International Standard 6481

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Acceptance conditions for vertical surface type broaching machines — Testing of accuracy

Conditions de réception des machines verticales à brocher les extérieurs — Contrôle de la précision

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6481 was developed by Technical Committee ISO/TC 39, *Machine tools*, and was circulated to the member bodies in June 1980.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Romania
Belgium	India	South Africa, Rep. of
Brazil	Ireland	Spain
Chile	Italy	Sweden
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Germany, F.R.	Poland	

The member body of the following country expressed disapproval of the document on technical grounds :

United Kingdom

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Acceptance conditions for vertical surface type broaching machines — Testing of accuracy

1 Scope and field of application

This International Standard specifies, with reference to ISO/R 230, both preliminary levelling and geometrical tests for general purpose and normal accuracy machines, and gives the corresponding permissible deviations which apply.

It also gives the terminology used for the main elements of the machine. [1)]

It deals only with the verification of accuracy of the machine. It does not apply to the testing of the running of the machine (vibrations, abnormal noises, stick-slip motion of components, etc.), or to its characteristics (speeds, feeds, etc.) which should generally be checked before testing accuracy.

2 Reference

ISO/R 230, *Machine tool test code.*

3 Preliminary remarks

3.1 In this International Standard, all the dimensions and permissible deviations are expressed in millimetres and in inches.

3.2 To apply this International Standard, reference should be made to ISO/R 230, especially for installation of the machine before acceptance, warming up of moving parts, description of measuring methods, and recommended accuracy of testing equipment.

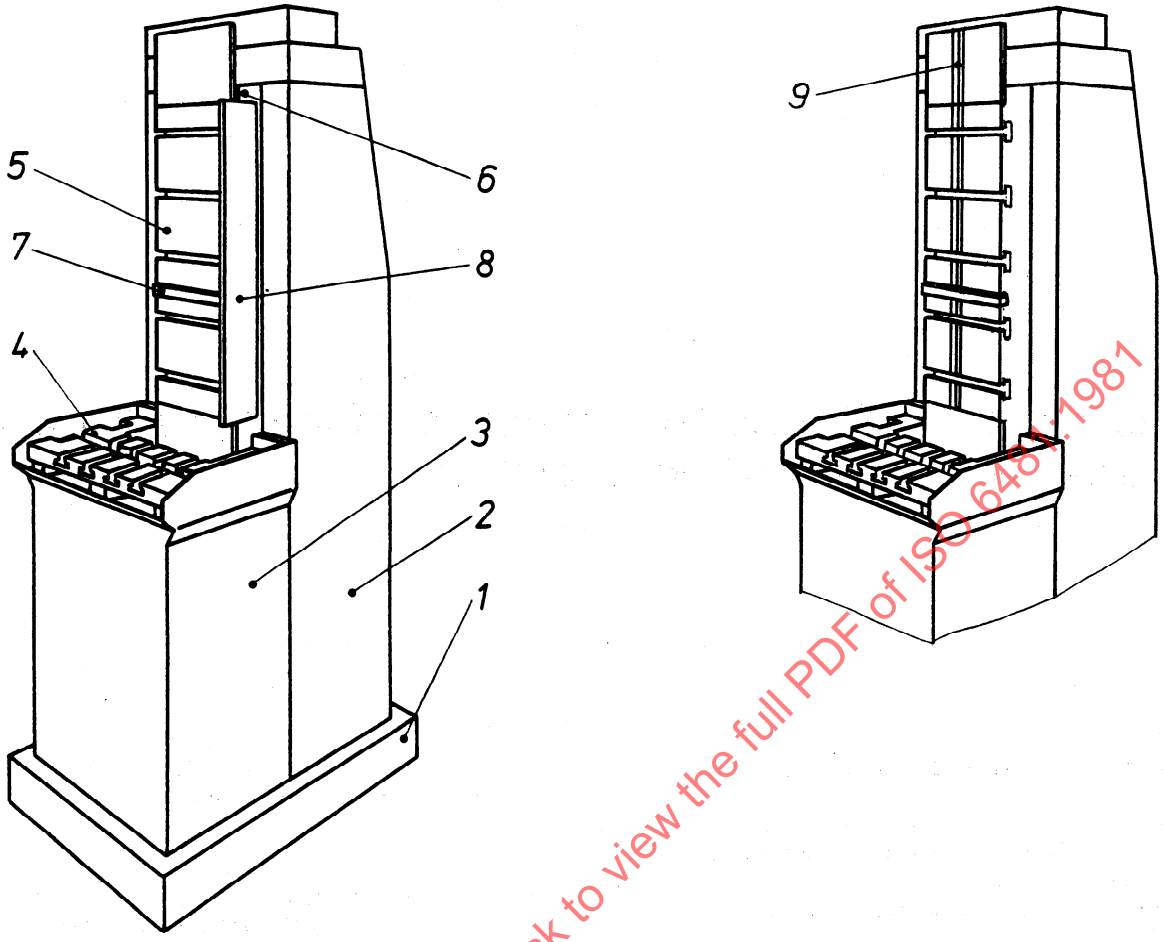
3.3 The sequence in which the geometrical tests are given is related to the sub-assemblies of the machine and this in no way defines the practical order of testing. In order to make the mounting of instruments or gauging easier, tests may be applied in any order.

3.4 When inspecting a machine, it is not always necessary to carry out all the tests given in this International Standard. It is up to the user to choose, in agreement with the manufacturer, those tests relating to the properties which are of interest to him, but these tests are to be clearly stated when ordering a machine.

3.5 Because of the diversity of shape of components produced by broaching machines, practical tests have not been included in this International Standard. If the user wishes to carry out a practical test, this one has to be stated in agreement with the manufacturer.

3.6 When establishing the tolerance for a measuring range different from that given in this International Standard (see clause 2.311 in ISO/R 230), it should be taken into consideration that the minimum value of tolerance, for geometrical tests as well as for possible practical tests, is 0,01 mm (0.0004 in).

1) In addition to terms used in the three official ISO languages (English, French and Russian), this International Standard gives the equivalent terms in German and Italian, these have been included at the request of ISO Technical Committee TC 39 and are published under the responsibility of the Member Bodies for Germany, F.R. and Italy. However, only the terms and definitions given in the official languages can be considered as ISO terms and definitions.



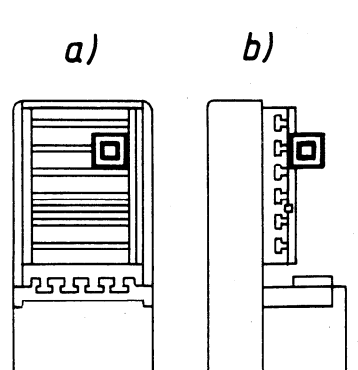
NOTE — Machine have either a stop rail (No. 8) or a vertical keyway (No. 9).

4 Terminology

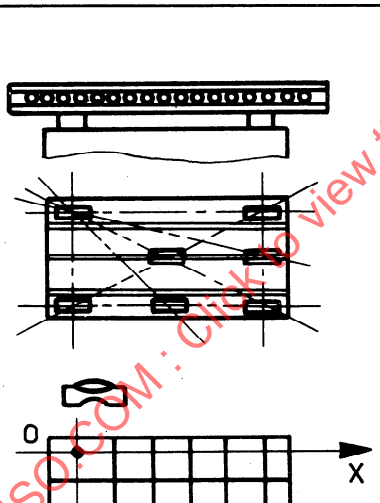
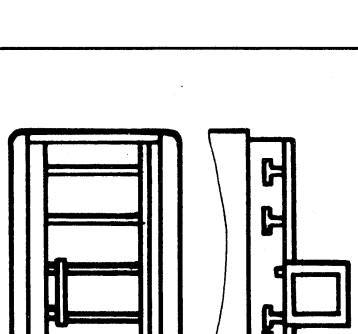
No.	English language	French language	Russian language
1	Base box	Socle	Основание
2	Column	Bâti arrière	Колонна
3	Table base	Bâti avant	Станина
4	Work table	Plateau de fixation	Рабочий стол
5	Tool slide	Coulisseau porte-outil	Каретка
6	Tool slide guide	Guidage du coulisseau porte-outil	Направляющая каретки
7	Cross tenon	Clavette d'entraînement	Замок
8	Stop rail	Règle de dégauchissage	Выравнивающая рейка
9	Vertical keyway	Rainure de dégauchissage	Шпоночная канавка

5 Acceptance conditions and permissible deviations

5.1 Preliminary levelling test

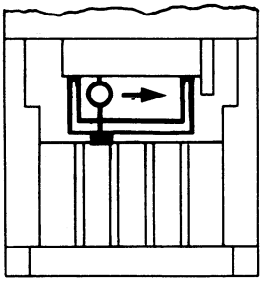
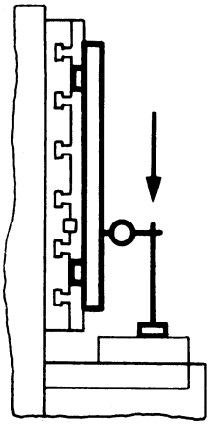
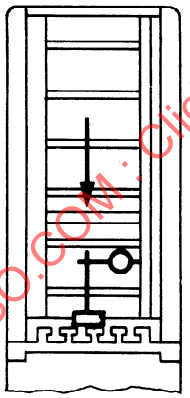
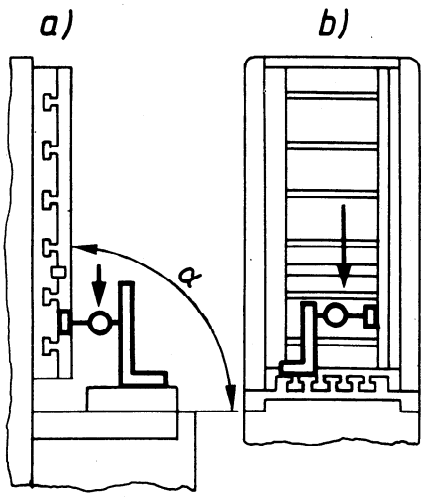
No.	Diagram	Object
G01		Checking of levelling of the machine : *a*) transverse verification; *b*) longitudinal verification.

5.2 Geometrical tests

G 1		Checking of flatness of the work table.
G 2		Checking of flatness of the surface of the tool slide in a vertical plane.

Permissible deviation		Measuring instruments	Observations and references to test code ISO/R 230
mm	in		
a) and *b*) 0,05/1000	*a*) and *b*) 0.002/40	Box spirit level	Clause 3.11 The box spirit level shall be placed successively on the surface of the tool slide and on the stop rail of the tool slide and the deviation observed. This test also applies to machines with a vertical keyway. NOTE — This test must be checked according to manufacturer's instructions.
0,04 up to 1000	0.0015 up to 40	Straightedge and gauges blocks or level	Clauses 5.322 and 5.323 Measuring instruments shall be placed on the work table successively in the longitudinal and transverse directions and the deviation observed.
0,04 up to 1000	0.0015 up to 40	Box spirit level	Clause 5.323 The box spirit level shall be placed successively at a number of positions and the deviation observed.

Permissible deviation		Measuring instruments	Observations and references to test code ISO/R 230
mm	in		
0,025 up to 500 Maximum deviation : 0,04	0.001 up to 20 0.0015	Dial gauge and special support or straightedge and gauge blocks	Clause 5.412 The special support shall be placed successively in the upper, mid-and lower positions on the surface of the tool slide. The dial gauge shall be moved on the special support in a horizontal plane and the deviation observed.
0,025 per a measuring length of 1000 Maximum deviation : 0,050	0.001 40 0.002	Dial gauge, straightedge and gauge blocks	Clause 5.422.21 The dial gauge shall be fixed on the work table, the fixation surface being in the lower position. The tool slide shall be moved downwards.
0,025 per a measuring length of 1000 Maximum deviation : 0,050	0.001 40 0.002	Dial gauge	Clause 5.422.21 The dial gauge shall be fixed on the work table, the stop rail being in the lower position. The tool slide shall be moved downwards. This test also applies to machines with a vertical keyway.
a) and *b*) 0,04/300 $1 \leqslant 90°$	*a*) and *b*) 0.0015/12 $1 \leqslant 90°$	Dial gauge square	Clause 5.522.2 The square shall be placed on the work table. The dial gauge shall be fixed at the lower end of the tool slide surface (figure *a*) and to the stop rail (figure *b*). The tool slide shall be moved downwards. Test *b*) also applies to machines with a vertical keyway.

No.	Diagram	Object
G 3		Checking of flatness of the surface of the tool slide in a horizontal plane.
G 4		Checking of parallelism of the tool slide movement to its surface.
G 5		Checking of parallelism of the tool slide movement to its stop rail. This test also applies to machines with a vertical keyway.
G 6		Checking of squareness of the tool slide movement to the work table : *a)* in the longitudinal direction; *b)* in the transverse direction.

Permissible deviation		Measuring instruments	Observations and references to test code ISO/R 230
mm	in		
0,03/300	0.0012/12	Square and gauge blocks or dial gauge	Clause 5.512.2 Instead of gauge blocks, a dial gauge can be moved along the stop rail or along a square. This test also applies to machines with a vertical keyway.
0,025/300	0.001/12	Square and gauge blocks	Clause 5.522
0,025 per a measuring length of 300	0.001 12	Dial gauge or straightedge and gauge blocks	Clause 5.422