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

HJ 668-2013

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

水质 总氮的测定 流动注射-盐酸萘乙二胺分光光度法

(English Translation)

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5.19 Chromogenic agent

5.20 Potassium nitrate standard stock solution. $\rho(\text{N})=1000\text{mg/L}$

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5.23 Glycine standard stock solution. $\rho(\text{N})=1000\text{mg/L}$

5.24 Glycine standard use solution. $\rho(\text{N}) = 10.0 \text{ mg/L}$

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Foreword

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, to protect the environment, to ensure human health, standardize the determination method of total nitrogen in water, and develop this standard.

This standard specifies the flow injection-naphthylethylenediamine spectrophotometric method for the determination of total nitrogen in water.

This standard is the first release.

Appendix A of this standard is an informative annex.

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 and Changshu Environmental Monitoring Station.

The standard verification unit. Beijing Environmental Protection Monitoring Center, Nantong Environmental Monitoring Center Station, Jiangsu Marine Fisheries Research Research Institute, Water Quality Testing Center of Suzhou Water Supply Company, Zhenjiang Environmental Monitoring Center Station and Changshu Environmental Monitoring 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 - Flow injection - Naphthylethylenediamine hydrochloride spectrophotometric method

1 Scope of application

This standard specifies the flow injection-naphthylethylenediamine spectrophotometric method for the determination of total nitrogen in water.

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

When the detection optical path is 10mm, the detection limit of this method is 0.03mg/L (in N), the measurement range is 0.12 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.

quasi.

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

3.1 Working principle of flow injection analyzer

In a closed pipeline, a volume of the sample is injected into the continuous flow of the carrier liquid, and the sample and reagent are in the chemical reaction module.

Mix and react in the specified order and proportion. Under the condition of incomplete reaction, enter the flow detection cell for photometric detection.

3.2 Method of chemical reaction principle

In an alkaline medium, the nitrogen-containing compound in the sample is oxidized to a nitrate by persulfate at $95^{\circ}\text{C} \pm 2^{\circ}\text{C}$ under ultraviolet irradiation.

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

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

1 peristaltic pump 2 heating tank (95°C) 3 UV digestion device 4 bubble removal device

5 Injection valve 6 Reaction ring 7 Cadmium column 8 Detection cell 10mm 540nm

R1 digestion solution (5.16) R2 sodium tetraborate buffer solution (5.17) R3 ammonium chloride buffer solution (5.18) R4 developer (5.19) C carrier liquid (5.27) S sample W waste

liquid

Figure 1 Flow injection-naphthylethylenediamine hydrochloride spectrophotometric determination of total nitrogen reference work flow chart

4 interference and elimination

4.1 When the sample contains a high concentration of organic matter, it will consume potassium persulfate oxidant, so that the determination result of total nitrogen is low.

The sample is over-diluted to eliminate the effect, but it needs to be confirmed by the consistency of the multiple dilution ratio determination results or the spike recovery experiment.

4.2 When the concentration of copper ions, iron ions, hexavalent chromium ions and chloride ions in the sample are not more than 100mg/L, 250mg/L, 100 respectively at mg/L and 10000 mg/L, there was no effect on the determination of total nitrogen.

5 reagents and materials Analytical purification reagents that meet national standards were used for analysis unless otherwise stated. Experimental water is freshly prepared and charged Ammonia-free water with a resistivity greater than 10 Mohm·cm (25 ° C). In addition to the standard solution, other solutions and experimental water are used with helium (5.28) or ultrasonic degassing.

5.2

Hydrochloric acid. $\rho(\text{HCl}) = 1.18 \text{ g/ml}$.

5.3

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

5.4

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

5.5

sodium hydroxide (NaOH).

5.6

potassium persulfate ($\text{K}_2\text{S}_2\text{O}_8$).

5.7

Sodium tetraborate decahydrate ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$).

5.8

Ammonium chloride (NH_4Cl).