
INTERNATIONAL STANDARD



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Test conditions for radial drilling machines with the arm adjustable in height — Testing of the accuracy

Conditions d'essais des machines à percer radiales à bras mobile en hauteur — 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 2423 was drawn up by Technical Committee ISO/TC 39, *Machine tools*, and circulated to the Member Bodies in January 1972.

It has been approved by the Member Bodies of the following countries :

Belgium	Ireland	Sweden
Chile	Italy	Switzerland
Czechoslovakia	Netherlands	Thailand
Egypt, Arab Rep. of	Poland	Turkey
France	Portugal	U.S.A.
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Hungary	South Africa, Rep. of	

The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

India
Japan
United Kingdom

Test conditions for radial drilling machines with the arm adjustable in height — Testing of the accuracy

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 radial drilling machines with the arm adjustable in height, and gives corresponding permissible deviations which apply.

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 characteristics (such as 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 testing, warming up of spindles and other 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.

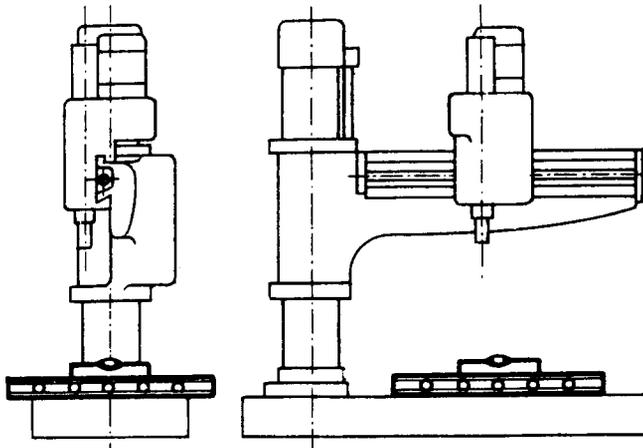
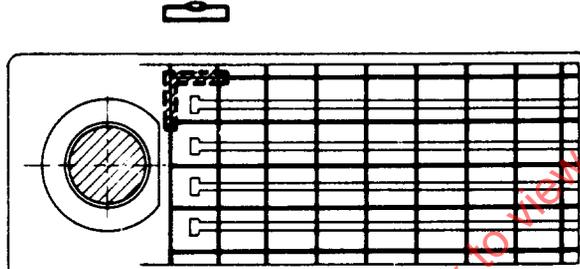
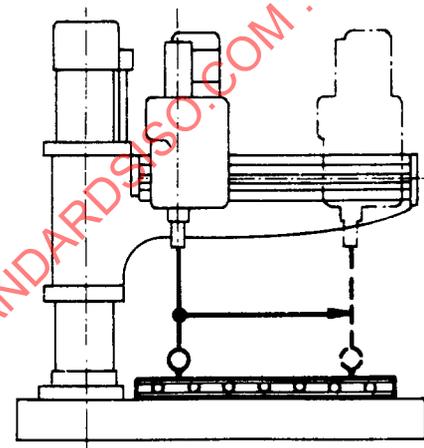
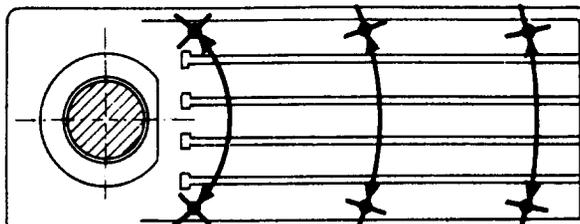
3.4 When inspecting a machine, it is not always necessary to carry out all the tests given in this International Standard. It is up to the user to choose, in agreement with the manufacturer, those tests relating to the properties which are of interest to him, but these tests are to be clearly stated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

3.5 When establishing a 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 is 0,01 mm (0.000 4 in).

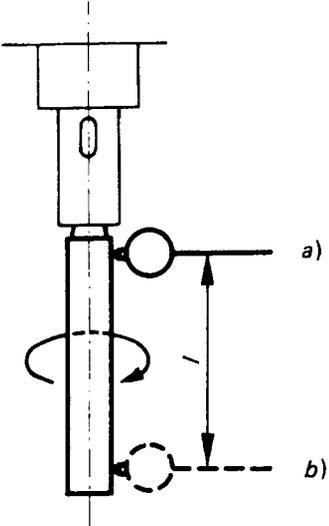
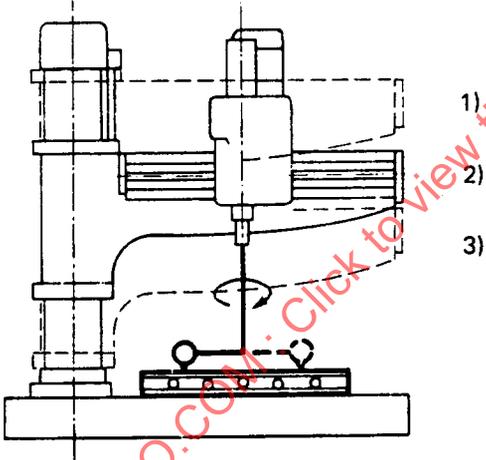
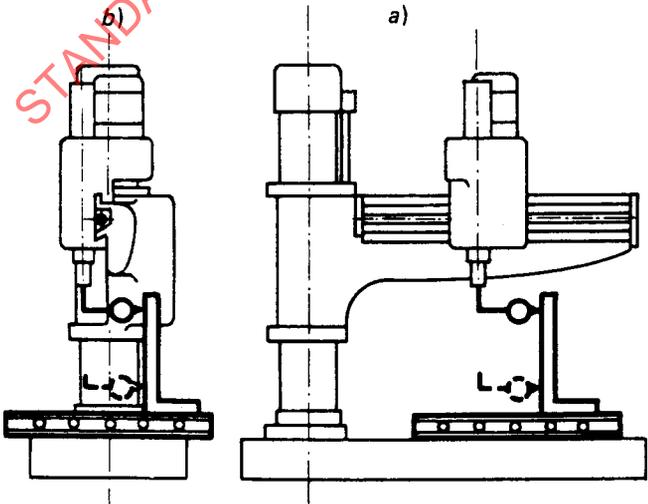
3.6 Unless otherwise specified, geometrical tests are carried out for the following positions: arm set at mid-travel on the column and saddle set at mid-travel on the arm.

4 TEST CONDITIONS AND PERMISSIBLE DEVIATIONS

4.1 Geometrical tests

No.	Diagram	Object	
G 0		<p>A – BASE PLATE Levelling of the base plate.</p>	
G 1		<p>Checking of flatness of the base plate.</p>	for a m of 100 (flat to
G 2		<p>B – ARM Checking of parallelism of the saddle movement to the base plate.</p>	for any over 10
G 3		<p>Checking of radial movement of arm parallel to base plate at three positions of saddle equally spaced along movement of arm.</p>	for any over 30

Permissible deviation		Measuring instruments	Observations and references to the test code ISO/R 230
mm	in		
0,1/1000	0.004/40	Precision level and straightedge.	Clause 3.11 The variation of level shall not exceed the permissible deviation.
0,1 for a measuring length of 1000 (flat to concave)	0.004 for a measuring length of 40 (flat to concave)	Precision level or straightedge and gauge blocks.	Clauses 5.322 and 5.323
0,3 for any measuring length over 1000	0.012 for any measuring length over 40	Straightedge and dial gauge	Clause 5.422.22 Arm set parallel to the direction of the longitudinal axis of the base plate. Arm locked.
0,05 for any measuring length over 300	0.002 for any measuring length over 12	Dial gauge	Clause 5.422.22 Dial gauge mounted on spindle. Saddle locked for each of its three posi- tions.

No.	Diagram	Object	
G 4		<p style="text-align: center;">C – SPINDLE</p> <p>Measurement of run-out of the internal taper of the spindle (spindle retracted) :</p> <p>a) at the mouth of taper;</p> <p>b) at a distance of $l = 300$ mm (12 in) from the spindle nose.</p>	<p>a)</p> <p>b)</p>
G 5		<p>Checking of straightness of the column and of squareness of the spindle axis to the base plate.</p>	
G 6		<p>Checking of squareness of the vertical movement of the spindle to the base plate :</p> <p>a) in a plane parallel to the plane of symmetry of the machine;</p> <p>b) in the plane perpendicular to the plane of symmetry of the machine.</p>	<p>a)</p> <p>b)</p>

Permissible deviation		Measuring instruments	Observations and references to the test code ISO/R 230
mm	in		
a) 0,025 b) 0,05	a) 0.001 b) 0.002	Dial gauge and test mandrel	Clause 5.612.3 Arm and saddle locked.
0,2/1000 *	0.008/40 *	Dial gauge and straight-edge	Clauses 5.512.1 and 5.512.42 Arm and saddle locked before taking measurements. Checking shall be carried out with the arm successively in its upper position 1), in its mid-travel 2) and then in its lower position 3). * Distance between the two points touched.
a) 0,1/300 b) 0,05/300	a) 0.004/12 b) 0.002/12	Square, dial gauge and straightedge	Clause 5.522.2 Arm and saddle locked.

4.2 Practical test

No.	Diagram	Object
P1	<p style="text-align: center;">Special equipment (Alternative)</p>	<p>Measurement of deflection of the spindle axis from its position square with the table under an axial force applied to the spindle :</p> <p>a) in a plane parallel to the plane of symmetry of the machine;</p> <p>b) in a plane perpendicular to the plane of symmetry of the machine.</p>

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