

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 1147-2020

Determination of pH value of water quality Electrode method

水质 pH 值的测定 电极法

(English Translation)

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Foreword

To implement the Environmental Protection Law of the People's Republic of China and the Water Pollution Prevention Law of the People's Republic of China, and protect the ecology the environment, to protect human health, regulate the method for measuring pH in water, and formulate this standard.

This standard specifies the electrode method for determining the pH value of surface water, groundwater, domestic sewage and industrial wastewater.

Compared with the "Glass Electrode Method for the Determination of pH Value of Water Quality" (GB 6920-86), the main differences between this standard are as follows.

-The name was revised to "The Electrode Method for the Determination of pH Value of Water Quality";

--Modified the scope of application of the method, the principle of the method and the sample storage conditions;

--Deleted the definition part;

--Improved the requirements of standard buffer solution and experimental water;

--Detailed contents such as calibration, sample determination and result presentation;

--Added the terms of sample collection, quality assurance and quality control, and

precautions.

Since the implementation of this standard, the original National Environmental Protection Agency approved and issued the "Water Quality pH Value" on October 10, 1986.

"Glass Electrode Method" (GB 6920-86) is implemented in the corresponding environmental quality standards and pollutant emission (control) standards.

Stop execution during implementation.

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

This standard was formulated by the Department of Ecological Environment Monitoring and the Department of Regulations and Standards of the Ministry of Ecology and Environment.

Drafting organization of this standard. Tianjin Ecological Environment Monitoring Center.

Verifiers of this standard. China National Environmental Monitoring Center, National Environmental Analysis and Testing Center, Beijing Ecological Environment Monitoring Center Center, Dalian Ecological Environment Monitoring Center of Liaoning Province, Hunan Ecological Environment Monitoring Center and Sichuan Provincial Ecological Environment Monitoring Center.

This standard was approved by the Ministry of Ecology and Environment on November 26, 2020.

This standard shall come into effect on June 1, 2021.

This standard is interpreted by the Ministry of Ecology and Environment.

1 Electrode method for measuring pH value of water quality

1 Scope of application this standard specifies the electrode method for determining the pH value of water.

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

The measurement range is 0-14.

2 Normative references

This standard quotes the following documents or their clauses. For undated reference documents, their valid versions are applicable to this standard.

GB/T 27501 Preparation method of buffer solution for pH value determination HJ 91.1 Technical Specification for Wastewater Monitoring HJ/T 91 Technical specification for surface water and sewage monitoring HJ/T 164 Technical Specification for Groundwater Environmental Monitoring

3 Principles of the method

The pH value is obtained by measuring the electromotive force of the battery. The battery usually consists of a reference electrode and a hydrogen ion indicator electrode. Solution for every change of 1 pH unit, the change of the potential difference at the same temperature is constant, so the pH value is directly read on the instrument.

Said.

4 Interference and elimination

4.1

Water color, turbidity, colloidal substances, oxidizing agents and reducing agents do not interfere with the measurement.

4.2

In a strong acid solution with a pH value of less than 1, an acid error will occur; in a strong alkaline solution with a pH value greater than 10, Will produce sodium difference. It can be measured with an acid and alkali-resistant pH electrode, or you can choose a standard buffer that is similar to the pH value of the measured solution the solution calibrates the instrument to counteract interference.

4.3

When measuring samples with low electrolyte, a pH electrode suitable for low ionic strength should be used;

For samples with a temperature greater than 5 per mille), a pH electrode suitable for high ionic strength should be used for measurement.

4.4

When measuring acidic samples with high concentration of fluorine, use a hydrofluoric acid-resistant pH electrode for measurement.

4.5

Temperature affects the electrode potential and the ionization balance of water, the instrument should have a temperature compensation function, and the temperature compensation range is based on Instrument manual.

5 Reagents and materials

Unless otherwise specified, analytical reagents that meet national standards are used for analysis.

25.1 Experimental water. newly prepared distilled water to remove carbon dioxide.

Pour the water into the beaker, boil for 10 minutes, cover and leave to cool. Temporarily use the current system.

5.2

Potassium hydrogen phthalate ($\text{C}_8\text{H}_5\text{KO}_4$).

Dry for 2 h at 110°C ~ 120°C , and store in a desiccator for later use.

5.3

Anhydrous disodium hydrogen phosphate (Na_2HPO_4).

Dry for 2 h at 110°C ~ 120°C , and store in a desiccator for later use.

5.4

Potassium dihydrogen phosphate (KH_2PO_4).

Dry for 2 h at 110°C ~ 120°C , and store in a desiccator for later use.

5.5

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

Place it in a desiccator with saturated sodium bromide (or sodium chloride and sucrose) solution (room temperature) for 48 hours to make sodium tetraborate the crystal remains stable.

5.6

Standard buffer solution.

5.6.1

Standard buffer solution I. $c(\text{C}_8\text{H}_5\text{KO}_4) = 0.05 \text{ mol/L}$, $\text{pH} = 4.00$ (25°C).

Weigh 10.12 g of potassium hydrogen phthalate (5.2), dissolve in water (5.1), transfer to a 1 L volumetric flask and dilute to Marking. You can also buy a commercially available qualified standard buffer solution and use it according to the instructions.

5.6.2 Standard buffer solution II. $c(\text{Na}_2\text{HPO}_4)=0.025 \text{ mol/L}$, $c(\text{KH}_2\text{PO}_4)=0.025 \text{ mol/L}$, $\text{pH}=6.86$

(25°C).

Weigh 3.53 g of anhydrous disodium hydrogen phosphate (5.3) and 3.39 g of potassium dihydrogen phosphate (5.4) and dissolve in water (5.1), Transfer to a 1 L volumetric flask and dilute to the mark. You can also buy a commercially available qualified standard buffer solution and use it according to the instructions.

5.6.3 Standard buffer solution III. $c(\text{Na}_2\text{B}_4\text{O}_7) = 0.01 \text{ mol/L}$, $\text{pH} = 9.18$ (25°C).

Weigh 3.80 g of sodium tetraborate (5.5), dissolve it in water (5.1), transfer to a 1 L