Chinastandards.org

JJF

NATIONAL METROLOGY TECHNICAL SPECIFICATION OF THE

PEOPLE'S REPUBLIC OF CHINA

# JJF 1949-2021

# Calibration Specification for Water Hardness Meters

水质硬度计校准规范

(English Translation)

**Issued on: December 28, 2021** **Implemented on: June 28, 2022**

**Issued by: State Administration for Market Regulation**

Preview: page 1 of 4 shown, 9 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/jjf-1949-2021

Chinastandards.org

# Table of Contents

Introduction (II)
1 Scope(1)
2 References (1)
3 Overview(1)
4 Metrology Characteristics(1)
4.1 Indication error of water hardness (1)
4.2 Repeatability(1)
4.3 Temperature indication error(1)
5 Calibration Conditions(1)
5.1 Environmental conditions (1)
5.2 Measuring instruments and ancillary equipment for calibration (2)
6 Calibration items and calibration methods (2)
6.1 Error of water hardness indication (2)
6.2 Repeatability(2)
6.3 Temperature indication error (3)
7 Expression of calibration results (3)
8 Recalibration interval(3)
Appendix A Standard Solution Preparation Method(4)
Appendix B Calibration Raw Record Format (Recommended) (5)
Appendix C Calibration Certificate Inner Page Format (Recommended) (6)
Appendix D Example of Measurement Uncertainty of Water Hardness Indication Error (7)

## 8 Recalibration interval(3)

Appendix A Standard Solution Preparation Method(4)

Appendix B Calibration Raw Record Format (Recommended) (5)

Appendix C Calibration Certificate Inner Page Format (Recommended) (6)

Appendix D Example of Measurement Uncertainty of Water Hardness Indication Error (7)



Preview: page 2 of 4 shown, 9 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/jjf-1949-2021

## Introduction

This specification is based on JJF 1001-2011 "General Metrology Terms and Definitions", JJF 1071-2010 "National Metrology" Calibration Specification Compilation Rules" and JJF 1059.1-2012 "Measurement Uncertainty Evaluation and Representation", refer to Tested GB 8538-2016 "National Food Safety Standard Drinking Natural Mineral Water Inspection Method", GB/T 6909-2018 "Determination of Hardness of Boiler Water and Cooling Water Analysis Method" and ASTMD1126-2017 "Standard of Water Hardness" this specification is published for the first time.

Specification for calibration of water hardness tester

1 Scope

This specification applies to the calibration of benchtop and portable water hardness testers whose measuring principle is the colorimetric or electrode method.

2 Reference documents this specification references the following documents.

GB/T 6682 Analysis Laboratory Water Specifications and Test Methods for dated references, only the dated version applies to this specification; for undated references the latest version (including all amendments) applies to this specification.

3 Overview

The total water hardness mainly refers to the total content of calcium ions and magnesium ions in the water body, of which calcium hardness is caused by calcium ions.

Magnesium hardness is caused by magnesium ions, and its common measurement units are molar concentration mmol/L or mass concentration mg/L (as CaCO3, CaO or Ca).

Water hardness tester (hereinafter referred to as hardness tester) is mainly used in food, medicine, environmental protection, chemical industry and other fields Measurement of water hardness. The hardness tester is roughly divided into two categories according to the measurement principle. One is the principle of colorimetry. calcium in water samples, Magnesium ions react with a color developer to form a compound of a specific color, and the absorbance value of the compound is similar to that of a specific wavelength.

The concentration of calcium and magnesium ions is related, and the water hardness value is obtained by measuring the absorbance value. The colorimetric hardness tester is mainly composed of a light source, a sample it is composed of a product room, a detection unit and a data processing unit. The other is the principle of the electrode method. the use of ion-selective electrodes for the relationship between the electrode potential and the water hardness content conforms to the thermodynamic Nernst equation.

water hardness value. Electrode hardness tester is mainly composed of electrodes, electronic units and (or) display units.



Preview: page 3 of 4 shown, 9 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/jjf-1949-2021

Chinastandards.org

## 4 Metrology characteristics

4.1 Indication error of water hardness Colorimetric hardness tester water hardness indication error. no more than ±10%.

The error of water hardness indication value of electrode method hardness tester. no more than ±15%.

4.2 Repeatability

Colorimetric hardness tester repeatability. <=3%.

Electrode method hardness tester repeatability. <=5%.

4.3 Temperature indication error Temperature indication error does not exceed ± 0.5 °C.

**Note:** The above measurement characteristics requirements are for reference only, not as a basis for judgment.

## 5 Calibration Conditions

5.1 Environmental conditions



Preview: page 4 of 4 shown, 9 in the full document. Complete English PDF, instant download:
https://chinastandards.org/standards/jjf-1949-2021