

ICS 13.060
CCS Z 16

HJ

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

HJ 598-2011

Replacing GB/T 13905-1992

**Water quality. Determination of TNT. Sodium sulfite
spectrophotometric method
(English Translation)**

Issued on: February 10, 2011

Implemented on: June 1, 2011

Issued by: Ministry of Ecology and Environment

Table of Contents

Foreword

1 Scope of application

2 Principle of the method

3 Interference and elimination

4 Reagents and materials

5 Instruments and equipment

6 Samples

6.1 Sample collection and preservation

6.2 Preparation of samples

6.3 Preparation of blank samples

7 Analysis steps

7.1 Calibration

7.2 Determination

7.3 Blank test

8 Calculation and representation of results

8.1 Calculation of results

8.2 Results representation

9 Precision and accuracy

10 Quality Assurance and Quality Control

11 Waste treatment

Foreword

To protect the environment and protect the human body in order to implement the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on Water Pollution Prevention and Control this standard is formulated for the determination of health and standardization of TNT in water.

This standard specifies the sodium sulfite spectrophotometric method for the determination of TNT in water.

This standard is a revision of the "Sodium Sulfite Spectrophotometric Method for the Determination of Water Quality TNT" (GB/T 13905-92).

This standard was first published in 1992. The original standard drafting unit was the Fifth

Design and Research Institute of China Ordnance Industry. This is the first revision.

The main revisions are as follows.

- increased interference and elimination clauses;
- Increased preparation of the sample;
- Added quality assurance and quality control regulations;
- Added waste disposal provisions.

The national environmental protection standard "Water quality approved and issued by the former National Environmental Protection Agency on December 2, 1992 since the implementation of this standard.

Determination of TNT's Sodium Sulfite Spectrophotometry (GB/T 13905-92) was abolished.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Beijing Zhongbing North Environmental Technology Development Co., Ltd., China Ordnance Industry Group Corporation and Liaoyang Qing Yang Special Chemical Co., Ltd.

This standard was approved by the Ministry of Environmental Protection on February 10, 2011.

This standard has been implemented since June 1, 2011.

This standard is explained by the Ministry of Environmental Protection.

Water quality - Determination of TNT - Sodium sulfite spectrophotometric method

1 Scope of application

This standard specifies the sodium sulfite spectrophotometric method for the determination of TNT in water.

This standard is applicable to the determination of TNT in industrial wastewater discharged during the production and use of powdered ammonium ladder explosives.

When the sample volume is 10.0 ml and the 30 mm cuvette is used, the detection limit is 0.1 mg/L and the measurement range is 0.4-10 mg/L.

For samples with a TNT concentration higher than the upper limit of the method, the sample can be appropriately diluted and measured.

2 Principle of the method

At room temperature, the TNT in the sample reacts with anhydrous sodium sulfite to form yellow trinitrotoluenesulfonate, which is measured at a wavelength of 420 nm.

The amount of absorbance. Within a certain concentration range, the TNT concentration and absorbance values are in accordance with Lambert-Beer law.

3 Interference and elimination

3.1

When the wastewater has a certain color, it will interfere with the measurement. It is advisable to dilute the water sample of the same volume as the sample to 25 ml as a sample blank.

The absorbance was measured directly without the addition of sodium sulfite solution. The absorbance of the sample blank is subtracted from the absorbance of the sample, and then calculated to eliminate the color the effect of degree on the determination.

3.2

When the hardness of the sample is greater than 600 mg/L, it will interfere with the measurement results. Add 1.0 ml of ethylenediamine tetraacetate to 10.0 ml of sample the acid disodium salt solution (4.3) and 1-3 drops of sodium hydroxide solution (4.4) are used to make the pH of the water sample in the range of 10-11. Amount of reagent added should be included in the calculation of the results.

4 Reagents and materials

Analytical purification reagents that meet national standards are used for analysis, unless otherwise stated. The experimental water is freshly prepared deionized water or steamed.

Distilled water.

4.1

Concentrated sulfuric acid. $\rho(\text{H}_2\text{SO}_4) = 1.84 \text{ g/ml}$.

4.2

Anhydrous ethanol ($\text{C}_2\text{H}_5\text{OH}$).

4.3

EDTA-2Na solution. $\rho(\text{C}_{10}\text{H}_{14}\text{N}_2\text{Na}_2\text{O}_8 \cdot 2\text{H}_2\text{O}) = 0.1 \text{ g/ml}$.

Weigh 10 g of disodium edetate dissolved in 100 ml of water and shake well.

4.4

Sodium hydroxide solution. $\rho(\text{NaOH}) = 0.2 \text{ g/ml}$.

Weigh 20 g of sodium hydroxide in 100 ml of water and shake well.

4.5

Aluminum sulfate solution. $\rho[\text{Al}_2(\text{SO}_4)_3] = 0.18 \text{ g/ml}$.

Weigh 18 g of aluminum sulfate dissolved in 100 ml of water and mix.

4.6

Sodium carbonate solution. $\rho(\text{Na}_2\text{CO}_3) = 0.16 \text{ g/ml}$.

Weigh 16 g of sodium carbonate dissolved in 100 ml of water and mix.

4.7

TNT. 2,4,6-trinitrotoluene $[\text{CH}_3\text{C}_6\text{H}_2(\text{NO}_2)_3]$.

Weigh 1.0 g of TNT (industrial product) in a small beaker, dissolve it with 10 ml of absolute ethanol (4.2), and filter with medium-speed quantitative filter paper.

Place the filtrate in a fume hood and allow it to dry naturally. Recrystallization twice, spare.

4.8

TNT standard solution. $\rho(\text{TNT}) = 50.0 \text{ mg/L}$.

Accurately weigh 0.050 g of TNT (4.7) dissolved in 3 ml of concentrated sulfuric acid (4.1), slowly add water to dissolve, and then transfer to a 1 000 ml volumetric flask.

In the middle, add water to the marking line and mix.

4.9

Anhydrous sodium sulfite solution. $\rho(\text{Na}_2\text{SO}_3) = 0.2 \text{ g/ml}$.

Weigh 20.0 g of anhydrous sodium sulfite dissolved in an appropriate amount of water, dissolve and transfer to a 100 ml volumetric flask, add water to the mark, and mix. this the solution is valid for 3 days.

5 Instruments and equipment

5.1

Visible spectrophotometer. with 30 mm cuvette.

5.2

Plug scale colorimetric tube. 25 ml.