
International Standard



1986

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

Acceptance conditions for surface grinding machines with horizontal grinding wheel spindle and reciprocating table — Testing of accuracy

Conditions de réception des machines à rectifier les surfaces planes, à broche porte-meule à axe horizontal — Contrôle de la précision

iTeh STANDARD PREVIEW

Second edition — 1985-06-15 (standards.iteh.ai)

[ISO 1986:1985](#)

<https://standards.iteh.ai/catalog/standards/sist/767981b8-6d21-4d4d-99f5-90f966d45d24/iso-1986-1985>

UDC 621.925-187

Ref. No. ISO 1986-1985 (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. 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.

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 1986 was prepared by Technical Committee ISO/TC 39, *Machine tools*.

ISO 1986 was first published in 1974. This second edition cancels and replaces the first edition, of which geometrical test G3 (G4 in the previous edition) has been revised technically.

Acceptance conditions for surface grinding machines with horizontal grinding wheel spindle and reciprocating table — Testing of accuracy

iTeh STANDARD PREVIEW (standards.iteh.ai)

1 Scope and field of application

This International Standard describes, with reference to ISO/R 230, both geometrical and practical tests on general purpose and normal accuracy surface grinding machines with reciprocating table and horizontal grinding wheel spindle, and the corresponding permissible deviations which apply.

It is not applicable to surface grinding machines with fixed or rotating tables or to machines having longitudinal traverse of the wheelhead.¹⁾

This International Standard 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.), nor to machine characteristics (speeds, feeds, etc.) which should generally be checked before testing accuracy.

2 Preliminary remarks

2.1 In this International Standard, all 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 applied in any order.

2.4 When inspecting a machine, it is not always necessary to carry out all the tests described 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 should be made with finishing cuts.

2.6 When the tolerance is established for a measuring range different from that given in this International Standard (see 2.311 in ISO/R 230 or when determining permissible deviation by calculation), it should be taken into consideration that the minimum value of tolerance is 0,001 mm (0.000 04 in) for geometrical tests and practical tests.

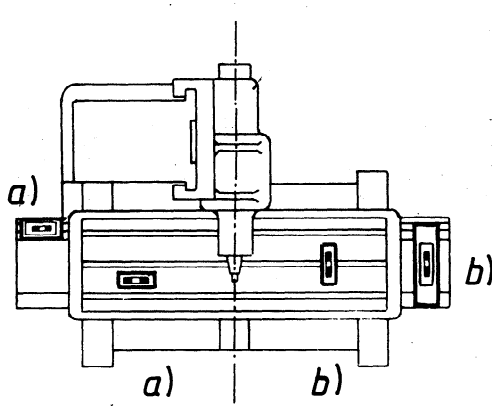
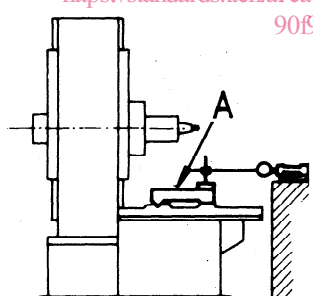
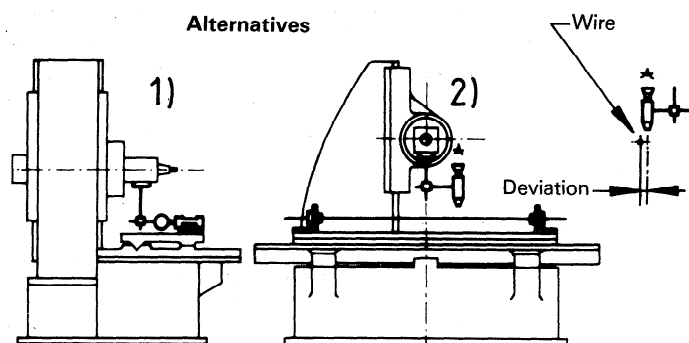
3 Reference

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

1) For reasons of simplicity, the diagrams in this International Standard illustrate only one type of machine.

4 Acceptance conditions and permissible deviations

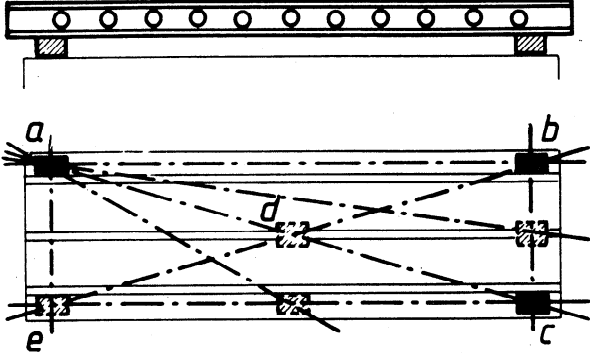
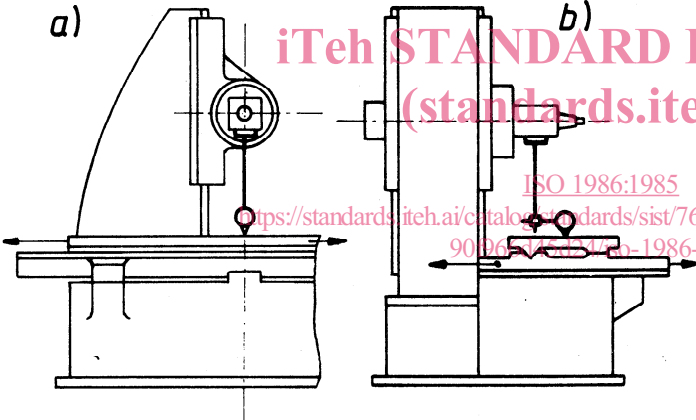
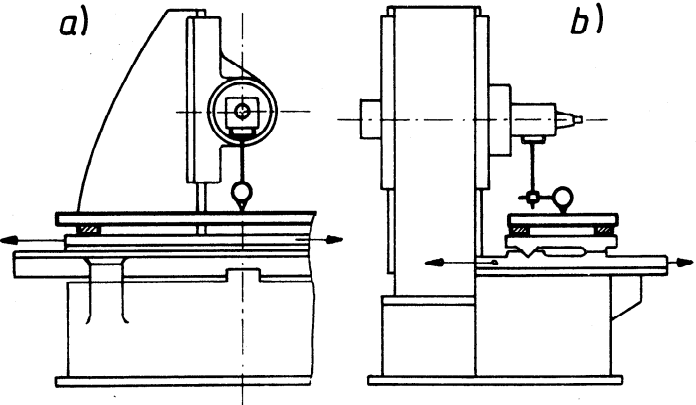
4.1 Geometrical tests

No.	Diagram	Object
G 0	 <p style="text-align: center;">iTeh STANDARD PREVIEW (standards.iteh.ai)</p>	<p>Verification of levelling of slideways:</p> <p>a) Longitudinal verification:</p> <p>Straightness of slideways in the vertical plane.</p> <p>b) Transverse verification:</p> <p>Slideways should be in the same plane.</p>
G 1	<p style="text-align: center;">https://standards.iteh.ai/catalog/standards/sist/767981b8-6d21-4d4d-99f5-90f966d45d24/iso-1986-1985</p> 	<p>Verification of straightness of slideways in a horizontal plane.</p>
	<p style="text-align: center;">Alternatives</p> 	<p>(These alternatives are for small machines where the table is not to be dismantled.)</p> <p>Verification of the straightness of the longitudinal movement of the table.</p>

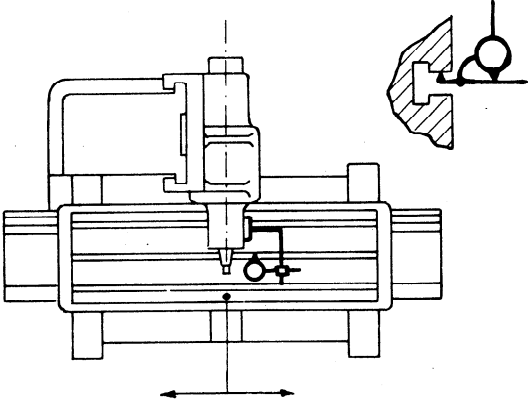
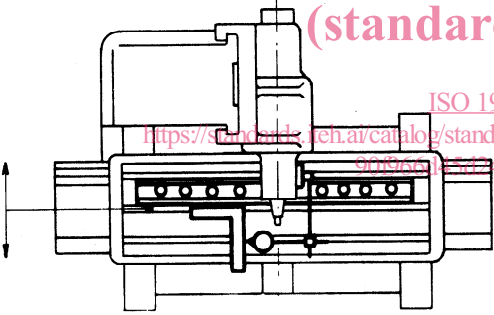
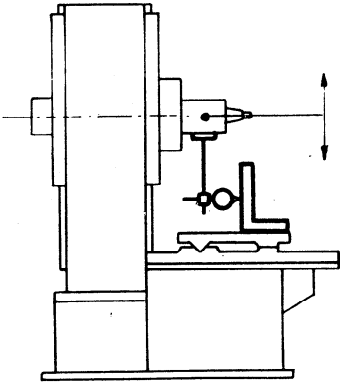
Permissible deviation		Measuring instruments	Observations and references in test code ISO/R 230
mm	in		
<p>a) 0,02 up to 1 000</p> <p>For each 1 000 mm increase in length, add</p> <p>0,015</p> <p>Maximum permissible deviation :</p> <p>0,05</p>	<p>a) 0.000 8 up to 40</p> <p>For each 40 in increase in length, add</p> <p>0.000 6</p> <p>Maximum permissible deviation :</p> <p>0.002</p>	Precision levels, optical or other methods	<p>a) Clauses 3.11, 3.21, 5.212.21 and 5.212.22</p> <p>Measurements should be made at a number of positions equally spaced along the length of the slideways.</p> <p>For machines standing on three support points or having a table travel less than 1 500 mm (60 in) the table need not be removed. In this case the level should be placed successively on the exposed portions of the slideways and on the table. The table should be in its central position.</p>
<p>a) Variation of level :</p> <p>0,02/1 000</p>	<p>b) Variation of level :</p> <p>0.000 8/40</p>		<p>b) Clause 5.412.7</p> <p>A level should be placed transversely on the slideways, and measurements should be taken at a number of positions equally spaced along the length of the slideway. The variation of level measured at any position should not exceed the permissible deviation.</p>
<p>0,02 up to 1 000</p> <p>For each 1 000 mm increase in length, add</p> <p>0,02</p> <p>Maximum permissible deviation :</p> <p>0,05</p> <p>Local tolerance :</p> <p>0,01</p> <p>over any measuring length of 300</p>	<p>0.000 8 up to 40</p> <p>For each 40 in increase in length, add</p> <p>0.000 8</p> <p>Maximum permissible deviation :</p> <p>0.002</p> <p>Local tolerance :</p> <p>0.000 4</p> <p>over any measuring length of 12</p>	Straightedge, support and dial gauge, or taut wire and microscope	<p>Clause 5.232.1</p> <p>The dial gauge should be fixed on a support A of a suitable form such that it can slide in the slideways with the stylus touching a straightedge laid parallel to the slideways.</p>
<p>0,01 up to 1 000</p> <p>For each 1 000 mm increase in length, add</p> <p>0,01</p> <p>Maximum permissible deviation :</p> <p>0,025</p>	<p>0.000 4 up to 40</p> <p>For each 40 in increase in length, add</p> <p>0.000 4</p> <p>Maximum permissible deviation :</p> <p>0.001</p>		<p>Clauses 5.232.1 or 5.212.3 — 5.232.2</p> <p>In alternative 1), the dial gauge support should be placed on a fixed part of the machine, the stylus touching a straightedge laid parallel to the general direction of the longitudinal movement of the table.</p>

iTeH STANDARD PREVIEW
(standards.iteh.ai)

ISO 1986:1985
<https://standards.iteh.ai/catalog/standards/sist/767981b8-6d21-4d4d-99f5-90f66d45d24/iso-1986-1985>

No.	Diagram	Object
G 2		<p>Verification of flatness of the table surface.</p>
G 3		<p>Verification of parallelism of the table surface :</p> <p>a) to its longitudinal movement;</p> <p>b) to its transverse movement or to the transverse movement of the wheelhead.</p>
G 3	<p style="text-align: center;">Alternative</p> 	

Permissible deviation		Measuring instruments	Observations and references in test code ISO/R 230
mm	in		
<p>0,01 up to 1 000</p> <p>For each 1000 mm increase in length, add</p> <p>0,01</p> <p>Maximum permissible deviation :</p> <p>0,04</p> <p>Local tolerance :</p> <p>0,005</p> <p>over any measuring length of 300</p>	<p>0.000 4 up to 40</p> <p>For each 40 in increase in length, add</p> <p>0.000 4</p> <p>Maximum permissible deviation :</p> <p>0.001 6</p> <p>Local tolerance :</p> <p>0.000 2</p> <p>over any measuring length of 12</p>	<p>Straightedge and slip gauges or precision level</p>	<p>Clauses 5.322 and 5.323</p> <p>Table not locked and positioned at the centre of travel.</p>
<p>a) $0,010 \times \frac{L^*}{1000}$</p> <p>Maximum permissible deviation :</p> <p>0,030</p> <p>Local tolerance :</p> <p>0,003</p> <p>over any measuring length of 300</p> <p>b) $0,007 \times \frac{L^*}{1000}$</p> <p>(this permissible deviation should be $\geq 0,001$)</p>	<p>a) $0.000 4 \times \frac{L^*}{40}$</p> <p>Maximum permissible deviation :</p> <p>0.001 2</p> <p>Local tolerance : <small>ISO 1986:1985</small></p> <p>0.000 12</p> <p>over any measuring length of 12</p> <p>b) $0.000 3 \times \frac{L^*}{40}$</p> <p>(this permissible deviation should be $\geq 0.000 04$)</p>	<p>Dial gauge</p>	<p>Clause 5.422.21</p> <p>1) Checking by direct contact with the table.</p> <p>If the spindle can be locked, the dial gauge may be mounted on it. If the spindle cannot be locked, the dial gauge should be placed on a fixed part of the machine.</p> <p>The stylus to be placed approximately in the wheel spindle axis.</p> <p>* L = measuring length</p>
<p>a) $0,007 \times \frac{L^*}{1000}$</p> <p>Maximum permissible deviation :</p> <p>0,020</p> <p>b) $0,007 \times \frac{L^*}{1000}$</p> <p>(this permissible deviation should be $\geq 0,001$)</p>	<p>a) $0.000 3 \times \frac{L^*}{40}$</p> <p>Maximum permissible deviation :</p> <p>0.000 8</p> <p>b) $0.000 3 \times \frac{L^*}{40}$</p> <p>(this permissible deviation should be $\geq 0.000 04$)</p>	<p>Dial gauge and precision straightedge</p>	<p>2) Checking with a straightedge.</p> <p>It is unnecessary to follow the test code ISO/R 230. The checking should be made on a straightedge laid parallel to the table surface and placed in the direction of the movement concerned.</p> <p>* L = measuring length</p>

No.	Diagram	Object
G 4		<p>Verification of parallelism of the median or reference T slot to the longitudinal movement of the table.</p>
G 5	<p style="text-align: center; color: red; font-weight: bold;">iTeh STANDARD PREVIEW (standards.itih.ai)</p> 	<p>Verification of squareness of the longitudinal movement of the table to its transverse movement or to the wheelhead movement.</p>
G 6		<p>Verification of squareness and straightness of the vertical movement of the wheelhead to the table surface in a transverse vertical plane.</p>

Permissible deviation		Measuring instruments	Observations and references in test code ISO/R 230
mm	in		
<p>0,015 up to 1 000</p> <p>For each 1 000 mm increase in length, add</p> <p>0,01</p> <p>Maximum permissible deviation :</p> <p>0,05</p> <p>Local tolerance :</p> <p>0,008</p> <p>over any measuring length of 300</p>	<p>0.000 6 up to 40</p> <p>For each 40 in increase in length, add</p> <p>0.000 4</p> <p>Maximum permissible deviation :</p> <p>0.002</p> <p>Local tolerance :</p> <p>0.000 3</p> <p>over any measuring length of 12</p>	Dial gauge	<p>Clauses 5.422.1 and 5.422.21</p> <p>If the spindle can be locked, the dial gauge may be mounted on it. If the spindle cannot be locked, the dial gauge should be placed on a fixed part of the machine.</p>
<p>0,03/300</p>	<p>0.001 2/12</p>	<p>Straightedge, square and dial gauge</p>	<p>Clause 5.522.4</p> <p>a) Place the straightedge parallel to the longitudinal movement of the table and then place the table in its central position.</p> <p>b) Place the square in contact with the straightedge.</p> <p>c) Check the transverse movement of the table or the wheelhead.</p>
<p>0,04/300</p>	<p>0.001 6/12</p>	<p>Dial gauge and square</p>	<p>Clause 5.522.2</p> <p>Clamp the wheelhead if possible when taking measurements.</p> <p>If the spindle can be locked, the dial gauge can be mounted on it. If the spindle cannot be locked, the dial gauge should be placed on a fixed part of the wheelhead.</p>

iTech STANDARD PREVIEW
(standards.iteh.ai)

ISO 1986:1985
<https://standards.iteh.ai/catalog/standards/sist/6793168-5d21-4d41-9915-901966d45d24/iso-1986-1985>