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

GB/T 33523.700-2025

**Geometrical product specifications (GPS) - Surface texture:
Areal - Part 700: Calibration, adjustment and verification of
areal topography measuring instruments**

产品几何技术规范（GPS） 表面结构：区域法 第700部分：区域形貌测量仪器的
校准、调整和验证

(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 700 of GB/T 33523 Geometrical Product Specification (GPS) Surface Structure. Area Method.

GB/T 33523 has published the following parts.

- Part 1: Representation of surface structure;
- Part 2: Terms, definitions and surface structure parameters;
- Part 3: Specification of operation sets;
- Part 6: Classification of surface structure measurement methods;
- Part 70: Physical measurement standards;
- Part 71: Software measurement standards;
- Part 72: XML file format x3p;
- Part 73: Terms and definitions of physical standard surface defects;
- Part 600: Metrological characteristics of area topography measurement methods;
- Part 601: Nominal characteristics of contact (stylus) instruments;
- Part 602: Nominal characteristics of non-contact (confocal chromatic aberration probe) instruments;
- Part 603: Nominal characteristics of non-contact (phase-shift interferometry) instruments;
- Part 604: Nominal characteristics of non-contact (coherent scanning interferometry)

instruments;

--- Part 605: Nominal characteristics of non-contact (point autofocus probe) instruments;

--- Part 606: Nominal characteristics of non-contact (zoom) instruments;

--- Part 700: Calibration, adjustment and verification of area topography measuring instruments;

--- Part 701: Calibration and measurement standards for contact (stylus) instruments.

This document is equivalent to ISO 25178-700:2022 "Geometrical Product Specification (GPS) Surface Structure. Area Method Part 700 Section. Calibration, adjustment and verification of area topography measurement instruments.

Introduction

With the implementation of the national product quality improvement plan, unified specifications or principles used in product design, manufacturing, measurement and inspection processes are required.

The demand for surface structure in the original product geometry specification and related standards can no longer meet the needs of product manufacturing.

Surface quality control requirements during the process.

GB/T 33523 "Product Geometry Technical Specification (GPS) Surface Structure. Area Method" is based on the new generation of GPS product geometry specification.

Through digital measurement technology, software analysis technology and metrological evaluation, a new set of three-dimensional surface structure measurement and analysis is constructed.

GB/T 33523 is a recommended national standard. Based on the proposed surface structure representation method, surface structure parameters and standard operation set, it analyzes the method of surface structure measurement is given, and the measurement technology used and the nominal characteristics of the instrument are given. In particular, GB/T 33523 covers contact While introducing non-contact measuring instruments, we also focus on introducing a variety of non-contact measuring instruments that are of great value in high-precision measurement applications but lack standard support.

GB/T 33523 also specifies the physical measurement and software measurement standards, and provides software file standards and surface structure measurement standards.

GB/T 33523 has achieved a leap from two-dimensional profile measurement to three-dimensional surface structure measurement, and has laid a solid foundation for the GPS product geometry specification system.

Provides measurement and testing support.

GB/T 33523 is planned to consist of 17 parts.

--- Part 1: Representation of surface structure. Aims to specify the method of using surface structure in product technical documents (such as drawings, specifications, contracts and reports).

Graphic symbols represent the regularity of the surface structure of the area.

--- Part 2: Terms, definitions and surface texture parameters. Aims to specify the terms, definitions and parameters for evaluating surface texture using the area method.

--- Part 3: Set of standard operations. Aims to specify complete standard operations applicable to the regional method for assessing surface structure (size-limited surface) Make a collection.

--- Part 6: Classification of surface structure measurement methods. Aims to specify the classification system mainly used for surface structure measurement methods, defining the three types of methods are described, and the relationship between the three types of methods is described, and the specific methods are briefly explained.

--- Part 70: Physical measurement standards. Aims to specify physical measurement standards for periodic verification and adjustment of area method surface structure measurement instruments.

Characteristics of quantity standards.

--- Part 71: Software measurement standards. Aims to specify S1 and S2 software measurement standards for use in measuring instrument software calibration Definition of the term (etalon).

--- Part 72: XML file format x3p. Aims to specify the XML file format for storing and exchanging topography and contour data Type x3p.

--- Part 73: Terms and definitions of physical standard surface defects. Aims to define the terms and definitions specified in ISO 5436-1 and ISO 25178.70 Definition of the types of geometric defects that can appear on the surface of physical measuring tools and calibration samples, and definition of the treatment methods for these defects the term.

--- Part 600: Metrological characteristics of area topography measurement methods. Aims to specify area method measuring instruments for surface topography measurement the measurement characteristics.

--- Part 601: Nominal characteristics of contact (stylus) instruments. To specify the nominal characteristics of contact (stylus) instruments using the surface structure area method.

Nominal characteristics.

--- Part 602: Nominal characteristics of non-contact (confocal chromatic aberration probe) instruments. It is intended to specify the use of white light axial dispersion based on Design and metrological characterization of a non-contact instrument for measuring surface structure using a confocal chromatic aberration probe.

--- Part 603: Nominal characteristics of non-contact (phase shift interferometry) instruments. To specify the phase shift interferometry (PSI) profile and area Metrological properties of a surface structure measurement microscope.

--- Part 604: Nominal characteristics of non-contact (coherent scanning interferometry) instruments. To specify the nominal characteristics of non-contact (coherent scanning interferometry) instruments for three-dimensional mapping of surface height.

Metrological characteristics of a coherence scanning interferometry (CSI) measurement system.

--- Part 605: Nominal characteristics of non-contact (point autofocus probe) instruments. To specify the use of point autofocus probe measurement Metrological properties of non-contact instruments for measuring surface structure.

--- Part 606: Nominal characteristics of non-contact (varifocal) instruments. To specify the use of variable focal length (FV) sensors to measure surface structures.

Design and metrological characteristics of non-contact instruments.

--- Part 700: Calibration, adjustment and verification of area topography measuring instruments. Aims to specify the calibration, adjustment and verification of area topography measuring instruments.

General procedure for the common metrological characterization of areal topography instruments as described in ISO 25178-600.

--- Part 701: Calibration and measurement standards for contact (stylus) instruments. To specify the area method surface structure contact (stylus) type Characteristics of physical measuring tools used as measuring standards, methods for assessing residual errors, tests for calibration, acceptance and periodic verification method.

Geometric Product Specification (GPS) Surface Structure.

Area law part 700.area topography measuring instruments Calibration, adjustment and verification

1 Scope

This document specifies the procedures for calibrating, adjusting and verifying the common metrological characteristics of areal topography measuring instruments as described in ISO 25178-600.