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pH (acidity) Measuring instrument (English Translation)

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1 Scope

This verification system table is suitable for the transfer of pH (acidity) measuring instruments. It specifies the method and procedure for transferring the pH (acidity) value from the metering reference to the working measuring instruments at all levels through metering standard, as well as the optimal measuring capability when the value is transferred. When carrying out calibration, it can also be used as a basis for traceability of the value.

2.1 Reference range and expanded uncertainty

The national reference is used to reproduce and preserve the pH scale of aqueous solutions. The range of the national reference reproduced pH ranges from 0 to 14 (0 °C to 95 °C); the extended uncertainty is 0.005 ($k = 3$).

The national reference adopts the Harned-cell reference battery method without liquid junction, which realizes the traceability to the SI basic units of thermodynamic temperature, current, time, length, mass, etc. through the measurement of battery potential, temperature, gas pressure, etc.

2.2 Reference measuring device

The reference measuring device consists of the following instruments and equipment:

Liquid-junction-free reference battery pack (also known as Harned-cell reference battery pack), which is a liquid-junction-free measurement battery pack composed of platinum (palladium) hydrogen electrode as indicator electrode and silver/silver chloride electrode as reference electrode.

The battery potential measuring instrument adopts a DC digital voltmeter which has a resolution of 1 μV and a maximum allowable error of no more than $\pm 10 \mu\text{V}$.

Precision constant temperature water tank: the temperature uniformity of the constant temperature water tank does not exceed 0.01 $^{\circ}\text{C}$; the temperature verification of the instrument, usually the pH meter verification instrument is used. The measuring range of the pH meter verification device is 0 ~ 14; the

DC voltage range is -2V ~ 2V, which is divided into two levels: 0.003 and 0.0006.

The electrical meter verification device for pH meter composed of a standard battery and a standard potentiometer shall meet the requirements of the corresponding level of pH meter verification instrument.

The electrical meter verification device for pH meter transmits the value to the working measuring instrument through the direct measurement method.

4 Working measuring instruments

Working measuring instruments refer to laboratory pH meters, online pH meters, as well as the ion meters, potentiometric titrators, water quality analyzers, etc.

used as pH meters.

4.1 Laboratory pH meter

The pH measurement range of the laboratory pH meter is 0 ~ 14; the DC voltage measurement range is -2 V ~ 2 V, which are divided into 0.001, 0.01, 0.02, 0.1, 0.2 levels.

4.2 Online pH meter

The pH measurement range of the online pH meter is 0 ~ 14; the DC voltage measurement range is -2 V ~ 2 V, which is divided into 0.01 level and 0.1 level.

4.3 Others

For the ion meters, potentiometric titrators, water quality analyzers, etc. used as pH meters, it may, based on the pH measurement ranges and accuracy levels, determine the appropriate pH value transfer path by referring to this calibration system table.

5 Block diagram of verification system of pH (acidity)

measuring instrument

The block diagram of the pH (acidity) measuring instrument's verification system is shown in the Figure below.

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