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JJF

NATIONAL METROLOGY TECHNICAL SPECIFICATION OF THE

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Calibration specification for laser interferometer

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(English Translation)

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Introduction

JJF 1071 "Rules for the Compilation of National Metrology Calibration Specifications", JJF 1001 "General Metrology Terms and Definitions" and JJF 1059.1 "Assessment and Representation of Measurement Uncertainty" together constitute the basic series supporting the formulation of this specification.

This specification replaces JJG331-1994 "Laser Interferometer". Compared with JJG331-1994, except for editorial in addition to the modification, the main technical changes are as follows.

--- Replace the accuracy of the ratiometer with the indication error of the laser interference ratiometer;

--- Modified the measurement repeatability calibration and its data processing method;

--- Increased aiming repeatability and its calibration method;

--- Delete the uniformity of the laser parallel beam, the contrast of the interference fringes and the quality of the output signal, the measurement light Verification items such as the consistency of beam and movement direction, and the uniformity of table movement speed;

--- Added related calibration items for the image probe aiming system;

--- Added the measurement uncertainty evaluation example of the indication error of the laser interferometer in Appendix A.

The previous releases of this specification are as follows.

---JJG331-1994.

---JJG331-1983.

Laser Interferometer Calibration Specification

1 Scope

This specification applies to the calibration of laser interferometers with a measurement range of (0~1000) mm.

2 Reference documents this specification references the following documents.

JJG73-2005 High-grade line ruler JJF 1001-2011 General Metrology Terms and Definitions JJF 1059.1 Evaluation and representation of measurement uncertainty JJF 1094-2002 Characteristic Evaluation of Measuring Instruments 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 Terms and Definitions the following terms and definitions apply to this specification.

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The minimum scribe line interval of the line ruler that can be effectively measured by the laser interferometry.

4 Overview

The laser interferometer is based on the laser wavelength as the length measurement benchmark, and directly measures the linear ruler, linear displacement sensor, laser Optical interferometer is a standard instrument for measuring the length of the line value class. The laser interferometer consists of a mechanical main body, a length measuring system, a aiming system, motion control system, lighting system, environmental parameter measurement system and data processing system, etc.

The structure is shown in Figure 1.The length measuring system includes frequency-stabilized laser light source, interference optical path, wavelength correction system, etc.; aiming system Use a photoelectric microscope or an image probe for reticle aiming or reading.

Figure 1 Laser Interferometer

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