

JJG

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

JJG 376-2007

Verification Regulation of Electrolytic Conductivity Meters (English Translation)

Issued on: November 21, 2007

Implemented on: May 21, 2008

Issued by: State Administration of Quality Supervision, Inspection and
Quarantine Verification Regulation of

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1 Scope

This regulation applies to the first-time verification, subsequent verification, and in-use inspection of electrolytic conductivity meters. Calibration of resistivity meter, salinity meter based on the electrical conductivity measurement principle, and TDS measurement instrument can reference to this regulation.

2 Normative references

OIML R68 Edition 1985 Calibration method for conductivity cell

BS EN 60746-3.2002 Expression of performance of electrochemical analyzers - Part 3.

3.1 Electrolytic conductance

The ratio of current and electric potential difference when ionic charge of conductivity cell moves in the electrolyte solution.

3.3 Cell constant

Conductance cell constant is calculated by the formula (3).

3.4 Temperature coefficient

The relative change of the conductivity of the electrolyte solution that is caused by temperature change of 1 °C. For strong electrolyte whose electrical conductivity is greater than $1 \times 10^{-4} \text{ S} \cdot \text{m}^{-1}$, the temperature coefficient α can be approximately expressed by Formula (5).

4 Overview

Conductivity meter is used to measure the electrolyte solution conductivity. The measuring principle of conductivity meter is based on the relationship [formula (4)] of conductivity, electric conductance, and conductance cell's constant. Apply alternating electrical signals between electrodes of conductance cell to measure the solution conductivity; obtain the conductivity according to the imputed conductance cell's constant.

5.1 The electronic unit repeatability

Verification results shall comply with the provisions of Table 1.

5.2 Electronic unit cited error

Verification results shall comply with the provisions of Table 1.

5.3 Indication error of conductance cell's constant

Verification results shall comply with the provisions of Table 1.

6 General technical requirements

Instrument appearance shall be bright, clean and flat. Instrument function keys shall be able to work properly. All fasteners shall not be loose. The indication of instrument panel shall be clear and intact. Digital display instrument shall be clear and complete.

7 Control of measuring instruments

Control of measuring instruments includes first-time verification, subsequent verification and in-use inspection.

7.1.1 Environmental conditions

Verification results shall comply with the provisions of Table 2.

7.1.2 Solution conductance simulator

It is the standard device for verifying electronic unit's metrological performance. It is consisted of a set of non-inductive a.c. (alternate current) resistance. Setting of resistance value shall be able to meet the requirements of "verification method".

7.1.3 Conductivity standard solution

The relative uncertainty of reference value of standard solution used in verification shall be less than or equal to 0.25 0.25% ($k = 2$). Potassium chloride solution conductivity standard material may be used. It may also use KCl conductivity solid standard material prepared according to the provisions of the appendix.

7.3.8 Instrument repeatability

Repeatedly measure standard solution 1 or standard solution 2 for 6 times. Calculate the ratio of single-measurement standard deviation AND full-range according to Formula (6).

It represents the repeatability of instrument measurement results.

7.4 Processing of verification results

After verification, the instrument complying with this regulation is deemed as qualified instrument. A verification certificate shall be issued. The certificate shall provide each item's verification result and the instrument level. The instrument at certain level shall meet the requirements of all metrological performance of that level. If some range can not meet the requirements, it shall indicate the limitation range. If the instrument is not qualified, a notice of verification result shall be issued.

7.5 Verification period

The verification period generally shall not be more than a year.

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