

INTERNATIONAL STANDARD

**ISO
1708**

Fourth edition
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Acceptance conditions for general purpose parallel lathes — Testing of the accuracy

*Conditions de réception des tours parallèles d'usage général — Contrôle de la
précision*

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

International Standard ISO 1708 was prepared by Technical Committee ISO/TC 39, *Machine tools*.

This fourth edition cancels and replaces the third edition (ISO 1708 : 1983), of which it constitutes a minor revision.

Annex A of this International Standard is for information only.

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International Organization for Standardization

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Acceptance conditions for general purpose parallel lathes — Testing of the accuracy

1 Scope

This International Standard specifies, with reference to ISO 230-1, both geometrical and practical tests on general purpose parallel lathes, and gives the corresponding permissible deviations which apply.

It deals only with the verification of the 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 the checking of machine characteristics (speeds, feeds, etc.,) which shall generally be checked before the accuracy is tested.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 230-1 : 1986, *Acceptance code for machine tools — Part 1: Geometric accuracy of machines operating under no-load or finishing conditions*.

3 Preliminary remarks

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

3.2 To apply this International Standard, reference shall be made to ISO 230-1, 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.

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.

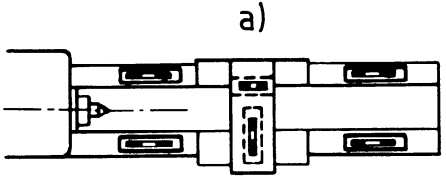
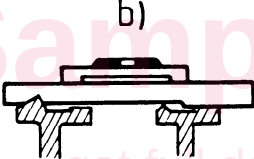
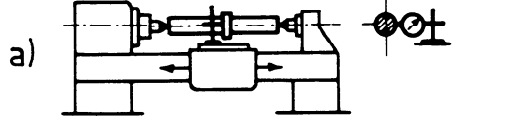
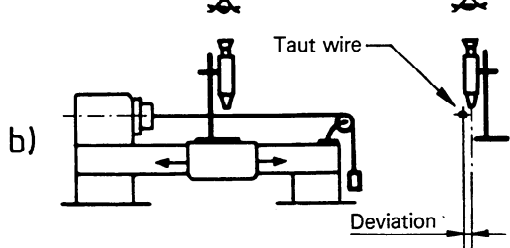
3.4 When inspecting a machine, it is not always necessary to carry out all the tests given in this International Standard. It is up to the user to choose, in agreement with the manufacturer, those tests relating to the properties which are of interest to him, but the agreed tests shall be clearly stated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

3.5 Practical tests shall be made with finishing cuts [for instance, depth = 0,1 mm (0,004 in); feed = 0,1 mm (0,004 in) per revolution] and not with roughing cuts, which are liable to generate appreciable cutting forces.

3.6 When establishing the tolerance for a measuring range different from that indicated in this International Standard (see ISO 230-1 : 1986, 2.311) it should be taken into consideration that the minimum value of tolerance is 0,005 mm (0,000 2 in) for precision lathes and 0,01 mm (0,000 4 in) for other lathes.

4 Acceptance conditions and permissible deviations

4.1 Geometrical tests

No.	Diagram	Object	Precision lathes	
			mm	in
			$D_a < 500$ and $DC < 1500$	$D_a < 20$ and $DC < 60$
G1	 a)	A — Bed Verification of levelling of slideways. a) Longitudinal verification: straightness of slideways in the vertical plane.	$DC < 500$ 0,01 (convex)	$DC < 20$ 0,000 4 (convex)
			$500 < DC < 1\,000$ 0,015 (convex) Local tolerance**): 0,005 over any measured length of 250	$20 < DC < 40$ 0,000 6 (convex) Local tolerance**): 0,000 2 over any measured length of 10
			$1\,000 < DC < 1\,500$ 0,02 (convex)	$40 < DC < 60$ 0,000 8 (convex)
			Local tolerance**): 0,005 over any measured length of 250	Local tolerance**): 0,000 2 over any measured length of 10
G2	 b)	b) Transverse verification: slideways shall be in the same plane.	b) Variation in level: 0,03/1 000	b) Variation in level: 0,001 2/40
	 a)	B — Carriage Checking of straightness of carriage movement in a horizontal plane or, possibly, in a plane defined by the axis of the centres and the tool point.	$DC < 500$ 0,01	$DC < 20$ 0,000 4
			$500 < DC < 1\,000$ 0,015	$20 < DC < 40$ 0,000 6
G2	 b)		$1\,000 < DC < 1\,500$ 0,02	$40 < DC < 60$ 0,000 8

*) DC = distance between centres.

D_a = maximum permissible diameter above the bed.

**) See clause 5.

Permissible deviation *)				Measuring instruments	Observations and references to the ISO 230-1 : 1986 acceptance code
Other lathes					
mm		in			
$D_a < 800$	$800 < D_a < 1\,600$	$D_a < 32$	$32 < D_a < 64$		
$DC < 500$ 0,01 (convex) 0,015 (convex)		$DC < 20$ 0,000 4 (convex) 0,000 6 (convex)		Precision levels, optical or other methods	a) Subclauses 3.11, 3.21, 5.212.21 and 5.212.22 Take measurements at a number of positions equally spaced along the length of the bed. The levels may be placed on the transverse slide. When the slideways are not horizontal, use a special straightedge as mentioned in subclause 5.212.21 (2°), figure 12.
$500 < DC < 1\,000$ 0,02 (convex) 0,03 (convex) Local tolerance**): 0,007 5 0,01 over any measured length of 250		$20 < DC < 40$ 0,000 8 (convex) 0,001 2 (convex) Local tolerance**): 0,000 3 0,000 4 over any measured length of 10			
$DC > 1\,000$ For each 1 000 increase in distance between centres beyond 1 000, add to the corresponding preceding tolerance: 0,01 0,02 Local tolerance**): 0,015 0,02 over any measured length of 500		$DC > 40$ For each 40 increase in distance between centres beyond 40, add to the corresponding preceding tolerance: 0,000 4 0,000 8 Local tolerance**): 0,000 6 0,000 8 over any measured length of 20			
b) Variation in level: 0,04/1 000		b) Variation in level: 0,001 6/40		Precision levels	b) Subclause 5.412.7 Place a level transversely on the slideways and take measurements at a number of positions equally spaced along the length of the slideways. The variation in level measured at any position shall not exceed the permissible deviation.
$DC < 500$ 0,015 0,02		$DC < 20$ 0,000 6 0,000 8		a) For $DC < 1\,500$ mm (< 60 in): dial gauge and mandrel between centres or straight-edge b) Whatever the value of DC , taut wire and microscope or optical methods	a) Subclause 5.232.3 a) or 5.232.1 Touch the front generatrix of the mandrel (instead of the mandrel, a straightedge with parallel faces may be used). The length of the mandrel between centres shall be as nearly as possible equal to the value of DC . b) Subclauses 5.212.3 and 5.232.3 b) The deviation in straightness of carriage movement shall, other than in exceptional cases, be concave relative to the axis of the centres.
$500 < DC < 1\,000$ 0,02 0,025		$20 < DC < 40$ 0,000 8 0,001			
$DC > 1\,000$ For each 1 000 increase in distance between centres beyond 1 000, add to the corresponding preceding tolerance: 0,005 Maximum permissible deviation: 0,03 0,05		$DC > 40$ For each 40 increase in distance between centres beyond 40, add to the corresponding preceding tolerance: 0,000 2 Maximum permissible deviation: 0,001 2 0,002			