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

HJ 667-2013

**Water quality. Determination of total nitrogen by continuous
flow analysis(CFA) and N-(1-naphthyl)ethylene diamine
dihydrochloride spectrophotometry**

水质 总氮的测定 连续流动-盐酸萘乙二胺分光光度法

(English Translation)

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Foreword

To protect the environment and protect 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 Human health, standardizing methods for determining total nitrogen in water, and developing this standard.

This standard specifies the continuous flow of total nitrogen in water - naphthylethylenediamine hydrochloride spectrophotometry.

This standard is the first release.

Appendix A and Appendix B of this standard are informative annexes.

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

This standard is mainly drafted by. Suzhou Environmental Monitoring Center Station.

This standard is verified by. Jiangyin Environmental Monitoring Station, Taihu Basin Water Environment Monitoring Center, Jilin City Environmental Protection Monitoring Station, Tian Tianjin Water Environment Monitoring Center, Yellow River Basin Water Environment Monitoring Center, Suzhou Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on October 25, 2013.

This standard has been implemented since January 1, 2014.

This standard is explained by the Ministry of Environmental Protection.

Determination of total nitrogen in water - Continuous flow - Naphthylethylenediamine hydrochloride spectrophotometric method

1 Scope of application

This standard specifies the continuous flow of total nitrogen in water - naphthylethylenediamine hydrochloride spectrophotometry.

This standard applies to the determination of total nitrogen in surface water, groundwater, domestic sewage and industrial wastewater.

When the detection optical path is 30mm, the detection limit of this method is 0.04mg/L (in N), and the measurement range is 0.16 mg/L.

~10mg/L.

2 Normative references

The contents of this standard refer to the terms in the following documents. For undated references, the valid version applies to this standard.

HJ/T 91 Surface Water and Wastewater Monitoring Technical Specifications HJ/T 164 Technical Specifications for Groundwater Environmental Monitoring

3.1 Working principle of continuous flow analyzer

The sample and the reagent enter the chemical reaction module under the push of the peristaltic pump, and continuously flow in the closed pipeline, and are pressed by the bubble.

They are regularly spaced at regular intervals and mixed and reacted in a specific order and proportion. After the color development is completed, they enter the flow detection cell.

Photometric detection.

3.2 Principles of chemical reactions

In an alkaline medium, the nitrogen-containing compound in the sample is oxidized by persulfate at 107 ° C to 110 ° C under ultraviolet irradiation.

After the nitrate, it is reduced to nitrite by a cadmium column. In an acidic medium, nitrite is diazotized with sulfonamide and then with salt the acid naphthyl ethylenediamine was coupled to form a purple-red compound, and the absorbance was measured at a wavelength of 540 nm.

Refer to the work flow chart, as shown in Figure 1.

1 peristaltic pump 2 heating bath 107 ° C ~ 110 ° C 3 UV digestion device 4 mixed reaction ring 5 dialyzer (unit) 6 cadmium column 7 bubble removal 8 flow detection cell 30mm 540nm R1 potassium persulfate solution (5.15) 0.32ml/min R2 sodium tetraborate buffer solution (5.16) 0.42ml/min R3 Ammonium chloride buffer solution (5.18) 0.80ml/min, 1.40ml/min R4 Color reagent (5.19) 0.23ml/min S sample 1.00ml/min ReS secondary injection 0.32ml/min G air W waste liquid

Figure 1 Flow chart of continuous flow-naphthylethylenediamine hydrochloride spectrophotometric determination of total nitrogen

4 Interference and elimination

4.1

When the concentration of ferric ion, hexavalent chromium ion and chloride ion in the sample are greater than 180mg/L, 50mg/L and 5000mg/L respectively at the time of the measurement, the total nitrogen is negatively interfered; the high concentration of organic matter consumes potassium persulfate oxidant, and the water-like chromium method has a large COD value.

At 400 mg/L, the total nitrogen measurement results are low. The above interference can be eliminated by diluting the sample, but it is necessary to pass multiple dilutions.

Confirmation of the consistency of the results of the measurement or the addition of the standard.

4.2

The turbidity or chromaticity of the sample interferes with the measurement results and can be eliminated by the dialysis unit, see Figure 1.

4.3

When the sample contains more solid particles or suspended solids, it should be shaken, sampled, diluted properly, and homogenized.

After injection.

5 Reagents and materials

Analytical purification reagents that meet national standards were used for analysis unless otherwise stated. The experimental water is freshly prepared, Ammonia-free water with a resistivity greater than 10 Mohm·cm (25 ° C).

5.1

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

5.2

Phosphoric acid. $\rho(\text{H}_3\text{PO}_4) = 1.69 \text{ g/ml}$.

5.3

Ammonia. $\rho(\text{NH}_4\text{OH}) = 0.90 \text{ g/ml}$.

5.4

Sodium hydroxide (NaOH).