INTERNATIONAL STANDARD

ISO 3442-2

First edition
2005-10-15

Machine tools — Dimensions and geometric tests for self-centring chucks with two-piece jaws —

Part 2: Power-operated chucks with tongue and groove type jaws

Machines-outils — Dimensions et essais géométriques pour mandrins à serrage concentrique et à mors rapportés —

Partie 2: Mandrins à commande axiale assistée avec mors à assemblage cruciforme par tenon et languette

Reference number
ISO 3442-2:2005(E)

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3442-2 was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 8, *Work holding spindles and chucks*.

Together with ISO 3442-1 and ISO 3442-3, this first edition of ISO 3442-2 cancels and replaces ISO 3442:1991 and ISO 9401:1991. ISO/TC 39/SC 8 decided to split ISO 3442:1991 into three parts, at the same time incorporating ISO 9401:1991. As soon as all three parts of ISO 3442 are published, ISO 3442:1991 and ISO 9401:1991 will be withdrawn.

ISO 3442 consists of the following parts, under the general title *Machine tools — Dimensions and geometric tests for self-centring chucks with two-piece jaws*:

— *Part 1: Manually operated chucks with tongue and groove type jaws*

— *Part 2: Power-operated chucks with tongue and groove type jaws*

— *Part 3: Power-operated chucks with serrated jaws*

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Machine tools — Dimensions and geometric tests for self-centring chucks with two-piece jaws —

Part 2: Power-operated chucks with tongue and groove type jaws

1 Scope

This part of ISO 3442 specifies the sizes for interchangeability of self-centring, power-operated chucks with two-piece jaws (tongue and groove type) and describes, by reference to ISO 230-1, the geometric tests for such chucks. It also specifies the tolerances which apply to these tests.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 230-1:1996, *Test code for machine tools — Part 1: Geometric accuracy of machines operating under no-load or finishing conditions*

3 Preliminary remarks

3.1 Measurement units

All dimensions and tolerances in this part of ISO 3442 are expressed in millimetres.

3.2 Geometric tests

This part of ISO 3442 deals only with the verification of the rotational accuracy of the chuck and the positioning of the assembling elements of the top jaws. It does not apply to other dynamic considerations, such as measurement of lack of balance during rotation, balancing or measurement of gripping power.

The main purpose of these tests is to allow either top jaw mounting compatible with the machining accuracy of the chuck or precise setting for top jaws on the chuck after carrying out preliminary centring, straightening or locking operations on a jig separate from the machine.

4 Accuracy classes

This part of ISO 3442 specifies only one accuracy class.

For information, it should be noted that power-operated chucks can be provided, if necessary, with specially adjusted base or master jaws which are not interchangeable with other base or master jaws. In such cases, the chucks shall be marked.

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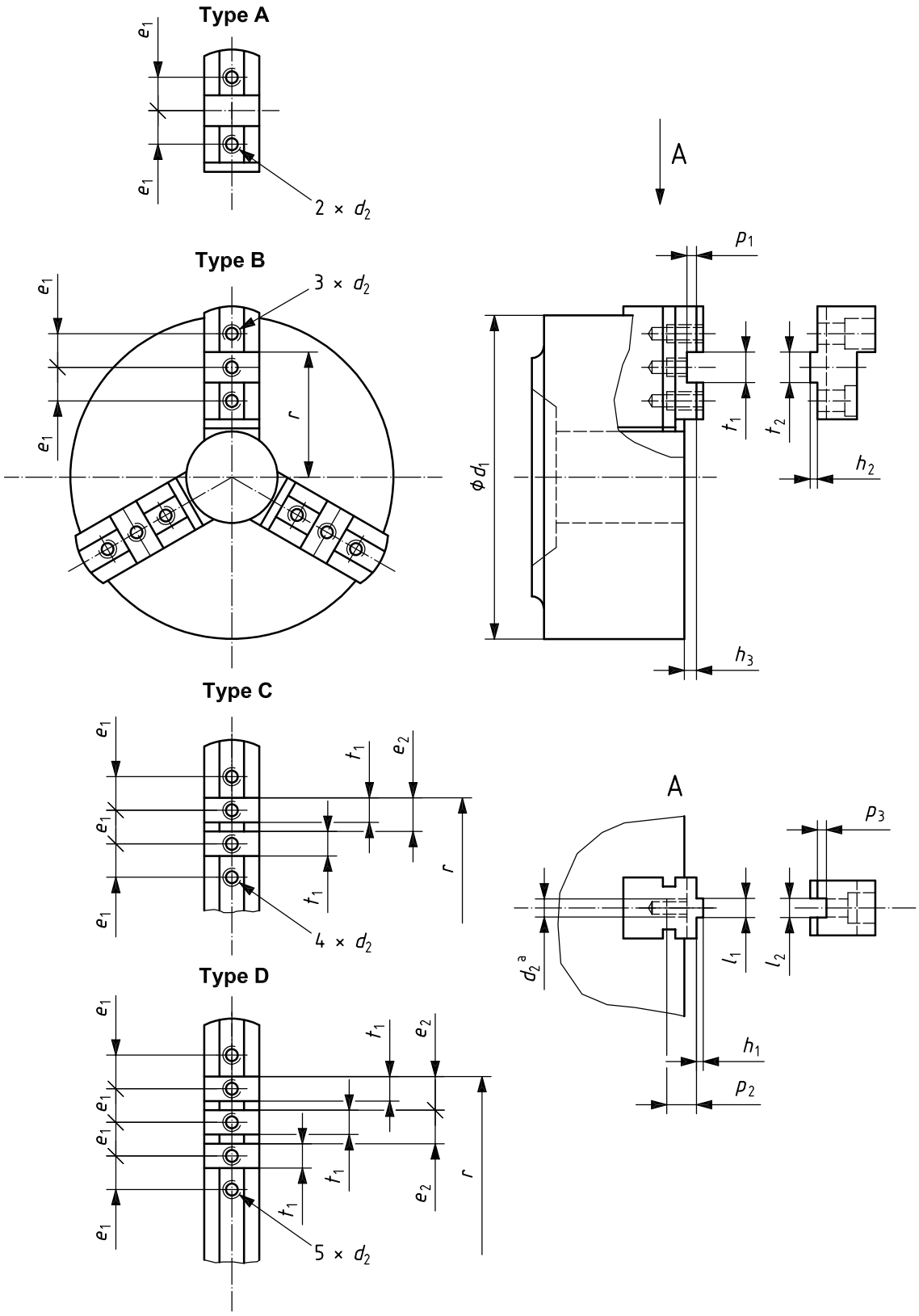
5 Sizes for interchangeability

The sizes for interchangeability of power-operated chucks are shown in Figure 1 and given in Table 1.



a Threaded holes (see Table 1).

Figure 1 — Tongue and groove jaws

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Table 1 — Dimensions of power-operated chucks

Nominal diameter of chuck $d_{1\ nom}$	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**
Type	**A**	**A**	**A**	**A**	**A**	**B**	**B**	**C**	**D**	**D**
d_1 ± 5 %	100	125	160	200	250	315	400	500	630	800
Base or master jaw										
d_2	M6	M8	M10	M12	M16	M16	M20	M20	M20	M20
$e_1 \pm 0{,}15$	9,5	11,1	19	22,2	27	31,75	38,1	38,1	38,1	38,1
e_2	—	—	—	—	—	—	—	38,1	38,1	38,1
h_1	2,2	2,2	3	3	3	3	3	3	3	3
h_3 min.	4	4	5	5	5	5	8	8	8	8
l_1 h9	6,35	6,35	7,94	7,94	12,7	12,7	12,7	12,7	12,7	12,7
p_1	3,2	3,2	4	4	4	4	7	7	7	7
p_2	9	13	20	22	27	30	38	38	38	38
t_1 H8	7,94	7,94	12,675	12,675	19,025	19,025	19,025	19,025	19,025	19,025
Top jaw										
h_2	2,2	2,2	3	3	3	3	6	6	6	6
l_2 E9	6,35	6,35	7,94	7,94	12,7	12,7	12,7	12,7	12,7	12,7
p_3	3,2	3,2	4	4	4	4	4	4	4	4
t_2 h8	7,94	7,94	12,675	12,675	19,025	19,025	19,025	19,025	19,025	19,025
r [a] Jaw open	38	47,5	65	76,5	95	118	150	205	265,5	341,7

[a] Dimension r is a reference value.

6 Geometric tests

6.1 Spindle or face plate accuracy

Since some of the geometric tests to be carried out involve the chuck rotation, the chuck should be mounted on a test spindle, either directly, or by means of a face plate. The radial run-out on the outside diameter of the test spindle or face plate and camming at any point on its face shall have been previously checked as in G01 and G02.

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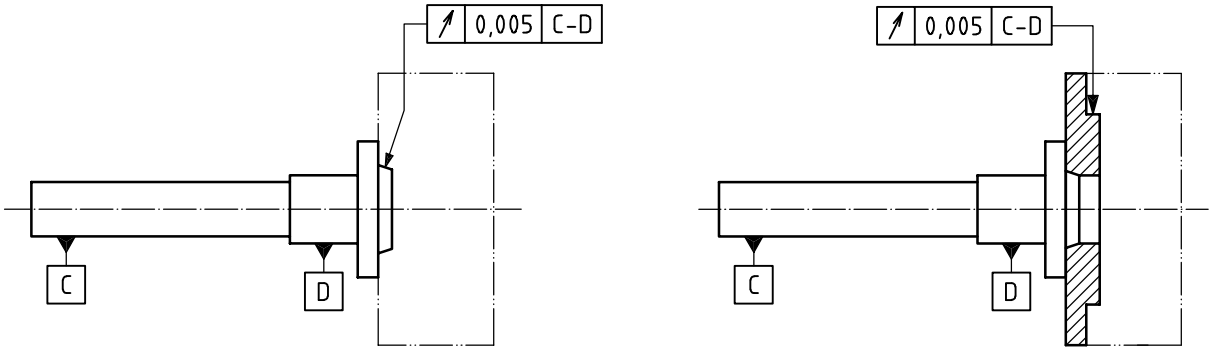
Object

Checking radial run-out of spindle nose or face plate.

G01

Diagram



Tolerance

0,005

Measured deviation

Measurement instruments

Dial gauge.

References to ISO 230-1:1996 and observations 5.611.4 and 5.612.2

In the case of a tapered spindle nose, the stylus of the dial gauge shall be set normal to the surface which is to be checked.

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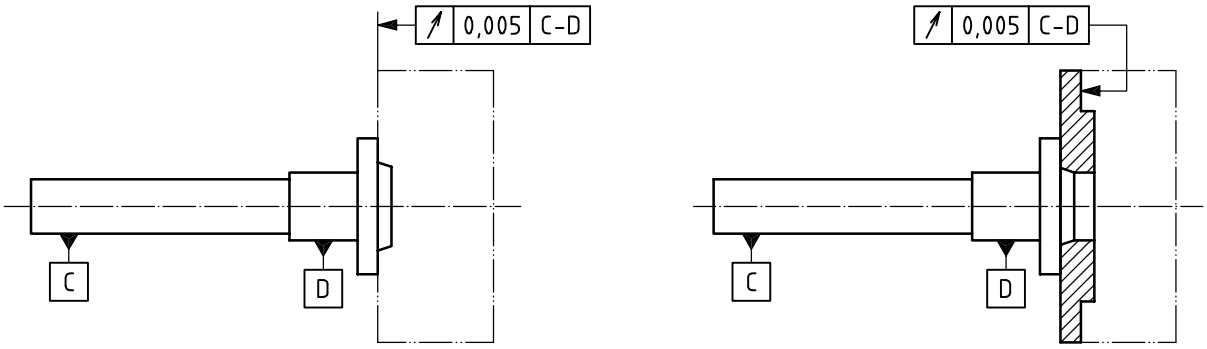
Object

Checking camming of spindle nose or face plate.

G02

Diagram



Tolerance

0,005

Measured deviation

Measurement instruments

Dial gauge.

References to ISO 230-1:1996 and observations 5.63

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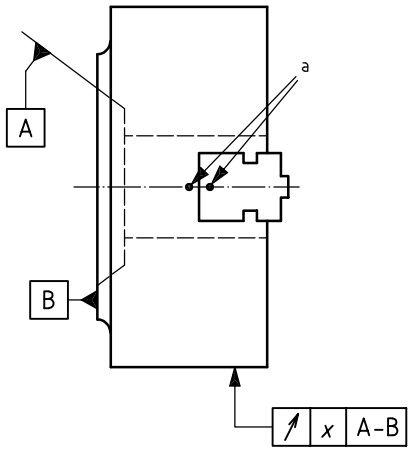
6.2 Geometric tests and relevant tolerances for power-operated chucks

Object

Checking radial run-out of outer surface.

G1

Diagram



[a] Identification to be marked when the master jaws are not interchangeable.

Nominal diameter of chuck $d_{1\,nom}$	Tolerance x (full indicator movement)
$d_{1\,nom} \leqslant 125$	0,02
$125 < d_{1\,nom} \leqslant 200$	0,03
$200 < d_{1\,nom} \leqslant 315$	0,04
$315 < d_{1\,nom} \leqslant 500$	0,05
$500 < d_{1\,nom} \leqslant 800$	0,06

Measured deviation

For $d_{1\,nom}$ = …:

Measurement instruments

Dial gauge.

NOTE Two measurements are possible:

a) with the chuck mounted on a spindle or

b) with a measuring machine.

The results of the two measurements may differ depending on the tolerances on the spindle nose and the chuck.

References to ISO 230-1 and observations

For the purposes of this test, the chuck may be mounted on a test spindle, either directly or by means of a face plate. In this case, see 6.1.

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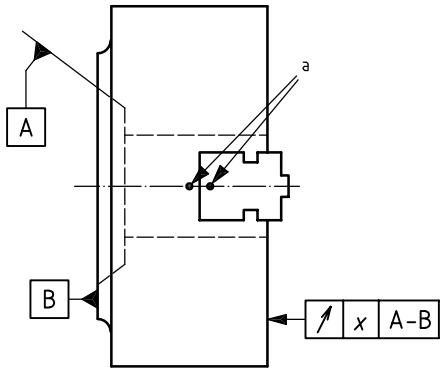
Object

Checking camming of chuck face.

G2

Diagram



[a] Identification to be marked when the master jaws are not interchangeable.

Nominal diameter of chuck $d_{1\,\mathrm{nom}}$	**Tolerance** x **(full indicator movement)**
$d_{1\,\mathrm{nom}} \leqslant 125$	0,02
$125 < d_{1\,\mathrm{nom}} \leqslant 200$	0,03
$200 < d_{1\,\mathrm{nom}} \leqslant 315$	0,04
$315 < d_{1\,\mathrm{nom}} \leqslant 500$	0,05
$500 < d_{1\,\mathrm{nom}} \leqslant 800$	0,06

Measured deviation

For $d_{1\,\mathrm{nom}}$ = …:

Measurement instruments

Dial gauge.

NOTE Two measurements are possible:

a) with the chuck mounted on a spindle or

b) with a measuring machine.

The results of the two measurements may differ depending on the tolerances on the spindle nose and the chuck.

References to ISO 230-1 and observations

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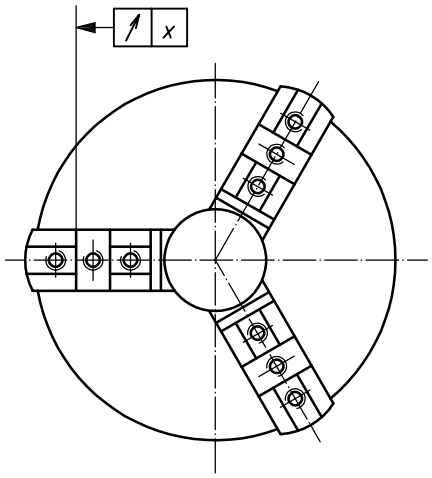
Object

Checking equidistance between outer surfaces of top jaw locating key slots.

G3

Diagram



Nominal diameter of chuck $d_{1\,nom}$	Tolerance x (full indicator movement)
$d_{1\,nom} \leqslant 125$	0,03
$125 < d_{1\,nom} \leqslant 200$	0,04
$200 < d_{1\,nom} \leqslant 315$	0,05
$315 < d_{1\,nom} \leqslant 500$	0,08
$500 < d_{1\,nom} \leqslant 800$	0,12

Measured deviation

For $d_{1\,nom}$ = …:

Measurement instruments

Dial gauge.

References to ISO 230-1 and observations

For the purposes of this test, the chuck may be mounted on a test spindle, either directly or by means of a face plate. In this case, see 6.1.

This test shall be carried out with the chuck tightened and with the base or master jaws locked on a dummy piece. The value of the clamping force shall be as specified by the manufacturer.

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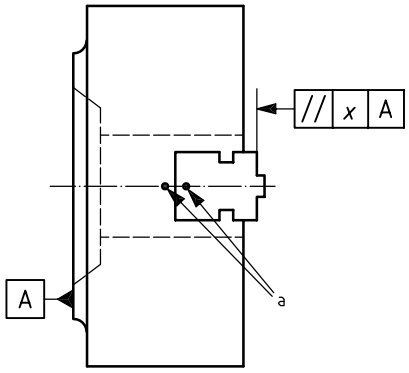
Object

Checking deviation in dimension between top of master jaws and mounting chuck face.

G4

Diagram



a Identification to be marked when the master jaws are not interchangeable.

Nominal diameter of chuck $d_{1\,nom}$	**Tolerance** x **(full indicator movement)**
$d_{1\,nom} \leqslant 125$	0,03
$125 < d_{1\,nom} \leqslant 200$	0,04
$200 < d_{1\,nom} \leqslant 315$	0,06
$315 < d_{1\,nom} \leqslant 500$	0,08
$500 < d_{1\,nom} \leqslant 800$	0,10

Measured deviation

For $d_{1\,nom}$ = …:

Measurement instruments

Dial gauge.

References to ISO 230-1 and observations

This test shall be carried out with the chuck tightened and with the base or master jaws locked on a dummy piece. The value of the clamping force shall be as specified by the manufacturer.

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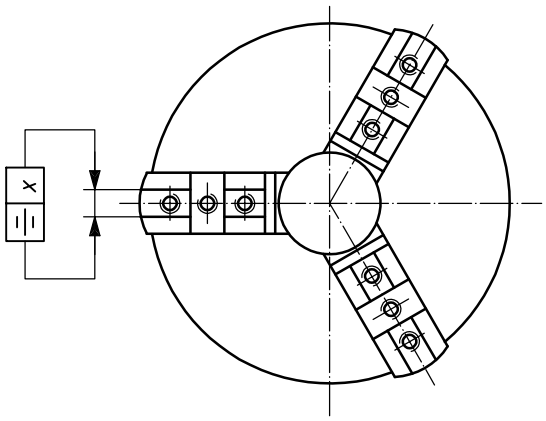
Object

Checking permissible deviation between top jaw locating centre-line and parallel plane through centre-line of chuck.

G5

Diagram



Nominal diameter of chuck $d_{1\,nom}$	Tolerance x (full indicator movement)
$d_{1\,nom} \leqslant 125$	0,05
$125 < d_{1\,nom} \leqslant 200$	0,08
$200 < d_{1\,nom} \leqslant 315$	0,12
$315 < d_{1\,nom} \leqslant 500$	0,16
$500 < d_{1\,nom} \leqslant 800$	0,20

Measured deviation

For $d_{1\,nom}$ = …:

Measurement instruments

Dial gauge.

References to ISO 230-1 and observations

For the purposes of this test, the chuck may be mounted on a test spindle, either directly or by means of a face plate. In this case, see 6.1.

The test shall be carried out with the chuck tightened and with the base or master jaws locked on a dummy piece. The value of the clamping force shall be as specified by the manufacturer.

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Bibliography

[1] ISO 1101, *Geometrical Product Specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

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