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

GB/T 4681-2025

Replacing GB/T 4681-2007

**External cylindrical centreless grinding machines - Testing of
the accuracy**

无心外圆磨床 精度检验

(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 4681-2007 "Accuracy Inspection of Centerless Cylindrical Grinding Machines". Compared with GB/T 4681-2007, except for structural adjustments...

Aside from integration and editorial changes, the main technical changes are as follows.

- A new chapter on "Terminology and Definitions" has been added (see Chapter 3);
- Added requirements regarding "machine tool leveling" (see 5.2);
- Added requirements regarding "software compensation" (see 5.8);
- Added requirements regarding "non-inspection shafts" (see 5.9);
- The G1 measurement length has been changed (see Table 1, 5.1 of the 2007 edition);
- The G2 measurement length has been changed (see Table 2, 5.2 of the 2007 edition);
- Item c) of the G2 test has been deleted (section 5.2 in the 2007 version);
- The G3 measurement length has been changed (see Table 3, 5.3 of the 2007 edition);
- The tolerance of item G5b has been changed (see Table 5, 5.5 of the 2007 edition).
- Increased the straightness of the grinding wheel axial slide movement (Z1) (see Table 6);
- Added "Z-axis positioning accuracy and repeatability of grinding wheel axial slide movement" (see Table 11).

This document is modified to adopt ISO 3875:2020 "Machine tools - Inspection conditions for centerless cylindrical grinding machines - Accuracy inspection".

The technical differences between this document and ISO 3875:2020, and the reasons therefor, are as follows.

- The normative reference GB/T 6477-2008 (see Chapter 3) has been added to adapt to my country's actual needs.
- The tolerances for item G1a) have been modified (see Table 1) to suit the actual needs of my country;
- The tolerances for item G1c have been modified (see Table 1) to suit the actual needs of my country;
- The tolerance of G1c)0.160/1000 has been changed (see Table 1) to adapt to the actual needs of my country;
- The tolerances for item G2a) have been modified (see Table 2) to suit the actual needs of my country;
- The positioning and repeatability accuracy of P2 "measurement length ≤ 0.200 " has been increased (see Table 8) to meet the actual needs of my country;
- The "Measured Deviation" column in the Tolerance column of Tables 1-13 has been deleted, as this is a blank cell with no practical significance.

The following editorial changes have been made to this document.

- To align with existing standards, the standard name has been changed to "Accuracy

Inspection of Centerless Cylindrical Grinding Machines";

---ISO 841 has been replaced with GB/T 19660-2005 (reference standard) to adapt to my country's technical conditions and improve operability.

(See Chapter 4.)

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 testing methods for the geometric accuracy, working accuracy, axis positioning accuracy, and repeatability of centerless cylindrical grinding machines.

The corresponding tolerances.

This document applies to the accuracy inspection of centerless cylindrical grinding machines with a maximum grinding diameter of 20mm to 400mm, for general purposes and with ordinary precision.

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 that date applies to this document; for undated references, the latest version (including all amendments) applies.

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 (ISO 230-1:2012, IDT) GB/T 17421.2-2023 General Rules for Machine Tool Inspection Part 2: Determination of Positioning Accuracy and Repeatability of CNC Axes (ISO 230-2:2014, IDT)

3 Terms and Definitions

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

centerless grinding

Grinding of a workpiece that is freely supported between a guide wheel and a bracket.

[Source. GB/T 6477-2008, 7.4.10] 3.2 the workpiece is held in a centerless clamp, typically supported between guide wheels and a bracket. The guide wheels drive the workpiece to rotate, and this method is mainly used for grinding cylindrical surfaces.

The grinding machine.

[Source. GB/T 6477-2008, 7.1.4] 3.2.1 A centerless grinder used for grinding cylindrical outer surfaces.

[Source. GB/T 6477-2008, 7.1.4.1]

4 Machine tool layout and motion axis naming

Figure 1 shows the layout of the main components of the machine tool, and the motion axes are named according to GB/T 19660-2005.