

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 1214-2021

**Water quality - Determination of adsorbable organically bound
halogens (AOX) - Microcoulometric method**

水质 可吸附有机卤素（AOX）的测定 微库仑法

(English Translation)

Issued on: January 1, 1970

Implemented on: January 1, 1970

Issued by: Ministry of Ecology and Environment

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1 Scope of application

This standard specifies the microcoulometric method for the determination of organic halides (excluding organic fluorides) that can be adsorbed on activated carbon in water.

This standard applies to the determination of adsorbable organic halogens in surface water, groundwater, domestic sewage and industrial wastewater.

The determination results of this standard include adsorbable organic halogens in suspended solids in water samples.

When the sampling volume is 100 ml, the detection limit of this method is 0.007 mg/L, and the lower limit of determination is 0.028 mg/L.

2 Normative references

This standard refers to the following documents or clauses thereof. For dated references, only the dated version applies to this standard.

For undated references, the latest edition (including all amendments) applies to this standard.

HJ/T 91 Technical Specification for Surface Water and Sewage Monitoring HJ 91.1

Technical Specification for Wastewater Monitoring HJ 164 Technical Specification for Groundwater Environmental Monitoring HJ 493 Technical Regulations for the Preservation and Management of Water Quality Samples

3 Terms and Definitions

The following terms and definitions apply to this standard.

Adsorbable organically bound halogens (AOX) Under the test conditions specified in this standard, chlorine, bromine, iodine (not contains the equivalent total amount of organic fluorides), the results are in chlorine.

dissolved organic carbon (DOC) Total organic carbon content in water samples after filtration through a 0.45 µm microporous membrane.

4 Principles of the method

The water sample is acidified by nitric acid, adsorbed by activated carbon, and then rinsed with sodium nitrate-nitric acid solution to remove the inorganic halide adsorbed on the activated carbon.

The adsorbed activated carbon is pyrolyzed and burned in the oxygen flow to generate hydrogen halide gas, and the hydrogen halide gas is passed into the micro-coulomb cell, and the micro-coulomb method is used.

The amount of halide ions was measured, and the result was expressed as the mass concentration of chlorine.

5 Interference and cancellation

5.1

The free chlorine in the water sample can lead to high AOX measurement results, and sodium sulfite solution (6.14) should be added immediately after sampling to eliminate dryness.

disturb.

5.2

When the inorganic chloride concentration in the sample is greater than 1 g/L, it should be diluted and measured; the sample with a lower AOX value contains more than 1 g/L Chloride ions may lead to high determination results. Adding the same concentration of chloride ions (such as NaCl) to laboratory blank samples can eliminate dryness.

disturb.

5.3

Inorganic bromide and iodide in water samples will lead to high determination results.

5.4

When the DOC in the sample exceeds 10 mg/L, it should be diluted and measured.

5.5

The organic bromide and organic iodide in the sample generate high-valence oxides of bromine and iodine during the combustion process, and this part of AOX cannot be measured, which will result in a low measurement result.

5.6

Alcohols, aromatic compounds and hydroxy acids can cause low results.

5.7

For samples containing living cells (such as microorganisms, algae, etc.), the determination results are high due to their own chloride content.

Add nitric acid to acidify the water sample, destroy the algae and microbial cells, dissolve the chloride contained in the water sample, and then go through the elution step to eliminate the interference.

6 Reagents and Materials

Unless otherwise specified, analytical reagents that meet national standards were used in the analysis. The experimental water was distilled water or pure water without AOX.

6.1

Nitric acid. $\rho=1.42$ g/ml.

6.2

Hydrochloric acid. $\rho=1.19$ g/ml.

6.3

Sulfuric acid. $\rho=1.84$ g/ml.

6.4

Sodium nitrate (NaNO_3).

6.5

Sodium sulfite (Na_2SO_3).

6.6

p-Chlorophenol ($\text{C}_6\text{H}_5\text{ClO}$).

6.7 2-Chlorobenzoic acid ($C_7H_5ClO_2$).

6.8

Potassium iodide (KI).

6.9

Soluble starch.

6.10

Nitric acid solution. $c(HNO_3)=0.02$ mol/L.

Measure 1.36 ml of nitric acid (6.1) and dilute to 1000 ml with water.

6.11

Hydrochloric acid solution. $c(HCl)=0.010$ mol/L.

Measure 0.83 ml of hydrochloric acid (6.2) and dilute to 1000 ml with water.

6.12

Sodium nitrate-nitric acid solution. $c=0.2$ mol/L.

Weigh 17.00 g of sodium nitrate (6.4) and dissolve it in water, add 25 ml of nitric acid (6.1), and dilute to 1000 ml with water. Sodium nitrate - nitric acid solution the liquid can be stored for 3 months in the amber glass bottle.

6.13

Sodium nitrate-nitric acid eluent. $c=0.01$ mol/L, pH~1.7.

Take 50 ml of sodium nitrate-nitric acid solution (6.12) and dilute to 1000 ml with water.

Sodium nitrate-nitric acid eluent is safe in amber glass vials Save 1 month.

6.14

Sodium sulfite solution. $c(Na_2SO_3)=1$ mol/L.

Weigh 126 g of sodium sulfite (6.5), dissolve it in water, and dilute to 1000 ml with water. This solution is refrigerated at 4 °C and can be stored for 1 moon.

6.15

p-chlorophenol stock solution. $\rho(Cl)=200$ µg/ml.

Accurately weigh 0.0725 g of p-chlorophenol (6.6) and dissolve it in water, transfer it to a 100 ml volumetric flask, and dilute to the mark with water. p-chlorophenol storage the prepared solution is stored in a glass bottle and refrigerated at 4°C for 1 month.

Commercially available certified standard solutions can also be used, refer to standard solutions the certificate is saved.