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

GB/T 4019.1-1997

Replacing GB/T 4019.1-1997, GB/T 4019.2-1997

**Test conditions for box type vertical drilling machines - 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 replaces GB/T 4019.1-1997 "Accuracy Inspection of Square Column Vertical Drilling Machines - Part 1: Geometric Accuracy Inspection" and GB/T 4019.2-1997 "Accuracy Inspection of Vertical Drilling Machines with Square Columns - Part 2: Inspection of Working Accuracy". This document is based on GB/T 4019.1-1997.

This version primarily integrates the content of GB/T 4019.2-1997. Compared with GB/T 4019.1-1997, aside from structural adjustments and editorial changes, the main...

The technological changes are as follows.

---Added simplified machine tool structure diagrams, terminology, and axis definitions (see Chapter 4);

---The "Machine Tool Leveling" inspection item has been removed (see Chapter 4, G0 of the 1997 edition);

---The tolerance value for "radial runout of the spindle taper bore" has been changed (see Chapter 6 G2, Chapter 4 G2 in the 1997 edition);

---The inspection item "straightness of the workbench column guide rails to perpendicularity of the workbench surface" has been removed (see Chapter 4 of the 1997 edition).

This document is modified to adopt ISO 2772:2019 "Inspection conditions for vertical drilling machines with square columns - Accuracy inspection".

Compared with ISO 2772:2019, this document has undergone the following structural adjustments.

---Sections 5.1 to 5.7 of this document correspond to sections 5.2, 5.1, 5.7, 5.3, 5.4, 5.5, and 5.6 of ISO 2772:2019, respectively;

---Appendix A of ISO 2772:2019 has been deleted;

---Added "Working Accuracy Inspection" (see Chapter 7);

---Added Appendix A, "Relationship Curve between Axial Force F and Machine Tool Drilling Diameter".

The technical differences between this document and ISO 2772:2019, and the reasons therefor, are as follows.

---ISO 230-1:2012 has been replaced with the normatively referenced GB/T 6477-2008 (see Chapter 3). There is no corresponding relationship between the two documents.

To adapt to the application of technology in our country;

---Added terminology and definition 3.1 "Drilling", improving the terminology for drilling operations;

---The inspection method and tolerance values for machine tool leveling have been added (see 5.3). Leveling is a preliminary step in the inspection of machine tool accuracy and should be given...

Determine tolerance values to ensure the effectiveness of subsequent accuracy inspections;

---The inspection method for "flatness of the workbench surface" has been changed (see Chapter 6 G1). The current inspection method is intuitive and simple, and meets our requirements.

National conditions;

---ISO 230-1:2012 (see G1, G3, G4 in Chapter 6) has been replaced by the normatively

referenced GB/T 17421.1-2023.

(G5) There is no consistent correspondence between these two documents, in order to adapt to the application of technology in my country;

---ISO 230-11:2018 (see Chapter 6, G2) has been replaced by the normatively referenced GB/T 17421.1-2023. These two documents...

There is no consistent correspondence between them, in order to adapt to the application of technology in my country;

---A "Working Accuracy Inspection" section has been added (see Chapter 7 and Appendix A). Working accuracy inspection is an important component of machine tool accuracy inspection.

The score is used to reflect the machine tool's performance.

---Added a "Relationship Curve of Axial Force F and Machine Tool Drilling Diameter" (see Appendix A) to adapt to the application of technology in my country.

The following editorial changes have been made to this document.

---The titles of sections 6.1, 6.2, and 6.3 have been removed.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Metal Cutting Machine Tools (SAC/TC22).

1 Scope

This document specifies the inspection requirements, inspection methods, and corresponding tolerance requirements for the geometric and working accuracy of square column vertical drilling machines.

This document applies to general-purpose vertical drilling machines with square columns.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to the date noted applies. For undated references, the latest version (including all amendments) applies.

In this document.

GB/T 6477-2008 Terminology for Metal Cutting Machine Tools GB/T 17421.1-2023 General Rules for Machine Tool Inspection - Part 1: Geometric Accuracy of Machine Tools under No-Load or Quasi-Static Conditions

3 Terms and Definitions

The terms and definitions defined in GB/T 6477-2008, as well as the following terms and definitions, apply to this document.

Drilling

Methods of cutting holes in a workpiece using drill bits, reamers, etc.

Note: Usually the workpiece is stationary while the drill bit rotates and performs axial feed.

holedrilling

The method of drilling holes in solid materials using a drill bit.

Drilling machines

A machine tool that mainly uses drill bits to machine holes in workpieces.

Note: The rotation of the drill bit is the main motion, and the axial movement of the drill bit is the feed motion.

A machine tool that uses a drill bit to machine holes in a workpiece, wherein the axial movement of the drill bit is driven by operating a handwheel or lever.

Note: Handwheels or joysticks may include power axial feed or power to the spindle or workpiece via non-programmable positioning, achieved manually.

A drilling machine is a machine in which the drill bit moves vertically on a column with a rectangular cross-section and parallel guide rails.

4 Machine tool structure, terminology and shaft names

The structure, terminology, and shaft names of the square column vertical drilling machine are shown in Figure 1.