

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

HJ 826-2017

**Water quality-Determination of anionic surfactants -- Flow
injection analysis(FIA) and methylene blue spectrophotometric
method**

水质 阴离子表面活性剂的测定 流动注射-亚甲基蓝分光光度法

(English Translation)

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Foreword

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 the Prevention and Control of Water Pollution, Protection of human health, regulate the determination of anionic surfactants in water, the development of this standard.

This standard specifies the flow of anionic surfactants in the determination of surface water, groundwater, domestic sewage and industrial waste Shot - methylene blue spectrophotometric method.

This standard is the first release.

This standard is organized by the Environmental Monitoring Department of the Ministry of Environmental Protection, the Secretary for Science and Technology Standards.

The main drafting unit of this standard. Jiangsu Province Environmental Monitoring Center.

The standard verification unit. Beijing Environmental Protection Monitoring Center, Wuxi City Environmental Monitoring Center Station, Huai'an City Environmental Monitoring Central station, Yangzhou City Environmental Monitoring Center Station and Changshu City

Environmental Monitoring Station.

The environmental protection department of this standard approved on March 30, 2017.

This standard has been implemented since May 1, 2017.

This standard is explained by the Ministry of Environmental Protection.

Determination of Water Anionic Surfactants Flow injection - methylene blue spectrophotometric method Warning. Trichloromethane is a toxic substance, the operation should be required to wear protective equipment and in the fume hood, to avoid contact with the skin, After the detection of waste residue should be properly safe handling.

1 Scope of application

This standard specifies the flow injection-methylene blue spectrophotometric method for the determination of anionic surfactants in water.

This standard is applicable to the determination of anionic surfactants in surface water, groundwater, domestic sewage and industrial waste water.

When the optical path length is 10 mm, the detection limit of this method is 0.04 mg/L (in terms of LAS), the measurement range is 0.13 Mg/L to 2.00 mg/L (in LAS).

2 Normative reference documents

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

Water quality - Anionic surfactants - Methylene blue spectrophotometric method GB 7494
Technical specification for surface water and wastewater monitoring Technical specification for groundwater environmental monitoring

3 Terms and definitions

The following terms and definitions apply to this standard.

Anionic surfactants anionic surfactants Refers to the active ingredient of synthetic detergents, which refers to the most widely used sodium alkylphenylsulfonate (LAS). The

4.1 Flow injection analyzer works

In a closed line, a volume of the sample into the continuous flow of the carrier liquid, the sample and reagents in the chemical reaction mode the blocks are mixed and reacted in a specific order and proportion, and are subjected to photometric detection under a non-complete reaction condition into the flow detection cell.

4.2 Principles of chemical reactions

The anionic surfactant in the sample forms a methylene blue active substance (MBAS) with cationic dye methylene blue, Methyl chloride, and the organic phase was measured at 650 nm. Specific work flow shown in Figure 1.

1. Peristaltic pump; Injection valve; Reaction ring; Phase separation device; Detection cell 10mm, 650nm; R1 Alkaline methylene blue solution II (6.17); Acid methylene blue solution (6.18) C. Carrier liquid (6.15); Sample; W1. Waste liquid (chloroform); W2. Waste Liquid (water phase)

Figure 1 Flow chart of flow injection - methylene blue spectrophotometric method for the determination of anionic detergents

5 Interference and elimination

The main interferences of this process are organic sulfonates, hydroxyacids, phenols, and inorganic sulfates, sulfites, Nitrates, cyanates, thiocyanates and the like, and these functional groups containing anionic bonds react with methylene blue to form chloroform Blue complex, resulting in positive interference, by aqueous solution backwash can not remove the non-surface active substances caused by the interference, can be gas the extraction of anionic surfactants from the aqueous phase to the organic phase is eliminated by extraction. For details, see GB 7494.

Sulfide in sewage can produce a colorless reduction with methylene blue and consume methylene blue reagent. In this case, Sample to alkaline, add appropriate amount of hydrogen peroxide, to eliminate interference.

Some cations such as proteins and 4-amino compounds can negatively interfere with the results of this method.

Substances can be removed under appropriate conditions using cation exchange resin. See GB 7494 for details.

6 Reagents and materials

Unless otherwise stated, analytical reagents in accordance with national standards are used for the analysis, and the experimental water is freshly prepared Deionized water or distilled water.

Note: The experimental water in the ultrasonic instrument ultrasonic degassing for 20 min, or in the course of the experiment results in the formation of bubbles. The following reagents are alkali Methylene blue solution, acidic methylene blue solution, methanol solution equivalent treatment.

6.1

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

6.2

Hydrochloric acid. $\rho(\text{HCl}) = 1.19 \text{ g/ml}$.

6.3

Sodium hydroxide (NaOH). excellent grade pure.

6.4

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

6.5

Trichloromethane (CHCl_3). stabilized with pentylene.

Note: Trichloromethane reagents generally have bubbles, in the analysis process is easy to produce periodic bubble peak, affecting the determination of the results. Recommended ultrasound Wave instrument ultrasonic degassing for 20 min, or with helium degassing 5 min, and then water seal.

6.6

Methanol (CH_3OH).

6.7

Formaldehyde (CH_2O).

6.8

Sodium dodecylbenzenesulfonate ($\text{C}_{18}\text{H}_{29}\text{NaO}_3\text{S}$, LAS).

6.9

Methylene blue ($\text{C}_{16}\text{H}_{18}\text{N}_3\text{ClS}$).

6.10

sulfuric acid solution. $c(\text{H}_2\text{SO}_4) = 0.5 \text{ mol/L}$.

In about 800 ml of water slowly add 26.9 ml of sulfuric acid (6.1), after cooling, diluted with water to 1000 ml, mix.

6.11

sodium tetraborate solution. $c = 0.05 \text{ mol/L}$.

Weigh 9.53 g of sodium tetraborate (6.4) in the appropriate amount of water, dissolved and moved to 500 ml volumetric flask, add water to the mark, mix.

6.12

sodium hydroxide solution. $c(\text{NaOH}) = 0.100 \text{ mol/L}$.