

HG

**CHEMICAL INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

HG/T 3812-2006

Sodium thiocyanate for industrial use

工业硫氰酸钠

(English Translation)

Issued on: July 26, 2006

Implemented on: March 1, 2007

**Issued by: Ministry of Industry and Information Technology of the
People's Republic of China**

Table of Contents

Foreword	3
1 Scope	4
2 Normative references	4
3 Requirements	5
4 Test methods	5
5 Inspection rules	14
6 Marking and labeling	15
7 Packaging, transportation and storage	16

1 Scope

This standard specifies the requirements, test methods, inspection rules, marking, packaging, transportation and storage of sodium thiocyanate for industrial use.

This standard applies to sodium thiocyanate for industrial use. This product is mainly used as a solvent for spinning polyacrylonitrile fibers, an herbicide for airport roads, and also in pharmaceuticals, printing and dyeing, rubber treatment, black nickel plating, and the manufacture of artificial mustard oil. It is also used as a raw material in the manufacture of chemical reagents and developers.

Molecular formula. NaSCN Relative molecular mass. 81.08 (based on the Atomic Weights of the Elements 2001)

2 Normative references

The provisions in the following documents become the provisions of this standard through reference in this standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this standard; however, parties who reach an agreement based on this standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest editions of the referenced documents apply to this standard.

GB/T 191-2000 Packaging - Pictorial marking for handling of goods (eqv ISO 780:1997)

GB/T 1250 Rules for expression and judgment of limiting values

GB/T 3049-1986 Chemical products for industrial use - General method for determination of iron content - 0-phenanthroline spectrophotometric method (eqv ISO 6685:1982)

GB/T 6678 General principles for sampling chemical products

GB/T 6680 General rules for sampling liquid chemical products

GB/T 6682-1992 Water for analytical laboratory use - Specification and test methods (eqv ISO 3696:1987)

HG/T 3696.1 Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 1: Preparations of standard volumetric solutions

HG/T 3696.2 Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 2: Preparations of standard solutions for impurity determination

HG/T 3696.3 Inorganic chemicals for industrial use - Preparations of standard and reagent solutions for chemical analysis - Part 3: Preparations of reagent solutions

3 Requirements

3.1

Appearance. Crystalline products are white to light yellow crystals; liquid products are transparent solutions without obvious impurities.

3.2

Sodium thiocyanate for industrial use shall meet the requirements of Table 1.

4.1 Safety tips

Some reagents used in this test method are toxic or corrosive; operators must exercise extreme caution! If splashed on skin, rinse immediately with water; for severe cases, seek immediate medical attention. When using flammable materials, never use an open flame for heating.

4.2 General provisions

Unless otherwise specified, the reagents and water used in this standard refer to analytical grade reagents and grade III water as specified in GB/T 6682-1992.

Unless otherwise specified, the standard solutions, impurity standard solutions, preparations and products required for the test shall be prepared in accordance with the provisions of HG/T 3696.1, HG/T 3696.2 and HG/T 3696.3.

4.3.1 Method summary

Excess silver nitrate is added to an acidic solution to produce silver thiocyanate, which is then back-titrated with a standard ammonium thiocyanate titration solution using ammonium ferric sulfate as an indicator.

4.3.2 Reagents

4.3.2.1 95% ethanol.

4.3.2.2

Nitric acid solution. 1+9.

4.3.2.3

Ammonium ferric sulfate solution. 50 g/L.

4.3.2.4

Silver nitrate standard titration solution. $c(\text{AgNO}_3) \sim 0.1 \text{ mol/L}$.

4.3.2.5

Ammonium thiocyanate standard titration solution. $c(\text{NH}_4\text{SCN}) \sim 0.1 \text{ mol/L}$.

4.3.3 Analysis steps

Weigh approximately 3 g of a crystalline sample dried to constant weight at $(105 \pm 2)^\circ\text{C}$, or approximately 6 g of a liquid sample, accurate to 0.0002 g, and place it in a 250 mL beaker. Dissolve the sample in water and transfer the entire amount to a 500 mL volumetric flask. Dilute to the mark and mix well. Pipette 50 mL of the solution into a 250 mL Erlenmeyer flask, add 10 mL of 95% ethanol and 5 mL of nitric acid solution, and then pipette 50 mL of silver nitrate standard titration solution and shake well. Add 2 mL of ammonium ferric sulfate solution and titrate with ammonium thiocyanate standard titration solution. When nearing the endpoint, shake vigorously with each additional drop. The endpoint is reached when the solution turns a light brownish-red color and remains so for 30 seconds.

4.3.4 Result calculation

The sodium thiocyanate content is expressed as the mass fraction w_1 of sodium thiocyanate (NaSCN), and the value is expressed as a percentage (%). It is calculated according to formula (1), where V_1 -- the volume of silver nitrate standard titration solution (4.3.2.4) added, in milliliters (mL);

V_2 -- the volume of ammonium thiocyanate standard titration solution (4.3.2.5) consumed in the titration, in milliliters (mL). c_1 -- the accurate concentration of silver nitrate standard titration solution, in moles per liter (mol/L); c_2 -- the accurate concentration of ammonium thiocyanate standard titration solution, in moles per liter (mol/L); m -- the mass of the sample, in grams (g).

M -- the molar mass of sodium thiocyanate (NaSCN), in grams per mole (g/mol) ($M=81.08$).

The arithmetic mean of the parallel measurement results is taken as the measurement result, and the absolute difference between the two parallel measurement results shall not

be greater than 0.2%.

4.4.1 Method summary

It is the same as Chapter 2 of GB/T 3049-1986.

4.4.2 Reagents

It is the same as Chapter 3 of GB/T 3049-1986.

4.4.3 Instruments

Spectrophotometer. It is equipped with an absorption cell with a thickness of 3 cm.

4.4.4.1 Plotting the working curve

Follow the procedure in 5.3 of GB/T 3049-1986, select a 3 cm absorption cell and the corresponding amount of iron standard solution, and plot the working curve.

4.4.4.2 Analysis steps

Weigh a certain mass of sample (if crystal, superior product. 15 g, first-class product/qualified product. 7 g; if liquid product. 15 g), accurate to 0.01 g, place it in a 100 mL beaker, and dissolve the crystalline product in 50 mL of water. Add 10 mL of hydrochloric acid and stir until homogeneous. Heat in a water bath for 30 minutes. In another beaker, add 50 mL of water and 10 mL of hydrochloric acid, and use it as the blank test solution. Transfer the test solution and the blank test solution, respectively, to 100 mL volumetric flasks and then proceed with the operation according to steps in 5.4.1 of GB/T 3049-1986, starting with "use the ammonia solution...".

4.4.5 Result calculation

The iron content is expressed as the mass fraction w_2 of iron (Fe), and the value is expressed as a percentage (%). It is calculated according to formula (2). where m_1 -- the mass of iron obtained from the working curve based on the measured absorbance of the test solution, in milligrams (mg); m_2 -- the mass of iron obtained from the working curve based on the measured absorbance of the blank test solution, in milligrams (mg). m -- the mass of the sample, in grams (g).

The arithmetic mean of the parallel measurement results is taken as the measurement result, and the absolute difference between two parallel measurement results shall not be greater than 0.0001%.