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# NATIONAL METROLOGY TECHNICAL SPECIFICATION OF THE PEOPLE'S REPUBLIC OF CHINA

# JJF 1831-2020

## Calibration Specification for Spherometers

球径仪校准规范

**(English Translation)**

**Implemented on: April 17, 2020**

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

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## Introduction

This specification is based on JJF 1001-2011 "General Metrology Terms and Definitions", JJF 1071-2010 "National Metrology Calibration Specification Compilation Rules, JJF 1059.1-2012 "Evaluation and Expression of Measurement Uncertainty", JJF 1094-2002 the "Evaluation of the Characteristics of Measuring Instruments" is based and revised.

This specification is a revision of JJG401-1985.Compared with JJG401-1985, except for editorial changes, the main the contents to be revised are.

--- Use "relative error of spherical radius of curvature measurement" instead of "comprehensive error of spherical diameter meter", use "vector height measurement "Measurement mechanism" replaces "reading device";

---Specifies 3 measurement characteristics. the indication error of the vector height measuring mechanism, the radius of the measuring ring, and the radius of curvature of the spherical surface Relative error of measurement;

---The standard required for calibration has been adjusted, and the universal tool microscope, special parallel flat crystal, and vertical Reflective lighting device;

--- Canceled the method of "Using the universal tool microscope to verify the radius of the steel ball measuring ring";

---Added appendix content.

---Change the number of measurements of the measured vector height from 5 to 3.

The release status of previous versions of this specification.

---JJG401-1985.

Spherometer calibration specification

1 Scope

This specification applies to the calibration of contact spherometers.

2 Reference documents this specification refers to the following documents.

JJF 1071-2010 National Metrology and Calibration Specifications Compilation Rules GB/T 308.1-2013 Rolling bearing balls Part 1: Steel balls for dated reference documents, only the dated version applies to this specification; for undated references the latest version (including all amendments) is applicable to this specification.

3 overview

The contact ball diameter meter (hereinafter referred to as the ball diameter meter) is a measuring instrument used to measure the radius of curvature of the spherical surface.



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It is used to measure the radius of curvature of the spherical surface of the optical panel, optical sample, spherical lens, spherical mirror, etc. Spherometer it is mainly composed of a measuring ring and a vector height measuring mechanism, which indirectly measures the curvature of the spherical surface by measuring the vector height of the spherical surface radius.

The measuring principle of the spherometer is shown in Figure 1 and Figure 2.The chord radius r in Figure 1 and Figure 2 is also measured by the spherometer the radius of the measuring ring in the characteristic.

Fig.1 The principle diagram of measuring the height of the vector using a steel ball type measuring ringFig.2 The principle diagram of measuring the height of the vector using a blade type measuring ring

Rc- the radius of curvature of the tested spherical surface; r- the radius of the chord; Rc- the radius of curvature of the tested spherical; r- the radius of the chord;

h- the measured value of the vector height measuring mechanism; rho- the steel ball radius h- the measured value of the vector height measuring mechanism

4 Measurement characteristics

4.1 Measure the radius of the ring.

4.2 The relative error of the measurement of the radius of curvature of the spherical surface.

4.3 Indication error of the vector height measuring mechanism.



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