

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 776-2015

**Water quality. Determination of 32 elements. Inductively
coupled plasma optical emission spectrometry**

水质 32种元素的测定 电感耦合等离子体发射光谱法

(English Translation)

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Foreword

To implement the "Environmental Protection Law of the People's Republic of China" and "Water Pollution Prevention Law of the People's Republic of China" to protect the environment and protect the human body Health, regulate the determination of 32 kinds of elements in water, the development of this standard.

This standard specifies the determination of surface water, groundwater, domestic sewage and industrial wastewater in the 32 elements of the inductively coupled plasma emission Spectrum method.

This standard is the first release.

Appendix A to this standard is a normative appendix, Appendix B and Appendix C are informative appendices.

This standard is organized by the Ministry of Environmental Protection Science and Technology Standards Division.

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

The standard verification unit. China Geological Survey Nanjing Center (Nanjing Institute of Geology and Mineral Resources), Jiangsu Province, physical and chemical testing center, Ministry of Land and Resources East China Mineral Resources Supervision and Testing Center, Suzhou City Environmental Monitoring Center, Huai'an City Environmental Monitoring Station and Changzhou City Environmental Monitoring Center station.

This standard is approved by the Ministry of Environmental Protection on December 4,

2015.

This standard has been implemented since January 1, 2016.

This standard is explained by the Ministry of Environmental Protection.

Water quality 32 kinds of elements Inductively Coupled Plasma Atomic Emission Spectrometry Warning. nitric acid, perchloric acid with strong oxidizing and corrosive, hydrochloric acid with strong volatility and corrosive, should wear protective and operate in a fume hood.

1 Scope of application

This standard specifies the inductively coupled plasma emission spectrometric method for the determination of 32 elements in water.

This standard applies to surface water, groundwater, domestic sewage and industrial wastewater in the silver, aluminum, arsenic, boron, barium, beryllium, bismuth, calcium, Iron, lead, sulfur, antimony, selenium, silicon, tin, strontium, titanium, vanadium, zinc and so on.

Determination of Soluble Elements and Elements in 32 Kinds of Elements.

The detection limit of each element in this standard is 0.009 mg/L ~ 0.1 mg/L, the lower limit of determination is 0.036 mg/L ~ 0.39 mg/L. Each element See Appendix A for the method of detection.

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 quasi.

GB/T 6682 Analytical laboratory water specifications and test methods Microwave digestion method for digestion of total water quality of HJ 678 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.

3.1 Soluble elements

The acid content of the sample after filtration through the 0.45 µm filter.

3.2 Total elements

The unfiltered sample, the content of the element measured after digestion.

4 Principle of the method

After the filtered or digested water sample is injected into the inductively coupled plasma emission spectrometer, the target element is gasified in the plasma torch, ionization, excitation and radiation of the characteristic line, in a certain concentration range, the characteristic line of the intensity and the concentration of the element is proportional to.

5 Interference and elimination

Inductively Coupled Plasma Atomic Emission Spectroscopy usually exists in the interference can be divided into two categories. one is spectral interference, the other is non-spectral dry Disturb.

5.1 Spectral interference

Spectral disturbances mainly include continuous background and overlapping interference. The current correction method is the background subtraction method (according to the single element and the mixed element test to determine the location and manner of subtracting the background) and the interference coefficient method. Basics can also be used in mixed standard solutions to eliminate its effects.

When there is a single element interference, the interference factor can be obtained according to the following formula.

$$Q_{QK} \cdot t_K = Q$$

Where t_K - interference coefficient;

Q_{QK} - interference element plus analysis element content;

Q - analysis of the content of elements;

TQ - the content of interfering elements.

By preparing a series of solutions containing a known amount of interfering elements, the Q_{QK} is determined at the position of the wavelength of the element, and the formula TQ , and then manual deduction or computer automatic deduction.

Under normal circumstances, surface water, groundwater samples due to low element concentration, spectral and inter-element interference between the general circumstances can ignore. Industrial wastewater and other common target elements to determine the wavelength spectrum interference see Appendix B. Note that the interferometric coefficients for different instruments are different.

5.2 Non-spectral interference

Non-spectral interference mainly includes chemical interference, ionization interference, physical interference and solvent interference, etc., in the actual analysis of various types of Interference is difficult to separate. Whether it is compensated and corrected, and the concentration of interfering elements in the sample. In addition, the physical interference is generally the same the degree of stickiness and surface tension of the product changes, especially when the sample contains a large number of soluble salts or samples of acidity is too high, Health interference. The easiest way to eliminate such interference is to dilute the sample. But should ensure that the content of the measured element is higher than the lower limit of determination.

6 Reagents and materials

Unless otherwise noted, the use of the use of national standards in accordance with the use of excellent pure chemical reagents. Experimental water should meet GB/T 6682 level Water related requirements.

6.1

Nitric acid. $\rho(\text{HNO}_3) = 1.42 \text{ g/ml}$.

6.2

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

6.3

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

6.4

Perchloric acid. $\rho(\text{HClO}_4) = 1.68 \text{ g/ml}$.

6.5

Sodium hydroxide (NaOH).

6.6

argon. purity not less than 99.9%.

6.7

Nitric acid solution. 1 1.

6.8

Nitric acid solution. 1 9.