
International Standard



4703

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Acceptance conditions for surface grinding machines with two columns — Machines for grinding slideways — Testing of accuracy

Conditions de réception des machines à rectifier les surfaces planes à deux montants — Machines à rectifier les glissières — Contrôle de la précision

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UDC 621.924.2-187

Ref. No. ISO 4703-1984 (E)

Descriptors : machine tools, grinding machines (tools), tests, testing conditions, dimensional measurements, accuracy.

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. Every 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.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4703 was prepared by Technical Committee ISO/TC 39, *Machine tools*.

ISO 4703 was first published in 1977. This second edition cancels and replaces the first, of which it constitutes a minor technical revision.

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Acceptance conditions for surface grinding machines with two columns – Machines for grinding slideways – Testing of accuracy

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1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies, with reference to ISO/R 230, geometrical and practical tests on general purpose and normal accuracy surface grinding machines with two columns – machines for grinding slideways – and gives the corresponding permissible deviations which apply.

It should be noted that the machines covered by this International Standard are machines with rectilinear grinding movements and with a movable table. Machines with a fixed table or with a rotary table movement are outside the scope.

It deals only with the verification of accuracy of the machine. It does not apply to testing 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 PRELIMINARY REMARKS

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

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

2.3 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 carried out in any order.

2.4 When inspecting a machine, it is not always necessary to carry out all the tests specified 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.

2.5 Practical tests shall be made with finishing cuts and not with roughing cuts, which are liable to generate appreciable cutting forces.

2.6 When establishing the tolerance for a measuring range different from that given in this International Standard (see sub-clause 2.311 of ISO/R 230), it should be taken into consideration that the minimum value of tolerance is 0,001 mm (0.000 04 in).

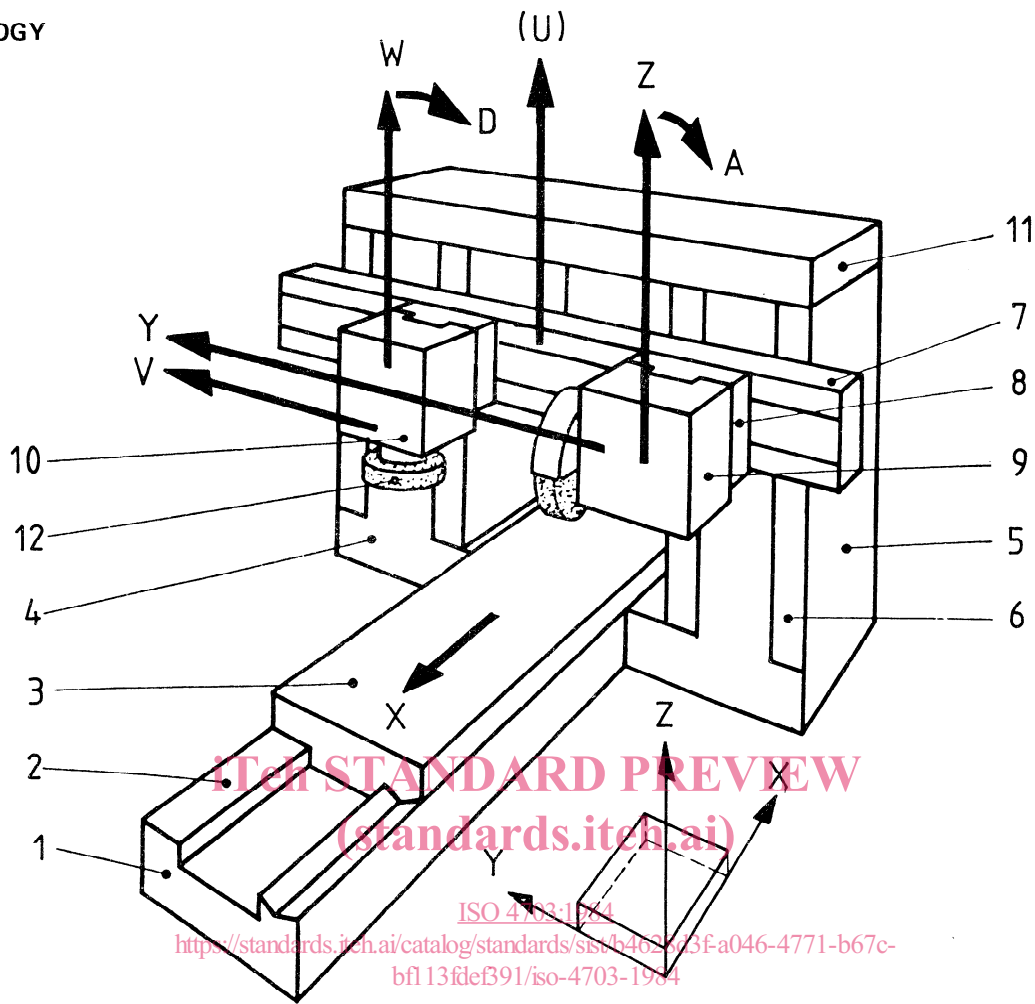
3 REFERENCE

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

4 DIAGRAMS

For reasons of simplicity the drawings in this International Standard illustrate only one type of machine.

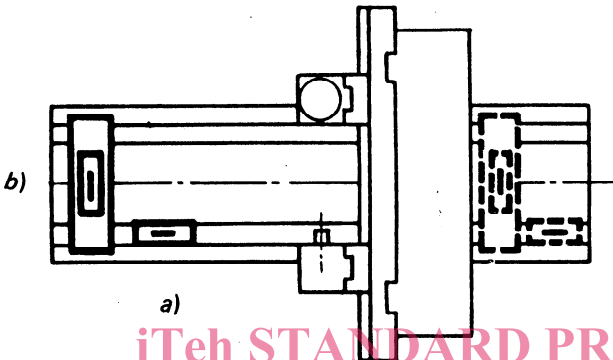
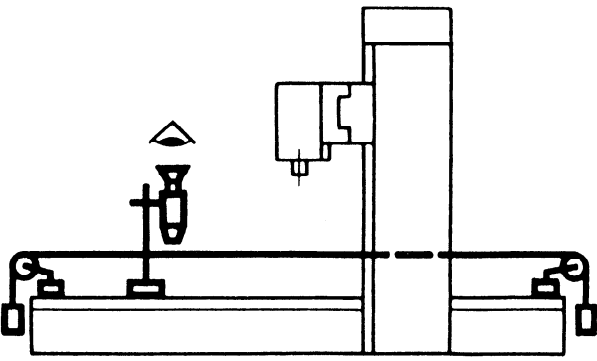
5 TERMINOLOGY



No.	Designation			
	English	French	Russian	German
1	Bed	Banc	Станина	Bett
2	Slideway	Glissière, banc	Направляющие	Führungsbahn, Bett
3	Table	Table	Стол	Tisch
4	Left-hand column	Montant gauche	Левая стойка	Ständer links
5	Right-hand column	Montant droit	Правая стойка	Ständer rechts
6	Slideway, right-hand column	Glissière, montant droit	Направляющие, правая стойка	Führungsbahn, Ständer rechts
7	Cross rail	Traverse mobile (coulisseau vertical)	Траверса	Querbalken
8	Saddle	Chariot	Салазки	Schlitten
9	Right-hand wheelhead (horizontal spindle)	Poupée porte-meule de droite (broche à axe horizontal)	Правая шпиндельная бабка (с горизонтальным шпинделем)	Schleifspindelstock rechts
10	Left-hand wheelhead (vertical spindle)	Poupée porte-meule de gauche (broche à axe vertical)	Левая шпиндельная бабка (с вертикальным шпинделем)	Schleifspindelstock links
11	Bridge	Entretoise	Поперечная балка	Traverse
12	Grinding wheel	Meule	Шлифовальный круг	Schleifscheibe

6 ACCEPTANCE CONDITIONS AND PERMISSIBLE DEVIATIONS

6.1 Preliminary operations

No.	Diagram	Object	
G01	 <p style="text-align: center;">iTech STANDARD PREVIEW (standards.iteh.ai)</p> <p style="text-align: center;">ISO 4703:1984 https://standards.iteh.ai/catalog/standards/sist/b4628d3f-046-4771-b67c-bf113fde391/iso-4703-1984</p>	<p>Verification of levelling and of the bed slideways¹⁾</p> <p>a) Longitudinal verification : Testing of straightness of the slideways in a vertical plane;</p> <p>b) Transverse verification.</p>	<p>a)</p> <p>b)</p>
G02		<p>a) Verification of straightness of the bed slideways in a horizontal plane;</p> <p>b) In the case of two V slideway machines, verification of parallelism.</p>	<p>a)</p> <p>b)</p>

Permissible deviation		Measuring instruments	Observations and references to test code ISO/R 230
mm	in		
0,01 for any measuring length of 1000	a) 0.0004	Precision levels or optical methods	<p>Clauses 3.11, 3.21, 5.212.21, 5.212.22 and 5.412.7</p> <p>Table dismantled.</p> <p>a) Measurements shall be made at positions equally distributed along the length of the bed.</p> <p>b) A level shall be placed transversely on the slideways and measurements taken at a number of positions spaced along the length of the slideways.</p> <p>The variation of level measured at any position shall not exceed the permissible deviation.</p> <p>These tests shall be carried out when assembling the machine.</p> <p>1) The characteristics of the basic form of the bed from which the permissible deviation is measured shall be specified by the manufacturer.</p>
0,02/1000	b) 0.0008/40		
0,01 for any measuring length of 1000	a) 0.0004	Microscope and taut wire or other optical measuring methods, special support	<p>Clauses 5.212.3 and 5.232.2</p> <p>Table dismantled.</p> <p>Wire shall be set at the ends of the slide-way, made taut and positioned.</p> <p>The special support and the microscope shall be positioned on the slideways.</p> <p>Measurements shall be made at positions equally distributed over the length of the bed.</p> <p>This test shall only be carried out when instructions on levelling have not been provided by the manufacturer.</p>
0,02	b) 0.0008		

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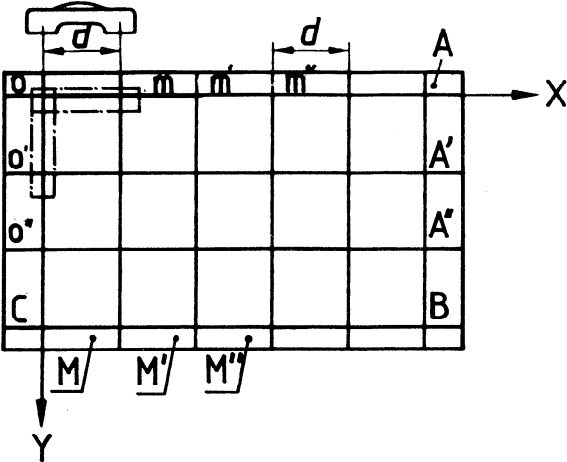
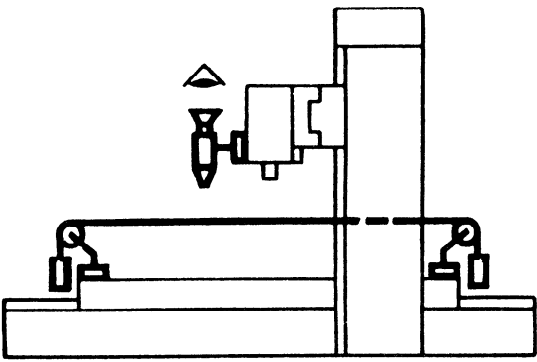
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6.2 Geometrical verifications

No.	Diagram	Object
G1		<p>Verification of flatness of the table surface within the grinding area.</p>
G2		<p>Verification of straightness of the table longitudinal movement in a horizontal plane.</p>

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Permissible deviation		Measuring instruments	Observations and references to test code ISO/R 230
mm	in		
up to 1000	— up to 40	Straightedge and gauge blocks or precision levels or other methods	Clauses 5.322, 5.323 and 5.324 Table not locked in mid-travel.
0,01	0.0004		
over 1000 up to 2000	— over 40 up to 80		
0,02	0.0008		
over 2000 up to 5000	— over 80 up to 200		
0,03	0.0012		
over 5000 up to 10000	— over 200 up to 400		
0,04	0.0016		
over 10000	— over 400		
0,05	0.002		
Local tolerance : 0,005	0.0002		
for any measuring length of : 500	20	ISO 4703:1984	
up to 1000	— up to 40	Microscope and taut wire or other optical methods	Clauses 5.212.2 and 5.212.3 Wire shall be set at the ends of the table, made taut and positioned. The microscope shall be positioned on the wheel head. Note the variation in the maximum deviation.
0,01	0.0004		
over 1000 up to 2000	— over 40 up to 80		
0,02	0.0008		
over 2000 up to 5000	— over 80 up to 200		
0,03	0.0012		
over 5000 up to 10000	— over 200 up to 400		
0,04	0.0016		
over 10000	— over 400		
0,05	0.002		

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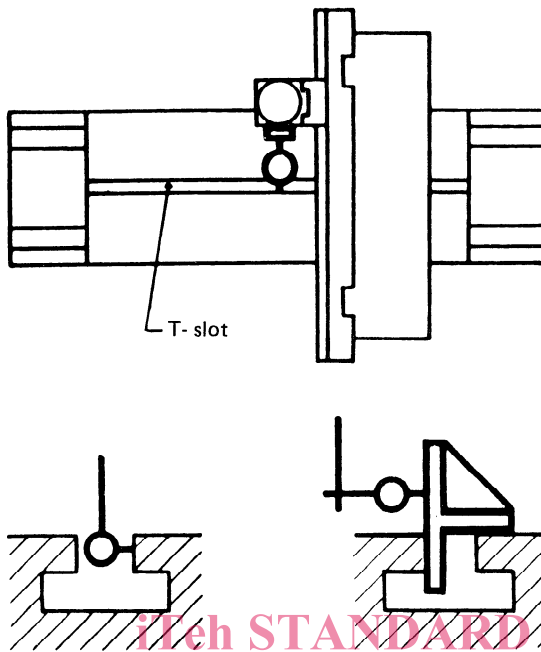
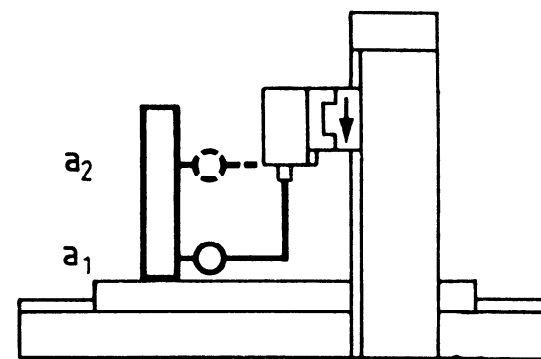
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No.	Diagram	Object
G3	 <p style="text-align: center;">STANDARD PREVIEW (standards.iteh.ai)</p> <p style="text-align: center;">ISO 4703:1984 https://standards.iteh.ai/catalog/standards/sist/b4628d3f-a046-4771-b67c-bf113fde391/iso-4703-1984</p>	<p>Verification of parallelism of the median or reference T-slot to the longitudinal movement of the table.</p>
G4		<p>Verification of squareness of the cross rail movement (vertical slide) with the table surface in a longitudinal plane.</p> <p>(This shall only be carried out in the case of machines performing surface grinding transverse to the direction of table movement when the vertical movement of the wheel head is not sufficient.)</p>

— up

— over