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

GB/T 34874.1-2025

**Geometrical product specifications (GPS) - X-ray three
dimensional size measuring machines - Part 1: Vocabulary**

产品几何技术规范（GPS）X射线三维尺寸测量机 第1部分：词汇

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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 1 of GB/T 34874 "Product Geometry Technical Specification (GPS) X-ray Three-dimensional Dimension Measuring Machine". GB/T 34874 The following parts have been published.

3. Acceptance testing and retesting;

4. Evaluation of measurement uncertainty;

6. Detection methods for workpieces. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the National Technical Committee for Standardization of Product Geometry Technical Specifications (SAC/TC240). This document was drafted by: China Institute of Metrology, China Machinery Research Institute of Standards and Technology (Beijing) Co., Ltd., Shenzhen China Metrology Institute Institute of Technology Innovation, Guangdong Institute of Metrology, Beijing Aerospace Metrology and Testing Technology Institute, Shenzhen Metrology Quality Inspection Institute Institute of Metrology and Measurement, Guangzhou Institute of Metrology and Testing Technology, China University of Metrology, Lima Precision Measurement Technology (Suzhou) Co., Ltd., Suzhou Metrology and Measurement Co., Ltd. Institute of Metrology, Beijing University of Aeronautics and Astronautics Ningbo Innovation Institute, Nanjing Metrology Supervision and Inspection Institute, and Shandong Institute of Metrology Science. The main drafters of this document are. Shi Yushu, Zhu Yue, Zhang Xinyu, Song Zhenfei, Zhang Shu, Song Jincheng, Guo Jiping, Wei Chun, Hu

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This document focuses on establishing the core terms and definitions of X-ray 3D dimension measuring machines, filling the gap in domestic vocabulary standards in this field. It provides a unified language specification for applications under the framework of product geometry specification (GPS). This document standardizes the use of relevant terms to ensure that they are used in theoretical research, international standard research, and Maintain consistent expression and understanding in research and measurement application practice. This document not only covers the core terms in the fields of measurement uncertainty, fitting algorithms, workpiece inspection, etc., but also provides a comprehensive guide to X-ray 3D dimensional measurement. The publication of this document will help promote the use of X-ray in the application of When developing three-dimensional dimension measuring machines, a unified and standardized language system is formed, thereby improving the overall communication efficiency of the industry and laying a foundation for the implementation of technical specifications. A solid foundation. For the convenience of readers, GB/T 34874 is divided into 6 parts. The contents of these parts are interrelated and independent, and together constitute The application method of X-ray three-dimensional dimension measuring system is specified, and the relevant contents of X-ray three-dimensional dimension measuring machine are specified in detail. GB/T 34874 is intended to consist of 6 parts.

- 1.Vocabulary. Aims to define the terms used in X-ray three-dimensional dimension measuring machines.
- 2.General technical requirements and applications. Aims to specify the basic operating requirements and applications of X-ray three-dimensional dimension measuring machines scene.
- 3.Acceptance test and retest. Aims to specify the inspection criteria and retest execution methods of equipment.
- 4.Evaluation of measurement uncertainty. Aims to provide a method for evaluating the measurement uncertainty of X-ray three-dimensional dimension measuring machines.
- 5.Extraction and fitting of feature elements. Aims to specify the feature extraction and data fitting methods in image processing.
- 6.Workpiece detection method. Aims to specify the specific operation method of the equipment in workpiece measurement. Product Geometric Specification (GPS) X-ray 3D dimension measuring machine Part

1 Scope

Part 1 of China's national standard for X-ray three dimensional dimensional measuring

machines, giving the vocabulary. It defines the general terms, the instrument measurement terms, the geometric property terms and the measurement uncertainty terms, with an informative annex modelling the machine. Industrial computed tomography has become a metrology instrument rather than an inspection one, and that shift is what this standard responds to. A CT scanner reconstructs a part as a volume of density values, and from that volume a surface can be extracted and measured - which means the machine can measure internal features that no coordinate measuring machine can reach, on parts that cannot be sectioned. Additive manufacturing made this indispensable, because a printed part's internal geometry is exactly what nobody can otherwise verify. The reason the series begins with a vocabulary is that the field inherited terms from radiography, from image processing and from coordinate metrology, and they do not agree with each other about what a measurement even is.

This document defines the terminology for X-ray 3D dimensioning machines. This document applies to X-ray 3D dimension measuring machines.

2 Normative references

This document has no normative references.

3 General terms

3.1 X-ray three dimensional size measuring machine Based on the principle of X-ray tomography, it uses computer 3D reconstruction technology to obtain the spatial geometric characteristics of the object being measured.

Note. The main structure of the X-ray three-dimensional dimension measuring machine includes the radiation source, turntable, radiation detector, magnification axis and adjustment axis, etc. See Appendix A.

3.2 tomosynthesis The process of digitally processing X-ray projection data and obtaining tomograms.

3.3 Radiation source A device that produces radiation. **Note**

1. According to the different principles of electron bombardment on target materials to produce X-rays, X-rays are divided into white X-rays (also called continuous spectrum) and characteristic X-rays (also called special (Collection of Records)). **Note**

2. The structure of the radiation source is shown in Figure 1. Index number description. 1

---High voltage anode; 2

---Glass wall; 3

---Contraction tube; 6

---X-ray generating center; 7

---W target. Figure

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