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

**GB/T 16462.2-2023**

Replacing GB/T 16462.2-2017

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**Test conditions for numerically controlled turning machines  
and turning centres - Part 2: Geometric tests for machines with  
a vertical workholding spindle**

**(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 2 of GB/T 16462 "Inspection Conditions for CNC Lathes and Turning Centers": GB/T 16462 has been released with Lower part:

- Part 1: Inspection of geometric accuracy of horizontal machine tools;
- Part 2: Inspection of geometric accuracy of vertical machine tools;
- Part 3: Geometric accuracy inspection of inverted vertical machine tools;
- Part 4: Inspection of positioning accuracy and repeatable positioning accuracy of linear and rotary axes;
- Part 5: Inspection of feed rate, speed and interpolation accuracy;
- Part 6: Accuracy inspection of finished specimens;
- Part 7: Evaluation of contour characteristics in the coordinate plane;
- Part 8: Assessment of thermal deformation:

This document replaces GB/T 16462.2-2017 "Inspection Conditions for CNC Lathes and Turning Centers Part 2: Geometric Accuracy of Vertical Machine Tools" Inspection", compared with GB/T 16462.2-2017, in addition to structural adjustments and editorial changes, the main technical changes are as follows:

- a) The scope of application of the document has been changed (see Chapter 1, Chapter 1 of the:2017 edition);
- b) The terms and definitions of "manual control", "manual control lathe" and "CNC vertical lathe" are deleted (see 3.2, 3.4,:2017 edition) 3:6), added the term and definition of "tool holder" (see 3.5);
- c) Added requirements and instructions for inspection tools (see 4.6);
- d) Increased the influence of gravity on the two saddle mechanisms (see 4.9);
- e) Added the naming of machine tool layout and axis (see 4.13);
- f) The size range of machine tools has been deleted (see 4.13 of the:2017 edition);
- g) The flatness inspection of the workpiece spindle end face (workbench) is deleted (see G1 of:2017 edition 5:1);
- h) The requirements for the end face runout and radial runout of the workpiece spindle or worktable have been changed (see G1 and G2 of 5:1, G2 and G2 of the:2017 edition of 5:1):

- i) The straightness and angle error requirements for X-axis motion have been changed (see G3 and G4 of 5:2, G14 and 5:5 of the:2017 edition of 5:4 G21);
- j) Added the straightness item of Z-axis motion and changed the angular error of Z-axis motion (see G5 and G6 of 5:2,:2017 version 5:3 G13);
- k) Delete the parallelism and perpendicularity inspection of the workpiece spindle rotation axis by side tool post movement and side tool post ram movement respectively (see:2017 G6 and G7 of annual version 5:2);
- l) The requirements for the perpendicularity of the X axis to the C axis and the parallelism requirements of the Z axis to the C axis have been changed (see G7 and G8 of 5:2,:2017 edition 5:2 G5, G4);
- m) The requirements for beam-related inspections have been changed (see G9~G11 of 5:3, G16 of 5:4, G10 of 5:3, and G10 of 5:2 in the:2017 edition G9);
- n) The requirements for Y-axis related inspections have been changed (see G12~G15 of 5:4, G15 of 5:4 and G11 of 5:3 in the:2017 edition);
- o) The requirements for inspection related to tool holders and tool holders have been changed (see G16 and G17 of 5:5, G18 and G21 of:2017 version 5:5);
- p) The requirements for relevant inspections of power-driven tool spindles have been changed (see G18~G21 of 5:6, G19 of 5:5 and G19 of 5:2 of the:2017 edition) G8, G17 of 5:5);
- q) The repeated positioning accuracy inspection item of tool holder indexing has been deleted (see G20 of:2017 version 5:5):

This document is modified to adopt ISO 13041-2:2020 "Inspection Conditions for CNC Lathes and Turning Centers Part 2: Geometric Accuracy of Vertical Machine Tools" test":

The technical differences between this document and ISO 13041-2:2020 and their reasons are as follows:

- Replaced ISO 230-1 (see Chapter 1, 4:2) with GB/T 17421.1-2023 to increase operability and facilitate the preparation of this document application;
- Replaced ISO 230-7:2015 and ISO 230-7 with normatively cited GB/T 17421.7-2016 (see Chapter 1, 4:2), increase operability and facilitate the application of this document;
- Change "Refer to ISO 230-1 and ISO 230-7" to "Perform GB/T 17421.1-2023 and GB/T 17421.7-2016" (see 4.2) to increase operability and facilitate the application of this document;
- Deleted the description of the kinematic mechanism in Table 1 in "Machine Tool Layout and Axis Naming" (see 4.13), which is suitable for my country's national conditions;

---Deleted the description of the movement structure in square brackets in Table 1, which is suitable for my country's national conditions;

---Change "refer to the corresponding provisions of the standard" in the inspection method to "according to the provisions of the corresponding provisions of the standard" (see G1~ in Chapter 5 G21), suitable for my country's national conditions and consistent with other domestic machine tool accuracy inspection standards:

The following editorial changes have been made to this document:

---Deleted the content of "note" in Figure 1 and Figure 2;

---Deleted the "measured deviation" column in the accuracy inspection table (see G1~G21 in Chapter 5);

---Deleted Appendix B (Informative) "Other Language Terms";

---References changed:

Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents:

## Introduction

GB/T 16462 "Inspection Conditions for CNC Lathes and Turning Centers" belongs to the general inspection standards for CNC lathes and turning centers and establishes the Principles and requirements for accuracy and performance testing:

GB/T 16462 "Inspection Conditions for CNC Lathes and Turning Centers" consists of eight parts:

---Part 1: Inspection of geometric accuracy of horizontal machine tools: The purpose is to standardize the geometric accuracy inspection of CNC horizontal lathes and turning centers methods and corresponding requirements:

---Part 2: Inspection of geometric accuracy of vertical machine tools: The purpose is to standardize the geometric accuracy inspection of CNC vertical lathes and turning centers methods and corresponding requirements:

---Part 3: Inspection of geometric accuracy of inverted vertical machine tools: The purpose is to standardize inverted CNC vertical lathes and inverted vertical turning machines Central geometric accuracy inspection methods and corresponding requirements:

---Part 4: Inspection of positioning accuracy and repeatable positioning accuracy of linear and rotary axes: The purpose is to standardize CNC lathes and turning Inspection methods and corresponding requirements for the positional accuracy of the center's linearity and rotation axis:

---Part 5: Inspection of feed rate, speed and interpolation accuracy: The purpose is to