INTERNATIONAL STANDARD

ISO
3070-4

Second edition
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Test conditions for boring and milling machines with horizontal spindle — Testing of the accuracy —

Part 4:
Planer type machines with movable column

Conditions d'essai des machines à aléser et à fraiser, à broche horizontale — Contrôle de la précision —

Partie 4: Machines à montant mobile et bancs en croix

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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.

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.

International Standard ISO 3070-4 was prepared by Technical Committee ISO/TC 39, *Machine Tools,* Subcommittee SC 2, *Test conditions for metal cutting machine tools.*

This second edition cancels and replaces the first edition (ISO 3070-3:1982) which has been technically revised.

ISO 3070 consists of the following parts, under the general title *Test conditions for boring and milling machines with horizontal spindle — Testing of the accuracy*:

— *Part 0: General introduction*
  (to become part 1 on its next revision)

— *Part 2: Table-type machines*
  (formerly part 1)

— *Part 3: Floor type machines with detached work-holding fixed table*
  (formely part 2)

— *Part 4: Planer type machines with movable column*
  (formerly part 3)

Annex A of this part of ISO 3070 is for information only.

Test conditions for boring and milling machines with horizontal spindle — Testing of the accuracy —

Part 4:
Planer type machines with movable column

1   Scope

This part of ISO 3070 specifies, with reference to ISO 230-1 and ISO 230-2, geometric tests, machining tests and tests for checking accuracy and repeatability of positioning by numerical control, on general purpose, normal accuracy, planer type horizontal spindle boring and milling machines with movable column. These types of machine tool are defined in subclauses 3.2 and 3.3 of ISO 3070-0:1982. This part of ISO 3070 also specifies the applicable tolerances corresponding to the above mentioned tests.

These machines can be provided with spindle heads of different types corresponding in most cases to figures:

> 4 (spindle head with sliding boring spindle and milling spindle)
> 5 (spindle head with sliding boring spindle and with facing head)
> 6 (spindle head with ram or milling ram)

of ISO 3070-0:1982.

In addition, it should be noted that this part of ISO 3070 concerns machines which have movement of the table along the X-axis, a vertical movement of the spindle head along the Y-axis, a movement of the column along the W-axis and may include a rotary or indexing table.

This part of ISO 3070 deals only with the verification of the accuracy of the machine. It does not apply to the testing of the machine operation (vibration, abnormal noise, stick-slip motion of components, etc.) nor to machine characteristics (such as speeds, feeds, etc.), as such checks are generally carried out before testing the accuracy.

2   Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 3070. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 3070 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

ISO 230-2:1997, *Test code for machine tools — Part 2: Determination of accuracy and repeatability of positioning of numerically controlled axes.*

ISO 1101:— [2], *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Generalities, definitions, symbols, indication on drawings.*

ISO 3070-0:1982[3], *Test conditions for boring and milling machines with horizontal spindle — Testing of accuracy — Part 0: General introduction.*

3 Terminology and designation of axes

See ISO 3070-0.

4 Preliminary remarks

4.1 Measuring units

In this part of ISO 3070, all linear dimensions, deviations and corresponding tolerances are expressed in millimeters; angular dimensions are expressed in degrees, and angular deviations and the corresponding tolerances are expressed in ratios as the primary method, but in some cases microradians or arcseconds may be used for clarification purposes. The equivalence of the following expressions should always be kept in mind:

$$0,010/1\,000 = 10 \times 10^{-6} = 10 \ \mu\text{rad} \approx 2''$$

4.2 Reference to ISO 230-1

To apply this part of ISO 3070, reference shall be made to ISO 230-1, especially for the installation of the machine before testing, warming up of the spindle and other moving components, description of measuring methods and recommended accuracy of testing equipment.

In the «Observations» block of the tests described in the following sections, the instructions are followed by a reference to the corresponding clause in ISO 230-1 in cases where the test concerned is in compliance with the specifications of that part of ISO 230.

4.3 Testing sequence

The sequence in which the tests are presented in this part of ISO 3070 in no way defines the practical order of testing. In order to make the mounting of instruments or gauging easier, tests may be performed in any order.

4.4 Tests to be performed

When testing a machine, it is not always necessary nor possible to carry out all the tests described in this part of ISO 3070. When the tests are required for acceptance purposes, it is up to the user to choose, in agreement with the supplier/manufacturer, those tests relating to the components and/or the properties of the machine which are of interest. These tests are to be clearly stated when ordering a machine. The mere reference to this part of ISO 3070 for the acceptance tests, without specifying the tests to be carried out, and without agreement on the relevant expenses, cannot be considered as binding for any contracting party.

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1) To be published. (Revision of ISO 230-2:1988)

2) To be published. (Revision of ISO 1101:1983)

3) See "Foreword".