# International Standard 2423

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

*Conditions de réception des machines à percer radiales à bras mobile en hauteur — Contrôle de la précision*

**Second edition — 1982-02-01**



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**Descriptors :** machine tools, drilling machines (tools), tests, test conditions, accuracy, verifying.



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

International Standard ISO 2423 was developed by Technical Committee ISO/TC 39, *Machine tools*.

This second edition was submitted directly to the ISO Council, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 2423-1974), which had 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 | USA |
| Germany, F.R. | Romania | USSR |
| Hungary | South Africa, Rep. of | |

The member bodies of the following countries had expressed disapproval of the document on technical grounds :

India
Japan
United Kingdom





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# Acceptance conditions for radial drilling machines with the arm adjustable in height — Testing of 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.

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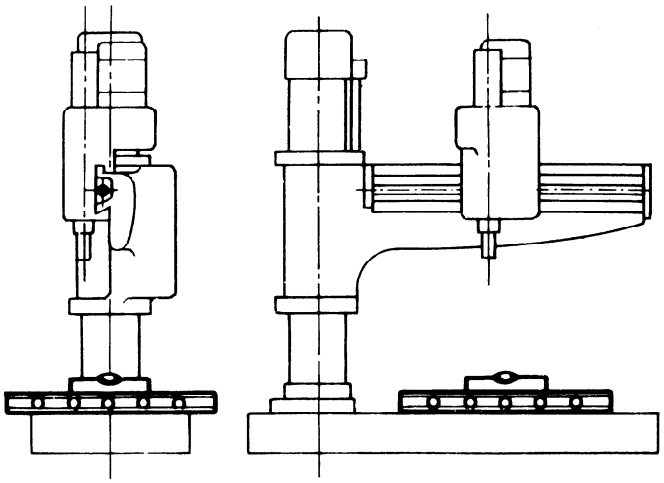
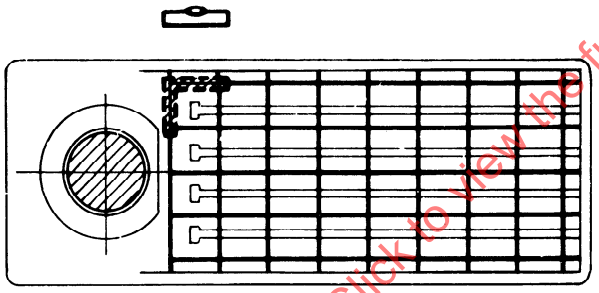
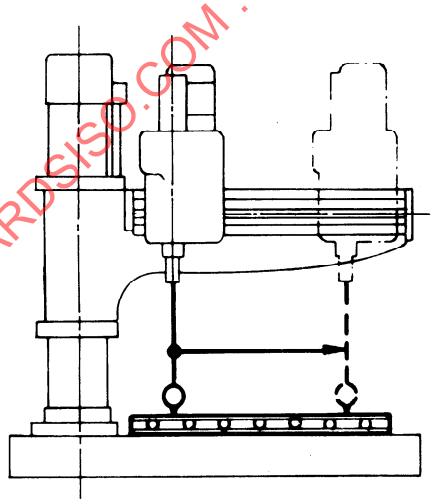
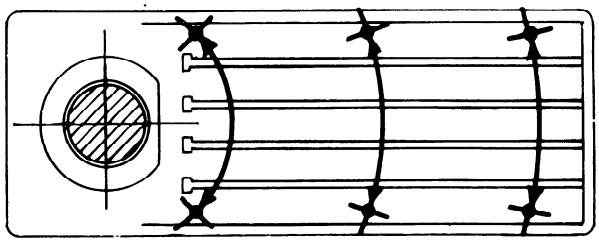
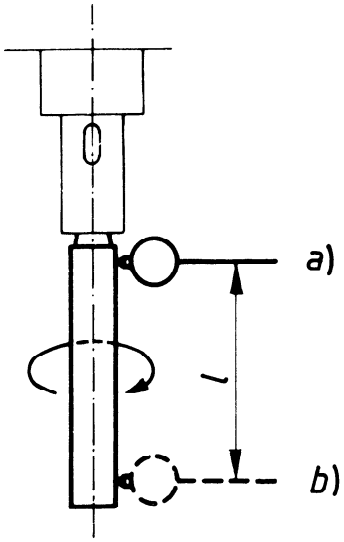
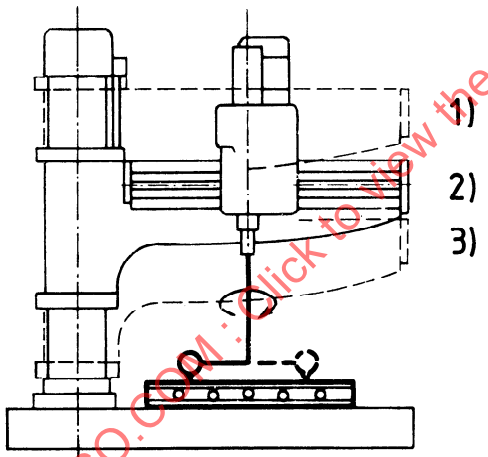
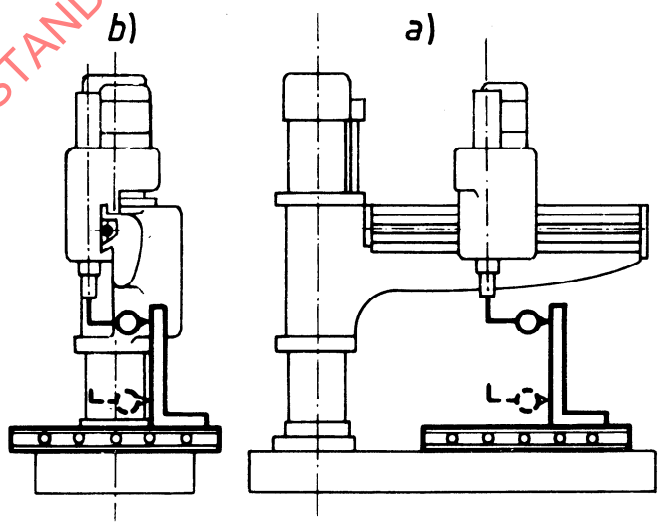
## 4 Acceptance conditions and permissible deviations

### 4.1 Geometrical tests

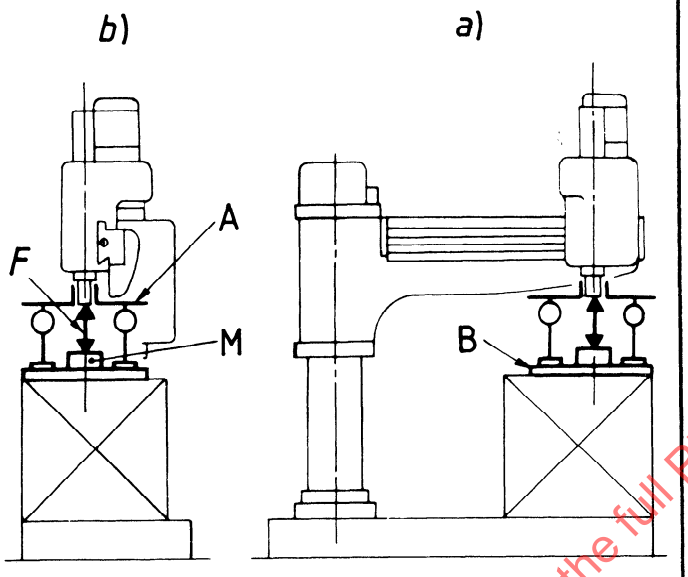
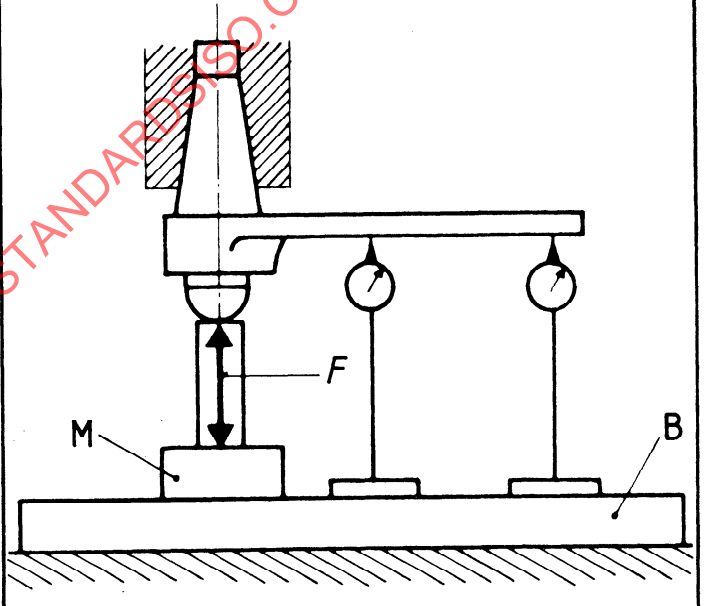
| No. | Diagram | Object | |
|---|---|---|---|
| G 0 |  | **A – BASE PLATE**<br>Levelling of the base plate. | |
| G 1 |  | Checking of flatness of the base plate. | |
| G 2 |  | **B – ARM**<br>Checking of parallelism of the saddle movement to the base plate. | |
| G 3 |  | Checking of radial movement of arm parallel to base plate at three positions of saddle equally spaced along movement of arm. | |

| 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<br>The variation of level shall not exceed the permissible deviation. |
| 0,1<br>measuring length<br>)00<br>to concave) | 0.004<br>for a measuring length of 40<br>(flat to concave) | Precision level or straightedge and gauge blocks. | Clauses 5.322 and 5.323 |
| 0,3<br>ıy measuring length<br>1000 | 0.012<br>for any measuring length over 40 | Straightedge and dial gauge | Clause 5.422.22<br>Arm set parallel to the direction of the longitudinal axis of the base plate.<br>Arm locked. |
| 0,05<br>ıy measuring length<br>300 | 0.002<br>for any measuring length over 12 | Dial gauge | Clause 5.422.22<br>Dial gauge mounted on spindle.<br>Saddle locked for each of its three positions. |

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

| Permissible deviation | | | Measuring instruments | Observations and references to the test code ISO/R 230 |
|---|---|---|---|---|
| mm | | in | | |
| 0,025<br>0,05 | *a*)<br>*b*) | 0.001<br>0.002 | Dial gauge and test mandrel | Clause 5.612.3<br>Arm and saddle locked. |
| 0,2/1000 * | | 0.008/40 * | Dial gauge and straight-edge | Clauses 5.512.1 and 5.512.42<br>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).<br>* Distance between the two points touched. |
| 0,1/300<br>0,05/300 | *a*)<br>*b*) | 0.004/12<br>0.002/12 | Square, dial gauge and straightedge | Clause 5.522.2<br>Arm and saddle locked. |

## 4.2 Practical test

| No. | Diagram | Object |
|---|---|---|
| P1 |  | Measurement of deflection of the spindle axis from its position square with the table under an axial force applied to the spindle :<br><br>*a*) in a plane parallel to the plane of symmetry of the machine;<br><br>*b*) in a plane perpendicular to the plane of symmetry of the machine. |
| | Special equipment (Alternative)<br>  | |