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NATIONAL METROLOGY TECHNICAL SPECIFICATION OF THE

PEOPLE'S REPUBLIC OF CHINA

JJF 1916-2021

Scanning Electron Microscope Calibration Specification

扫描电子显微镜校准规范

(English Translation)

Issued on: July 28, 2021 **Implemented on: January 28, 2022**

Issued by: State Administration for Market Regulation

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9 Recalibration interval(4)

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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 and revision of this specification.

This specification is the revision of JJG550-1988 "Scanning Electron Microscope (Trial)". Reference during revision GB/T 20307-2006 "General Principles of Scanning Electron Microscope Measurement Methods of Nanometer Length" and GB/T 27788-2011

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"Guidelines for Microbeam Analysis Scanning Electron Microscope Image Magnification Calibration". Compared with JJG550-1988, except for editorial revisions the main technical changes are as follows.

--- Increase the calibration of the error of the scanning electron microscope length measurement indication value;

---Increased the calibration of the length measurement and indication error in the Y direction;

--- Deleted the measurement of vacuum degree;

--- Deleted the measurement of X-ray leakage;

--- Added Appendix B "Scale Calibration Values".

The previous releases of this specification are as follows.

---JJG550-1988.

Scanning Electron Microscope Calibration Specification

1 Scope

This specification applies to the calibration of scanning electron microscopes.

2 Reference documents this specification references the following documents.

JJF 1071-2010 Rules for Compilation of National Metrology and Calibration Specifications GB/T 20307-2006 General rules for measuring method of scanning electron microscope of nanometer length 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.

3.1 Standard template referenceartifact A template with multiple equally spaced grids, the grid spacing is calibrated by the national legal metrology verification agency, and the spacing value is Traceable to national benchmarks.

4 Overview

Scanning electron microscope (hereinafter referred to as "electron microscope") uses a focused electron beam to scan point by point on the surface of the sample.

The interaction between the electron and the sample generates secondary electron signals and backscattered electron signals, thereby obtaining surface topography images, which can reach resolution to the nanometer level. Its structure is shown in Figure 1.

Fig.1 Schematic diagram of scanning electron microscope structure

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1- electron gun; 2- focusing lens; 3- scanning coil; 4- signal detector; 5- sample; 6- sample chamber; 7- vacuum system

5 Metrology characteristics the measurement characteristics of the electron microscope are shown in Table 1, and the performance indicators are for reference during calibration.

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