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

GB/T 14660-1993

Replacing GB/T 14660-1993

**NC jig vertical boring machine - Part 1: Testing of the accuracy
(English Translation)**

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting.

This document is Part 1 of GB/T 14660 "CNC Vertical Coordinate Boring Machine". GB/T 14660 has released the following parts.

---Part 1: Accuracy test.

This document replaces GB/T 14660-1993 "Accuracy of CNC Coordinate Boring Machines". Compared with GB/T 14660-1993, except for structural adjustments in addition to editorial changes, the main technical changes are as follows.

a) Changed the expression of G1 tolerance (see Table 1 in Chapter 5, G1 in Chapter 4 of the 1993 edition);

b) Changed G2, G3 and G4 to axis movement angle deviation (see Table 2, Table 3 and Table 4 in Chapter 5, G2 and G4 in Chapter 4 of the 1993 edition).

G3, G4);

c) G5 is added to be consistent with the machine tool structure and in line with the actual use of the industry (see Table 5 in Chapter 5);

d) The requirements for G6, G7, and G8 have been changed, and the stroke binning has been deleted, consistent with the current standards (see Table 6, Table 7, Chapter 5, Table 8, G7, G8, G9 in Chapter 4 of the 1993 edition);

e) G9 is added to be consistent with the machine tool structure and actual industry usage (see Table 9 in Chapter 5);

f) Change G10 to G14, consistent with the current standard (see Table 14 in Chapter 5, 1993 version of G10);

g) Changed the division of G12 and G13 spindle ends (see Table 12 and Table 13 in Chapter 5, G11 and G12 in the 1993 edition);

h) The inspection items and tolerance values for machine tool positioning accuracy and repeatable positioning accuracy inspection have been changed (see Table 15, Table 16, Chapter 6,

Table 17, Table 18, G13, G14, G15 of the 1993 edition);

i) The division of work surface width has been changed (see Table 19, Table 21 in Chapter 7, P1, P3, P4, P5 and P6 in the 1993 edition).

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Introduction

The purpose of formulating this document is to further standardize the accuracy inspection method of CNC vertical coordinate boring machines and make it consistent with the actual structure of machine tools.

structure, consistent with current relevant national standards. As a high-precision machine

tool, this type of machine tool has precision boring, precision milling, precision engraving, drilling, it has functions such as reaming and can also be used as a coordinate measuring machine with corresponding detection components. GB/T 14660 is designed to achieve the main functions of machine tools.

It can stipulate the requirements for geometric accuracy, positioning accuracy and repeated positioning accuracy, working accuracy, inspection methods and corresponding tolerances. It is planned to consist of two Partial composition.

---Part 1: Accuracy test. The purpose is to establish the inspection items and inspections that need to be followed during factory inspection of this type of machine tool products.

index.

---Part 2: Technical specifications. The purpose is to establish the requirements that need to be followed during the manufacturing process of this type of machine tool products to ensure machine tool performance and quality.

Various tests and inspections carried out based on the quantity.

The formulation and implementation of this document will enable the manufacturing enterprises of this type of machine tools to have evidence to rely on during product factory inspection and user acceptance, and ensure product safety.

It plays an important role in improving product quality, promoting trade and technological exchanges. Will promote the rapid development and product quality level of CNC vertical coordinate boring machines the continuous improvement will provide strong technical support for promoting the technological progress of the industry and increasing the market share of this type of machine tool products.

CNC vertical coordinate boring machine Part 1: Accuracy inspection

1 Scope

This document specifies the inspection requirements and inspection requirements for the geometric accuracy, positioning accuracy, repeat positioning accuracy, and working accuracy of CNC vertical coordinate boring machines.

methods and corresponding tolerance requirements.

This document is applicable to ordinary-grade (code-named P) and precision-grade (code-named M) single-column CNC with a work surface width not greater than 2000mm.

Accuracy inspection of vertical coordinate boring machines and double-column CNC vertical coordinate boring machines.

2 Normative reference documents

The contents of the following documents constitute indispensable provisions of this document through normative references in the text. Among them, the dated quotations for undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 17421.1-2023 General principles for inspection of machine tools Part 1: Geometric accuracy of machine tools under no-load or quasi-static conditions GB/T 17421.2-2023 General principles for machine tool inspection Part 2: Determination of positioning accuracy and repeatability accuracy of CNC axes

3 Terms and definitions

There are no terms or definitions to be defined in this document.

4.1 Unit of measurement

All linear dimensions, deviations and corresponding tolerances in this document are in millimeters (mm); angular dimensions are in degrees (°). angle Deviations and corresponding tolerances are generally expressed as ratios, but in some cases, for clarity, they can be expressed in microradians (μrad) or arc seconds (").

It should be expressed according to the following equivalent relationship.

$$0.010/1000=10 \times 10^{-6}=10 \mu\text{rad} \sim 2''$$

4.2 Implementation standards

When using this document, the provisions of GB/T 17421.1-2023 should be followed, especially the installation, spindle and other moving parts before machine tool inspection.

Temperature rise of parts, inspection methods and recommended accuracy of inspection tools. The positioning accuracy and repeat positioning accuracy of machine tools are in accordance with GB/T 17421.2-2023 Provisions. The installation level and ambient temperature of the machine tool meet the following requirements.

---Adjust the installation level of the machine tool according to the provisions of 6.1 in GB/T 17421.1-2023, place the worktable in the middle of the stroke, and Place a level in the middle of the workbench. The readings of the level in both the longitudinal and transverse directions should not exceed 0.02/1000;

---During inspection, the ambient temperature should be maintained within 20°C±1°C, and the machine tools and inspection tools should not be placed in the measurement environment for less than 12h to ensure a stable state before inspection.