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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JJG 719-2021

**Verification Regulation of Working Standards of DC
Electromotive Force
(English Translation)**

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Introduction

JJF1002-2010 "Rules for Compilation of National Metrology Verification Regulations", JJF1001 "General Metrology Terms and Definitions", JJF1059.1-2012 "Assessment and Expression of Measurement Uncertainty" together constitute the basis for the preparation of this regulation series specification:

This regulation replaces JJG 719-1991 "Working Standards of DC Electromotive Force": Compared with JJG 719-1991, the main the technical changes are as follows:

- Increased the definition of related terms;
- Cancel the internal resistance judgment;
- Added the method of measuring the electromotive force difference with a digital voltmeter;
- Increased temperature measurement method:

The previous releases of this regulation are as follows:

---JJG 719-1991:

DC electromotive force working benchmark verification regulations

1 Scope

This regulation applies to the initial verification, subsequent verification and in-use inspection of DC electromotive force working reference measuring instruments:

2 References

This procedure references the following documents:

GB 3929-1983 standard battery for dated references, only the dated version applies to this regulation; for undated references document, its latest version (including all amendments) applies to this regulation:

3 Terminology and units of measurement the device used to save the dc voltage main reference or the dc voltage testimonial reference recurring voltage unit, which can carry out the corresponding Quantity transfer works: The device consists of DC electromotive force sub-reference device, electromotive force difference measurement system, temperature measurement system and Composition of constant temperature oil tank:

The device used to save the unit of the DC electromotive force secondary reference transmission voltage can carry out the corresponding value transmission work: Should the device consists of a DC electromotive force reference device, an electromotive force difference measurement system, a temperature measuring instrument and a constant temperature oil tank:

3:3 difference method difference method Obtain data related to the measurement result by measuring the difference between the measured value and the reference quantity, and perform operations on the data the measurement method used to obtain the measurement result: The measurand in this regulation can be the electromotive force value of the standard battery, it can also be the electromotive force value of the standard battery being tested; the reference quantity refers to the electromotive force value of the standard battery for transition, or Other instruments output voltage values that are characteristic of standard battery emf values:

The substitution method is a different-time comparison method: The working parameters of a measurement system are determined by the known measured value, and the working parameters are maintained:

The parameters do not change, the known measured value is replaced by the unknown measured value, and the data related to the measurement result are obtained from the measurement system:

According to the measurement method: The difference substitution method refers to the measurement method that substitutes for each other in the substitution method and is measured as a difference:

When the difference substitution method is used for measurement, the number of measured objects is large, and the measurement duration is long:

The working parameters will change with time, and this change is mainly linear: In order to eliminate the linear variation brought by the system Error, all the measured objects participating in the measurement are measured twice isochronously in chronological order, the first time is measured in positive order, and the second time is measured the measurement is carried out in reverse order twice, and the average value of the two measurement data of each measured is used as the basis for calculating the measurement results:

It is known that this measurement method is called the closed-loop symmetric observation method: