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

GB/T 20957.4-2007

**Test conditions of precision machining centre -- Part 4:
Accuracy and repeatability of positioning of linear and rotary
axes**

精密加工中心检验条件 第4部分：线性和回转轴的定位精度和重复定位精度检验
(English Translation)

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Foreword

GB/T 20957 "Test conditions for precision machining centers" is divided into 10 sections as follows.

--- Part 1. horizontal spindle and with head Geometric tests for machines (horizontal Z-axis);

Universal spindle head Geometric tests for machines (vertical Z-axis) or vertical with vertical primary rotary axis;. --- Part 2

--- Part 3. with horizontal rotary axis of the main spindle head overall universal Geometric tests for machines (vertical Z-axis);

--- Part 4. positioning accuracy and linear and rotary axes repeatability test;

--- Part 5. Clamp the workpiece pallet positioning accuracy and repeatability of positioning accuracy test;

--- Part 6. feed rate, speed and accuracy test interpolation;

--- Part 7. finishing accuracy test specimen;

--- Part 8. Evaluation of the contouring performance in the three coordinate plane;

--- Part 9. Evaluation of conversion tool changer and pallet operation time;

--- Part 10. Evaluation of thermal deformation.

This section GB/T Part of 420,957.

The partial modification of the use of ISO 10791-4:1998 "Test conditions for machining centers - Part 4. positioning accuracy and linear and rotary axes Repeatability test "(in English).

This part of ISO 10791-4:1998 compared to the main technical content of the following

modifications.

--- Added "linear axis travel greater than 2000mm precision machining center can also refer to the use of" in scope;

--- According to machine precision grade requirements in the use of ISO 10791-4:1998 when tolerance for all test items in ISO 10791-4.

A compression (compression common ratio of 1.6 to 2) on the basis of 1998;

--- Increased 4.1.2, 4.1.3 and Table 2 "stroke exceeds 2000mm axis positioning accuracy of." for ease of use, this section made the following editorial changes.

--- "This standard" be replaced by "this section";

--- With a decimal point instead of a comma as the decimal point, ",";

--- Chapter 4, the heading "brief description" to "General requirements";

--- 4.3 and 5.3 under the heading "remarks and reference ISO 230-1 and ISO 230-2" to "Notes";

--- Of ISO 10791-4:1998 international standard referenced by our standard has been adopted as the national standard in place of the corresponding international standard;

--- Remove the ISO 10791-4:1998 Foreword and Introduction;

--- Remove the ISO 10791-4:1998 in the 4.4 and 5.4;

--- Remove the ISO 10791-4:1998 Annex A (informative).

And supporting the use of this part of the standards. GB/T 21012-2007 "precision machining centers and technical conditions." this section from the date of implementation of, and to revoke JB/T 8772.4-1998 "Test conditions for precision machining centers - Part 4. Linear and Positioning accuracy and repeatability of the rotation axis of the test." this part is proposed by China Machinery Industry Federation.

This part of the National Metal Cutting Machine Standardization Technical Committee (SAC/TC22) centralized.

This section drafted by. National Chiao Tung University Kunming Machine Technology Co., Ltd., Beijing Machine Tool Research Institute, Beijing Institute of milling machines, the machine is limited in the Czech Republic the company.

1 Scope

This section provides a linear axis precision machining centers and rotary axis positioning accuracy tolerance test.

This section applies to linear axis stroke to 2000mm and precision machining centers to the

axis of rotation of 360 ° stroke. Linear axis travel Greater than 2000mm precision machining center can also refer to use.

2 Normative references

The following documents contain provisions which, through reference GB/T 20957 in this section constitute provisions of this section. For dated reference documents Member, all subsequent amendments (not including errata content) or revisions do not apply to this section, however, encouraged to reach under this section Parties to research agreement to use the latest versions of these documents. For undated reference documents, the latest versions apply to this section.

GB/T 17421.1-1998 Test code for machine tools - Part 1. under no-load or finishing conditions Geometric accuracy of machines (Eqv ISO 230-1:1996) CNC axis positioning accuracy and repeatability of the determination; GB/T 17421.2-2000 Test code for machine tools - Part 2 (Eqv ISO 230-2:1997) GB/T 20957.1-2007 Test conditions for precision machining centers - Part 1. horizontal spindle and with geometric precision inspection machine head Test (horizontal Z-axis) (ISO 10791-1:1998, MOD) Universal vertical spindle head or with vertical primary rotary axis. GB/T 20957.2-2007 Test conditions for precision machining centers - Part 2 Geometric tests for machines (vertical Z axis) (ISO 10791-2:2001, MOD)

3 General requirements

3.1

section all linear dimensions, tolerances and corresponding tolerances in millimeters; angle dimensions in degrees; and a phase angle deviation the tolerance should be expressed in units of arc seconds. Equivalent relational expression as follows.

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

3.2

This section should be used with reference to GB/T 17421.2-2000, especially the assessment of environmental conditions, warming machine, test methods, results and given expression.

3.3

part of the order given in the test project does not represent the actual test sequence. In order to test assembly and disassembly tools and testing convenience, any order for inspection.

3.4

inspection tools, according to the structural characteristics must not test all of the items in this section. For the purpose of acceptance testing requirements, the Users can obtain the

manufacturer agreed to select some test items he is interested in, but these items should be clearly stated at the time of ordering the machine.

3.5

During the inspection, the three basic axes of linear motion of non-member inspection axis, as far as possible in the middle of its working stroke Location, otherwise affect the measurement should be placed in a position of minimum deviation. When the machine has a sliding spindle and ram other auxiliary axis, should be maintained at reduced Back position.

4.1 Tolerance

4.1.1

differ substantially linear axis travel to 2000mm precision machining center positioning accuracy tolerance measurement path shown in Table 1.