1+1). Place in a 100mL beaker. Add ammonia solution (2+3) dropwise to neutralize to neutral (use a precision pH test paper to inspect).

A.7.4.3 Drawing of working curve

See 6.3 of GB/T 3049-2006. Choose a 4cm or 5cm absorption cell and the corresponding iron standard solution volume.

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 3 websites:

1. https://www.ChineseStandard.us

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. https://www.ChineseStandard.net

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - https://www.ChineseStandard.us).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

3. https://www.google.com/search?tbm=bks&q=ChineseStandard.net

- SEARCH the standard ID, such as GB 4943.1-2022.
- Google Books -- Select your currency.
- Processed by Google (delivery, tax invoice etc.).
- Full-copy (NOT text-editable, NOT true-PDF) delivered in 9 seconds by Google.
- Email to Wayne, Sales@ChineseStandard.net for true-PDF if needed, with evidence.

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

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/

------ The End ------