



SWEDISH
STANDARDS
INSTITUTE

SVENSK STANDARD SS-ISO 1984-2

Fastställt
2001-06-29

Utgåva
1

Sida
1 (1+19)

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Test conditions for milling machines with table of fixed height – Testing of the accuracy – Part 2: Machines with vertical spindle

The International Standard ISO 1984-2:2001 has the status of a Swedish Standard. This document contains the official English version of ISO 1984-2:2001.

This standard supersedes the Swedish Standard SS-ISO 1984, edition 1.

Swedish Standards corresponding to documents referred to in this Standard are listed in "Catalogue of Swedish Standards", issued by SIS. The Catalogue lists, with reference number and year of Swedish approval, International and European Standards approved as Swedish Standards as well as other Swedish Standards.

Verktygsmaskiner – Fräsmaskiner av bäddtyp med fast bordshöjd – Acceptansk kontroll – Del 2: Maskiner med vertikal spindel

Den internationella standarden ISO 1984-2:2001 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 1984-2:2001.

Standarden ersätter SS-ISO 1984, utgåva 1.

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ICS 25.080.20

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Tryckt i augusti 2001

ISO 1984-2:2001(E)

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Printed in Switzerland

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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 3.

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 part of ISO 1984 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 1984-2 was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 2, *Test conditions for metal cutting machine tools*.

This first edition of ISO 1984-2, together with ISO 1984-1, cancels and replaces ISO 1984:1982 and ISO 1984-0:1984, of which they constitute a technical revision.

ISO 1984 consists of the following parts, under the general title *Test conditions for manually controlled milling machines with table of fixed height — Testing of the accuracy*:

- *Part 1: Machines with horizontal spindle*
- *Part 2: Machines with vertical spindle*

Test conditions for manually controlled milling machines with table of fixed height — Testing of the accuracy —

Part 2: Machines with vertical spindle

1 Scope

This part of ISO 1984 specifies, with reference to ISO 230-1, both geometric and machining tests on general purpose and normal-accuracy milling machines with table of fixed height and with a vertical spindle. It also specifies the applicable tolerances corresponding to the above-mentioned tests.

This part of ISO 1984 deals only with the verification of the geometric accuracy of the machine. It does not apply to the testing of the machine operation (vibrations, abnormal noises, stick-slip motion of components, etc.), nor to checking of its characteristics (speeds, feeds, etc.), which should generally be checked before testing the accuracy.

This part of ISO 1984 defines the terminology used for the principal elements of the machine and indicates the designation of axes in accordance with ISO 841^[1].

NOTE Numerically controlled milling machines are covered by ISO 10791-2^[2].

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 1984. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 1984 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC 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.*

3 Terminology, designation of axes and machining operations carried out

3.1 Terminology and designation of axes

See Figure 1 and Table 1.

3.2 Machining operations carried out

See Figure 2.

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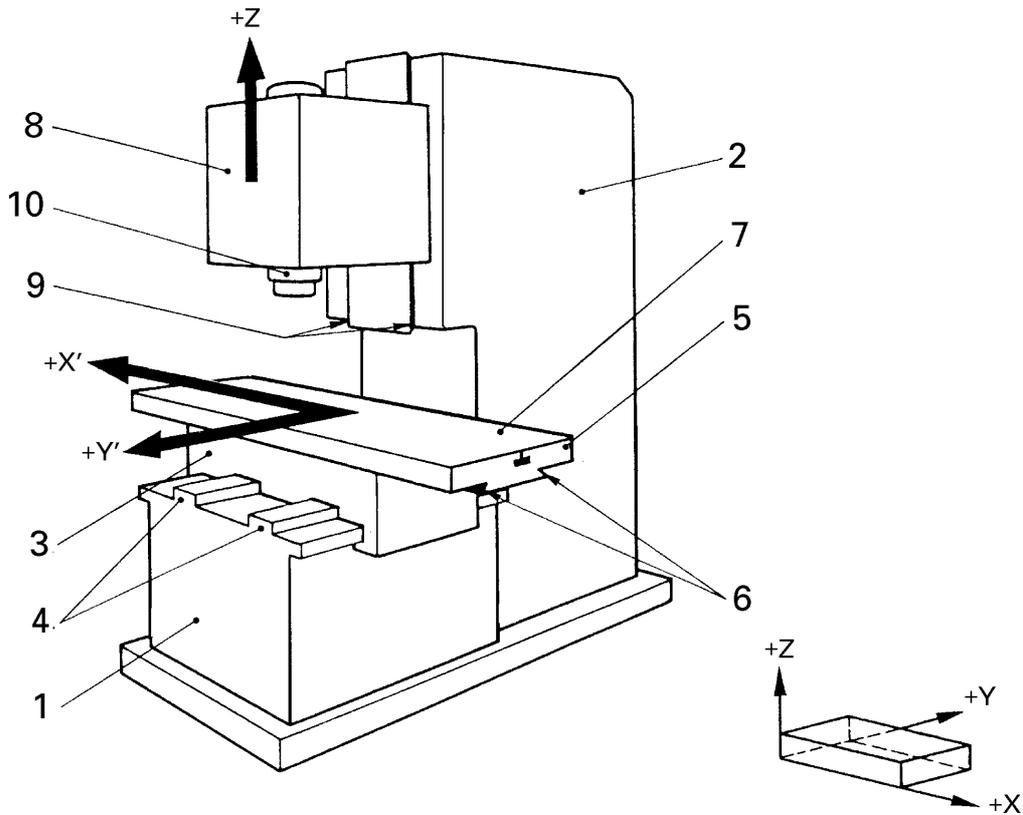


Figure 1 — Machines with vertical spindle

Table 1 — Terminology

Reference	English	French
1	Bed	Banc
2	Column	Montant
3	Saddle/cross-slide	Chariot
4	Saddle slideways	Glissières de selle
5	Table	Table
6	Table slideways	Glissières de table
7	Table surface	Surface de fixation
8	Spindle head	Poupée porte-broche
9	Spindle head slideways	Glissières de poupée porte-broche
10	Spindle nose	Nez de broche

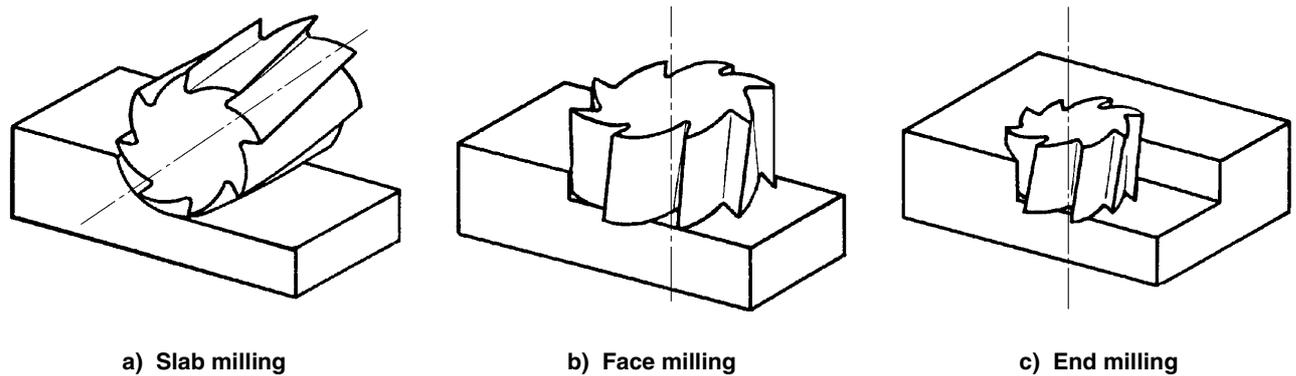


Figure 2 — Milling operations

4 Preliminary remarks

4.1 Measuring units

In this part of ISO 1984, all linear dimensions, deviations and corresponding tolerances are expressed in millimetres; 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 arc seconds may be used for clarification purposes. The equivalence of the following expressions should always be kept in mind:

$$0,010/1000 = 10 \mu\text{rad} \approx 2''$$

4.2 References to ISO 230-1

To apply this part of ISO 1984, 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 clauses 5 and 6, 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 ISO 230-1.

4.3 Testing sequence

The sequence in which the tests are presented in this part of ISO 1984 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 1984. When the tests are required for acceptance purposes, it is up to the user to choose, in agreement with the supplier/manufacture, 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.

4.5 Measuring instruments

The measuring instruments indicated in the tests described in clauses 5 and 6 are examples only. Other instruments measuring the same quantities and having at least the same accuracy may be used. Dial gauges shall have a resolution of 0,001 mm.

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4.6 Machining test

Machining tests shall be made with finishing cuts only, not with roughing cuts which are liable to generate appreciable cutting forces.

4.7 Minimum tolerance

When establishing the tolerance for a measuring length different from that given in this part of ISO 1984 (see 2.311 of ISO 230-1:1996), it shall be taken into consideration that the minimum value of tolerance is 0,005 mm.