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Test conditions for numerically controlled turning machines and turning centres —

Part 1: Geometric tests for machines with a horizontal workholding spindle

Conditions d'essai des tours à commande numérique et des centres de tournage —

Partie 1: Essais géométriques pour les machines à broche horizontale

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13041-1 was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 2, *Test conditions for metal cutting machine tools*.

ISO 13041 consists of the following parts, under the general title *Test conditions for numerically controlled turning machines and turning centres*:

— *Part 1: Geometric tests for machines with a horizontal workholding spindle*

— *Part 2: Geometric tests for machines with vertical workholding spindle*

— *Part 3: Geometric tests for machines with inverted vertical workholding spindle*

— *Part 4: Accuracy and repeatability of positioning of linear and rotary axes*

— *Part 5: Accuracy of feeds, speeds and interpolations*

— *Part 6: Accuracy of a finished test piece*

— *Part 7: Evaluation of contouring performance in the coordinate planes*

— *Part 8: Evaluation of thermal distortions*

Introduction

The object of ISO 13041 is to supply information as wide and comprehensive as possible on tests which can be carried out for comparison, acceptance, maintenance or any other purpose.

ISO 13041 specifies, with reference to the relevant parts of ISO 230, *Test code for machine tools,* tests for turning centres and numerically controlled turning machines with/without tailstocks, standing alone or integrated in flexible manufacturing systems. ISO 13041 also establishes the tolerances or maximum acceptable values for the test results corresponding to general purpose and normal-accuracy turning centres and numerically controlled turning machines.

Test conditions for numerically controlled turning machines and turning centres —

Part 1: Geometric tests for machines with a horizontal workholding spindle

1 Scope

This part of ISO 13041 specifies, with reference to ISO 230-1, the geometric tests on numerically controlled (NC) turning machines and turning centres, of normal accuracy, with horizontal work spindle(s) as defined in 3.1 and 3.2.

This part of ISO 13041 specifies the applicable tolerances corresponding to the tests mentioned above.

This part of ISO 13041 explains different concepts or configurations and common features of NC turning machines and turning centres. It also provides a terminology and designation of controlled axes (see Figure 1 and Table 1).

This part of ISO 13041 deals only with the verification of the accuracy of the machine. It does not apply to the operational testing of the machine (e.g. vibration, abnormal noise, stick-slip motion of components), nor to machine characteristics (e.g. speeds, feeds) as such checks are generally carried out before testing the accuracy.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 230-1:1996, *Test code for machine tools — Part 1: Geometric accuracy of machines operating under no-load or finishing conditions*

ISO 841:2001, *Industrial automation systems and integration — Numerical control of machines — Coordinate system and motion nomenclature*

ISO 3442:1991, *Self-centring chucks for machine tools with two-piece jaws (tongue and groove type) — Sizes for interchangeability and acceptance test specifications*

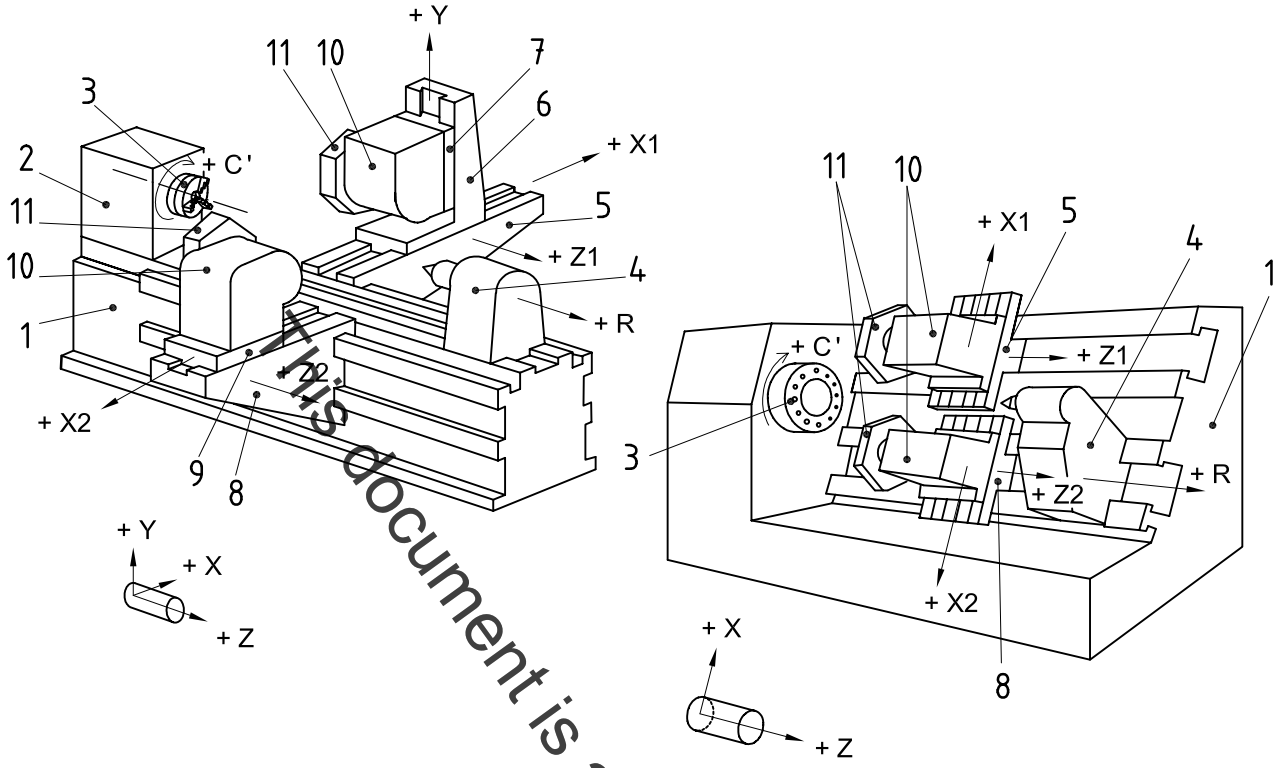

Figure 1 — Example of a horizontal-spindle turning centre

Table 1 — Terminology

Item number	English	French	German
1	Bed	Banc	Bett
2	Workhead	Porte-pièce	Spindelkasten
3	Work spindle, C′ axis	Broche porte-pièce, axe C′	Arbeitsspindel, C′-Achse
4	Tail stock, R axis	Contre-poupée, axe R	Reitstock, R-Achse
5	Carriage 1, Z axis	Chariot 1, axe Z	Schlitten 1, Z- Achse
6	Turret slide 1, X axis	Chariot de tourelle, axe X	Revolverschlitten 1, X-Achse
7	Vertical slide, Y axis	Chariot vertical, axe Y	Verticalschlitten, Y-Achse
8	Carriage 2, Z2 axis	Chariot 2, axe Z2	Schlitten 2, Z2-Achse
9	Turret slide 2, X2 axis	Chariot de tourelle 2, axe X2	Revolverschlitten 2, X2-Achse
10	Turret head 1 and 2	Tourelles 1 et 2	Revolverkopf 1 und 2
11	Indexing turret 1 and 2	Tourelles à indexage 1 et 2	Revolverscheibe 1 und 2

NOTE In addition to terms used in two of the three official ISO languages (English and French), this part of ISO 13041 gives the equivalent terms in German; these are published under the responsibility of the member body/National Committee for Germany (DIN). However, only the terms and definitions given in the official languages can be considered as ISO terms and definitions.