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NATIONAL STANDARD OF THE
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GB/T 9724-2007

Replacing GB/T 9724-1988

**Chemical Reagent –
General Rule for the Determination of pH**

化学试剂

pH值测定通则

(ISO 6353-1:1982, Reagents for chemical analysis -
Part 1: General test methods, NEQ)

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Foreword

This Standard is not equivalent to ISO 6353-1:1982 "Reagents for chemical analysis - Part 1: General test methods".

This Standard replaces GB/T 9724-1988 "Chemical reagent - General rule for the determination of pH". Compared with GB/T 9724-1988, the main changes are as follows:

- ADD the normative references (Chapter 2);
- INCREASE the degree of accuracy of the acidimeters (5.2);
- ADD saturated calomel electrode with double salt bridge and composite electrode (5.3 of this Standard);
- DELETE antimony electrode (5.3.2 in 1988 edition);
- ADD control of the operating conditions of the counter electrodes (Chapter 6 of this Standard);
- MODIFY contents in Annex A.

Annex A of this Standard is Informative.

This Standard was proposed by China Petroleum and Chemical Industry Association.

This Standard shall be under the jurisdiction of the National Technical Committee of Standardization for Chemicals (SAC/TC63/SC3).

Drafting organization of this Standard: Shanghai No.4 Reagent & H.V. Chemical Co., Ltd.

Chief Drafting Staff: Jia Ling.

This Standard was first-time issued in 1988.

Chemical reagent - General rule for determination of pH

1 Scope

This Standard specifies the general rules for measurement of pH of water solution in electrometric method.

This Standard is applicable to the measurement of pH of chemical reagent and water solution. The measurement range of pH is 1 ~ 12.

2 Normative References

The provisions in following documents, through reference in this text, constitute the provisions of this Standard. For dated reference, all subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who have reached an agreement on this Standard are encouraged to study whether the latest revisions of these documents are applicable. For undated reference, the latest revisions apply to this Standard.

GB/T 601 Chemical Reagent - Preparation of Standard Volumetric Solution

GB/T 603 Chemical reagent - Preparations of reagent solutions for use in test methods (GB/T 603-2002, ISO 6353-1:1982, NEQ)

GB/T 6682 Water for laboratory use - Specifications (GB/T 6682-1992, neq ISO 3696:1987)

JJG 119- 2005 Verification Regulation of Laboratory pH Meters

3 Method and Theory

Soak the specified indicator electrode and reference electrode into the solution to be measured to form a primary battery, whose electromotive force is related to the pH of solution. The pH of the solution may be obtained through measurement of the electromotive force of the primary battery.

(b) The reference electrodes shall use saturated calomel electrode, and Double Salt Bridge saturated calomel electrode;

(c) The composite electrodes.

6 Measurements

Use non-carbon dioxide water to prepare the samples into 50 g/L solution (except special case).

Prepare 2 kinds of standard buffer solutions - its pH values are respectively located at both ends of pH values of the test solution, and near to the pH value of the test solution. Calibrate the acidimeter with the above 2 kinds of standard buffer solutions; turn the thermal compensation knob to the temperature of the standard buffer solution; if the measured slope value is within the range of 90% ~ 100%, then the electrode is in normal operating conditions. If the acidimeter does not have the function to adjust the slope, it may use the 2 standard buffer solutions to calibrate each other; the pH value error shall not be larger than 0.1 (if the slope value is less than 90% or the pH value error is larger than 0.1, then the said electrodes shall be cleaned or replaced). Use standard buffer solution whose pH is close to the test solution to conduct positioning. Wash the electrode with water; scrub the electrode of the sample solution; then adjust the temperature of the sample solution to $25\pm 1^{\circ}\text{C}$; adjust the thermal compensation knob of the acidimeter to 25°C ; measure the pH of the sample solution. In order to get precise results, the sample solutions shall be divided into 2 portions and measured respectively; the measured pH values shall be stable for at least 1 min. The permissible error of the measured pH value at the two times shall not be larger than 0.02.

Annex A

(Informational Appendix)

Application and maintenance of the electrodes

A.1 Glass electrodes

Before use, new electrodes shall be soaked in the water for above 24 hours; after use, it shall be rinsed immediately and be submerged in water for conservation.

A.2 Saturated calomel electrodes

During use, the rubber stopper on the small hole at the upper end of the electrode must be pulled out to prevent diffusion potential that may impact the measurement result. The potassium chloride solution inside electrodes must not have bubble to prevent open circuit. There shall maintain some potassium chloride crystals in the solution, so as to ensure that the potassium chloride is in saturation. The connecting parts of the electrode shall not be stained or blocked, and to maintain appropriate speed of effluent seepage.

A.3 Saturated calomel electrode with double salt bridge

The salt bridge sleeves shall be loaded with saturated ammonium nitrate or potassium nitrate solution; other caution items are same as that of saturated calomel electrode.

A.4 Composite electrode

For the composite electrodes, the following matters shall be paid attention to:

- (a) During use, the protective caps at the lower ends of the electrodes shall be taken down to avoid connection of the sensitive glass bulbs with hard substances, so as to avoid inactive electrode. After use, the protective caps shall be put onto the electrodes, and reference feeding liquor of 3 mol/L potassium chloride shall be filled inside the caps to maintain the moisture of the electrodes.
- (b) Before use, if it is found that the feeding liquor inside the protective caps is dried, they shall be soaked into 3 mol/L potassium chloride for several hours to guarantee the service performance of the electrodes.
- (c) During use, the rubber stopper on the small hole at the upper end of the electrode must be pulled out to prevent diffusion potential that may impact the measurement. It may fill 3 mol/L potassium chloride through the little hole. When

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