
**Collets for tool holders with taper
ratio 1:10 — Collets, holders, nuts**

*Pinces de serrage pour mandrins à conicité 1:10 — Pinces, mandrins
à pinces, écrous de serrage*



Contents

	Page
1 Scope	1
2 Normative reference	1
3 Dimensions	1
3.1 Collets	2
3.2 Holder	4
3.3 Nut	5
3.4 Collet run-out tolerances	6
4 Material	7
4.1 Collet	7
4.2 Nut	7
5 Manufacturing requirements	8
5.1 Collet	8
5.2 Holder	8
5.3 Nut	8
6 Designation	8
6.1 Collet	8
6.2 Holder	9
6.3 Nut	9
6.4 Test mandrel	9
7 Marking	10
8 Operational set-up	10
Annex A (normative) Cone angle tolerances AT3 and AT4	12

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@isocs.iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

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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.

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.

International Standard ISO 10897 was prepared by Technical Committee ISO/TC 29, *Small tools*.

Annex A forms an integral part of this International Standard.

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Collets for tool holders with taper ratio 1:10 — Collets, holders, nuts

1 Scope

This International Standard specifies the dimensions, materials and manufacturing requirements, and designation of collets for tools with cylindrical shanks and their corresponding holders and nuts. For non-standardized clamping devices, such as clamping devices specified in drawings, these holders can be agreed upon between customer and supplier.

Form A applies where a clamping range of h10 is sufficient.

Form B can be used for any application without lateral cutting load.

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 2768-1:1989, *General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*.

3 Dimensions

Collets, holders and nuts need not correspond to figures 1 to 4; only the given dimensions shall be complied with.

General tolerances: ISO 2768-1 - m

3.1 Collets

See figures 1 and 2 and table 2.

Tolerances in millimetres,
surface roughness in micrometres

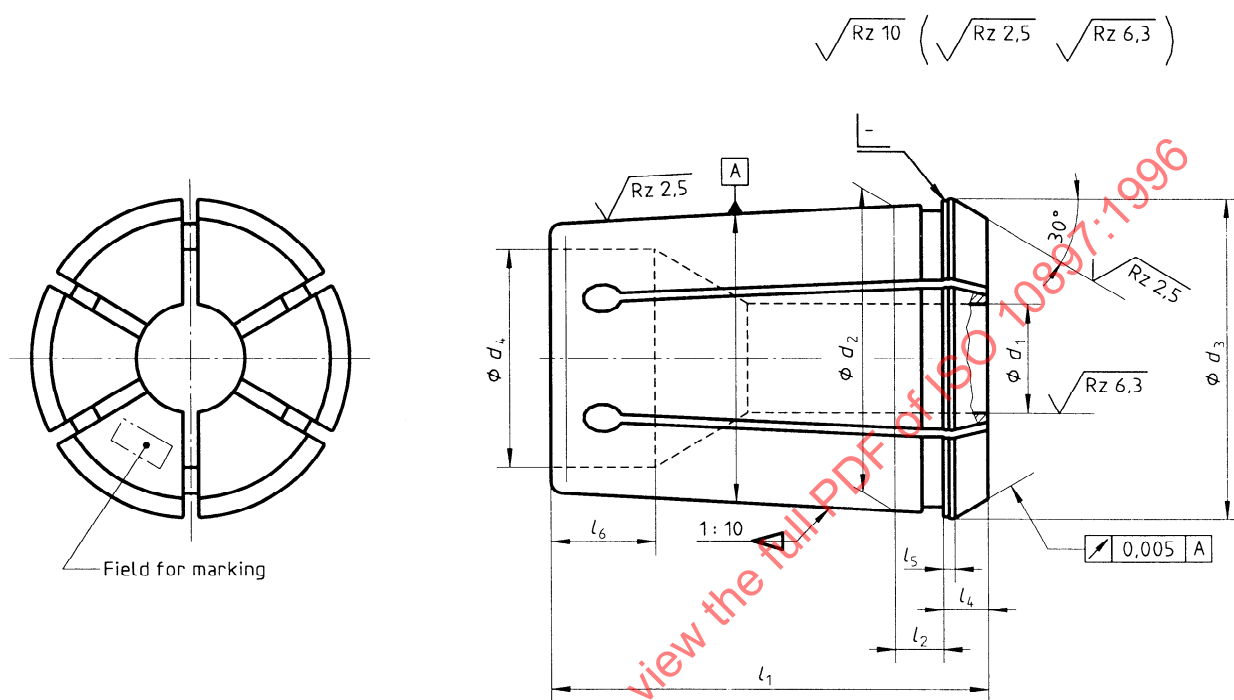
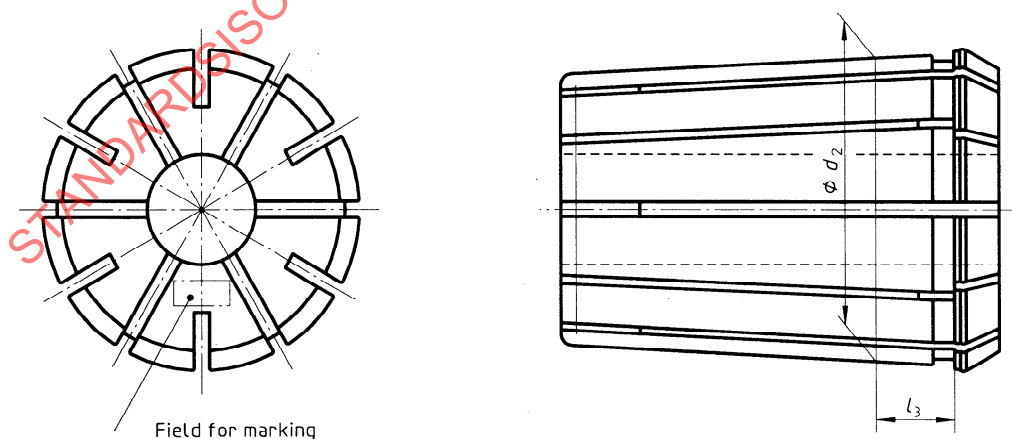


Figure 1 — Collet form A, unilaterally slotted, with short clamping bore for cylindrical shanks



NOTE - Other dimensions and tolerances as form A.

Figure 2 — Collet form B, bilaterally slotted, with continuous clamping bore for cylindrical shanks

Table 1 — Collet dimensions

Dimensions in millimetres

Nominal size	d_1				d_2	d_3 0 - 0,05	d_4 + 0,1 0	l_1	l_2	l_3	l_4 0 - 0,1	l_5	l_6 $\pm 0,2$
	H7												
	Form A 1) Form B 2)												
	Nominal diameter												
	from (incl.)	up to (incl.)	from (incl.)	up to (incl.)									
6	1	6	-	-	10,0	11,5	7	21	4	-	3,5	0,5	6
8	1	8	-	-	12,65	14,5	8,8	26	4,5	-	4	0,8	7
10	1	10	-	-	15,15	17,2	10,2	30	4,5	-	4,5	0,8	6,5
12	1	12	-	-	17,75	19,8	12,3	34	4,5	-	5	1,1	8
16	2	16	5	16	22,65	25,5	16,1	40	5,5	9,5	5,5	1,2	10
20	2	20	6	20	27,4	29,8	20,3	45	6	10	6	1,35	10
25	2	25	6	25	32,9	35,05	25,1	52	6	10	6	1,4	11
32	4	32	10	32	41,3	43,7	32,1	60	7	11	6	1,45	12
40	6	29,5	30	40	49,7	52,2	39,5	68	8	12	6	1,45	13,5
50	8	29,5	30	50	61,1	63,8	49,5	80	9	13	7	1,55	17

1) For clamping range h10.

2) For clamping range $\begin{smallmatrix} 0 \\ -0,5 \end{smallmatrix}$.

3.2 Holder

See figure 3 and table 2.

Tolerances in millimetres,
surface roughness in micrometres

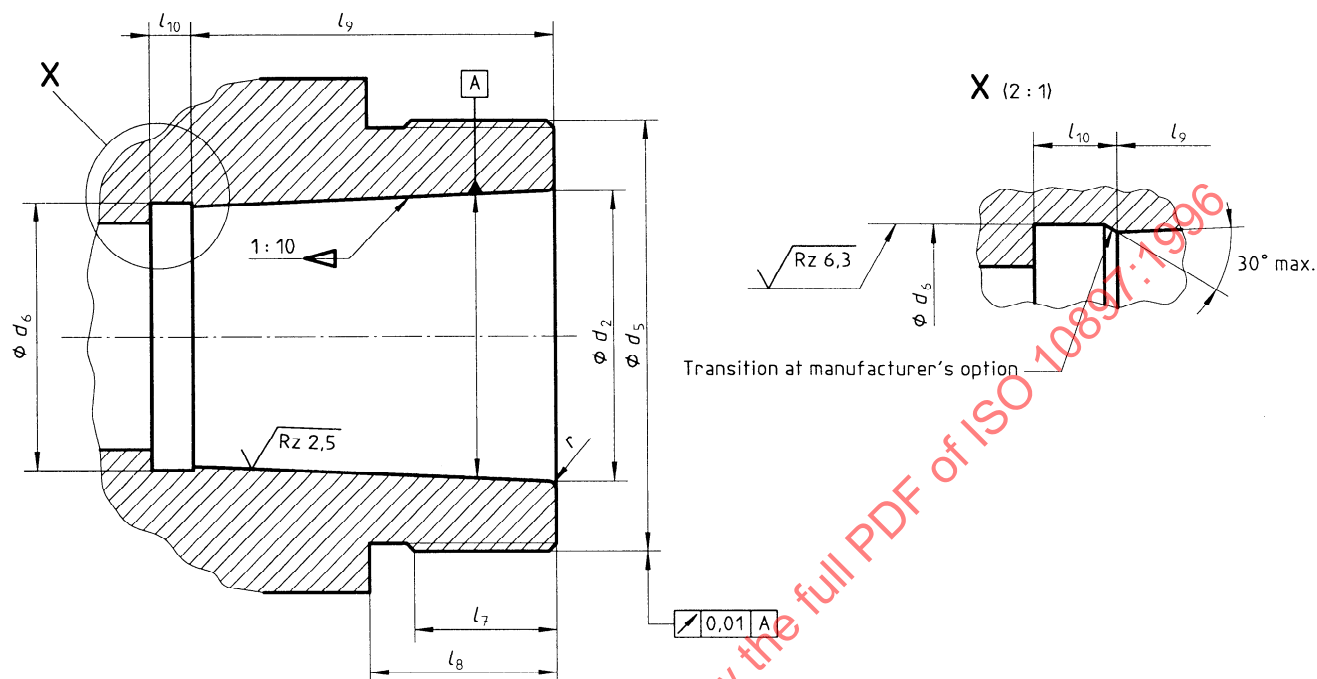


Figure 3 — Holder form C

Table 2 — Holder dimensions

Dimensions in millimetres

Nominal size	6	8	10	12	16	20	25	32	40	50
d_2 H7	10	12,65	15,15	17,75	22,65	27,4	32,9	41,3	49,7	61,1
d_5 6g	M14×1	M20×1,5	M22×1,5	M27×1,5	M33×1,5	M42×2	M48×2	M60×2,5	M68×2,5	M80×2,5
d_6 $\begin{smallmatrix} +0,5 \\ 0 \end{smallmatrix}$	8,5	10,8	12,9	15,1	19,6	23,9	28,7	36,4	44,1	54,5
l_7	8	10	10	11	15	16	18	21	24	27
l_8	11	15	15	16	18	22	24	27	30	33
l_9	16	20	24	28	32	36	43	51	59	69
l_{10} min.	3	3	4	4	5	5	5	6	6	6
r	0,5	0,5	0,6	0,6	1	1	1	1,6	1,6	1,6

3.3 Nut

See figure 4 and table 3.

Tolerances in millimetres,
surface roughness in micrometres

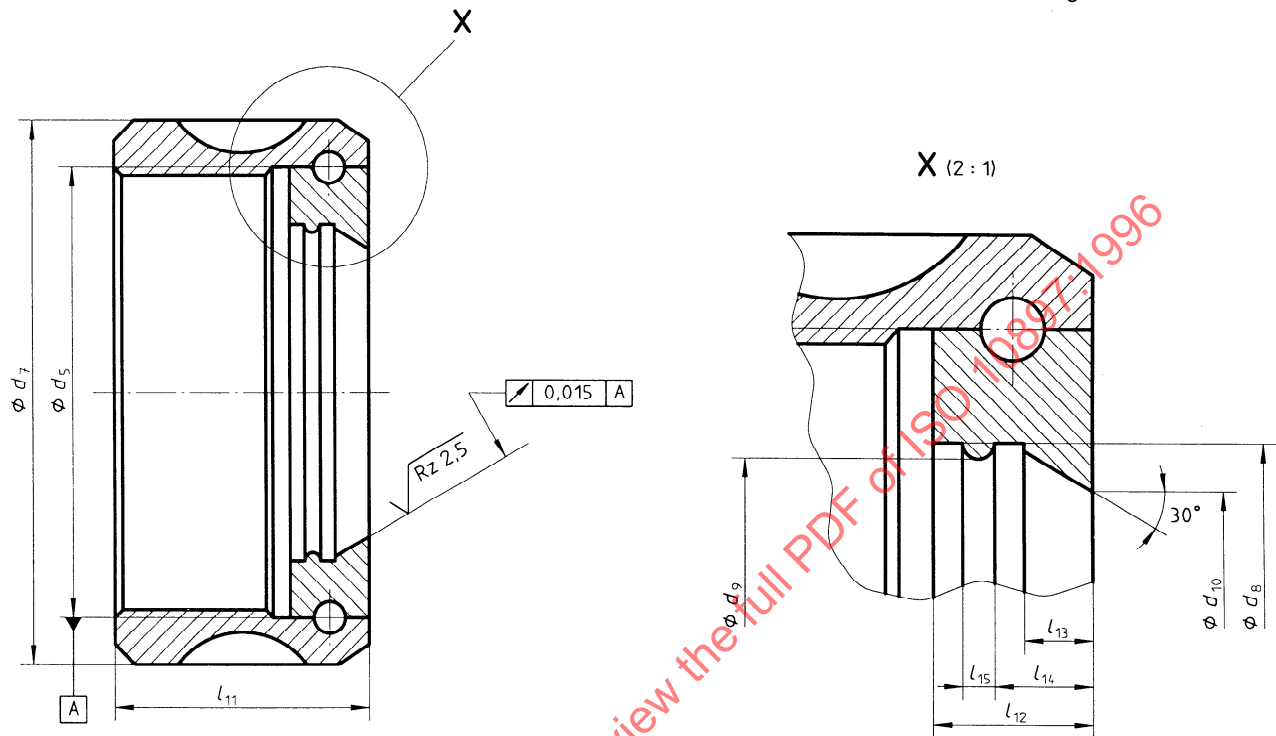


Figure 4 — Nut form D

Table 3 — Nut dimensions

Dimensions in millimetres

Nominal size	6	8	10	12	16	20	25	32	40	50
d_5 6H	M14×1	M20×1,5	M22×1,5	M27×1,5	M33×1,5	M42×2	M48×2	M60×2,5	M68×2,5	M80×2,5
d_7	18	26	30	35	43	50	60	72	85	100
d_8 $\begin{smallmatrix} +0,1 \\ 0 \end{smallmatrix}$	11,6	15,1	18	20,3	25,8	30,2	35,6	44,3	53,1	64,7
d_9 $\begin{smallmatrix} +0,1 \\ 0 \end{smallmatrix}$	10,9	13,85	16,4	19,0	24,6	28,7	33,8	42,5	51,0	62,6
d_{10}	7,7	10,7	12,8	15,2	20,2	24,1	29,7	38,5	46,6	57
l_{11}	14	19	19	20	24	28	30	33,5	37	43
l_{12}	5,2	5,75	6,05	6,75	9	10	10,5	10,5	11	13
l_{13}	2,5	2,5	2,8	3	4	4,5	4,5	4,5	4,5	5
l_{14} $\begin{smallmatrix} +0,1 \\ 0 \end{smallmatrix}$	4	4,25	4,55	5,25	5,65	6,35	6,3	6,3	7	8,25
l_{15} $\begin{smallmatrix} +0,05 \\ 0 \end{smallmatrix}$	1,2	1,5	1,5	1,5	1,5	1,5	2	2	2	2,5

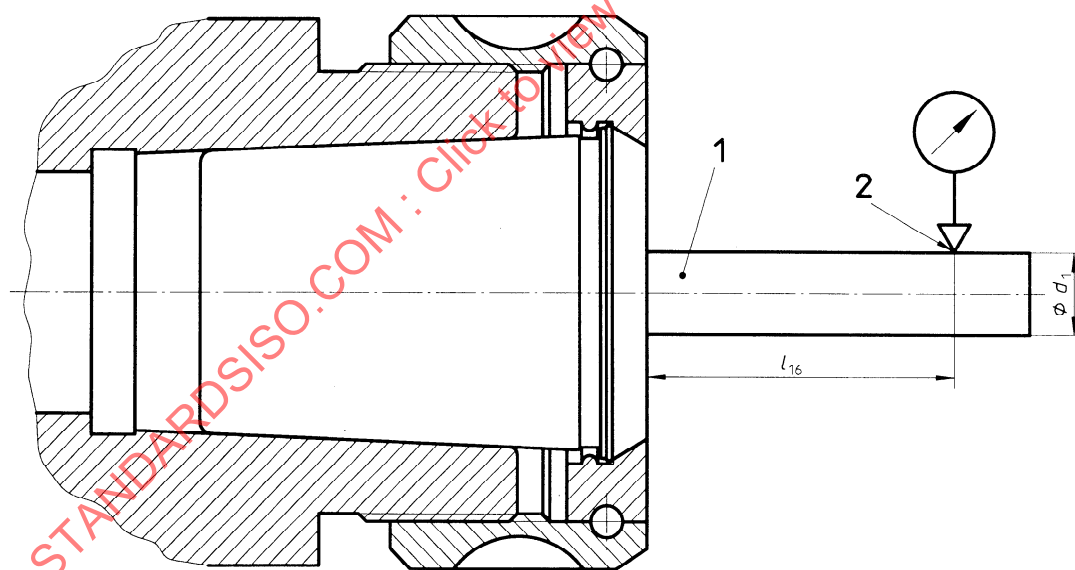
3.4 Collet run-out tolerances

Table 4 specifies collet run-out tolerances. These tolerances are checked as is shown in figure 5 by the introduction of a test mandrel into the collet.

The diameter of the test mandrel is the nominal diameter of the collet.

For the test mandrel the following specifications apply:

- a) diameter tolerance: h6;
- b) cylindricity: 0,002 mm;
- c) parallelism: 0,002 mm;
- d) roundness: 0,002 mm;
- e) surface without longitudinal marks;
- f) maximum surface roughness $R_z = 4 \mu\text{m}$;
- g) surface hardness: (58^{+3}_0) HRC.



Key

- 1) Test mandrel
- 2) Test point

Figure 5 — Testing of run-out

Table 4 — Collet run-out tolerance values

Dimensions in millimetres

d_1 H7 Nominal diameter		l_{16}	Run-out tolerance ¹⁾	
above	up to (included)		Class 1	Class 2
1 (included)	1,6	6	0,01	0,015
1,6	3	10		
3	6	16		
6	10	25		
10	18	40	0,015	0,02
18	24	50		
24	30	60		
30	50	80	0,02	0,03
NOTE - In the case of applications where run-out tolerances class 1 are required the accuracy of the whole system (machine tool spindle, holder, collet and tool) shall be observed.				
1) Normal style collets are designed with run-out tolerance class 2. If class 1 is required, it shall be given separately, see 5.1.				

4 Material

4.1 Collet

Steel at manufacturer's discretion with a tensile strength of at least 700 N/mm².

4.2 Nut

Steel at manufacturer's discretion.

5 Manufacturing requirements

5.1 Collet

Collet form A : bore and taper hardened, hardness (56^{+4}_0) HRC.

Collet form B : bore and taper hardened, hardness (44^{+4}_0) HRC.

Tolerances of taper : AT3 in accordance with table A.1.

Run-out tolerance : class 2, for normal styles.

5.2 Holder

Taper bore hardened, hardness (58^{+4}_0) HRC.

Tolerances of taper : AT4 in accordance with table A.2.

5.3 Nut

Design at manufacturer's discretion.

6 Designation

6.1 Collet

A collet in accordance with this International Standard shall be designated by

- a) "Collet";
- b) reference to this International Standard;
- c) form (A or B);
- d) nominal size;
- e) nominal diameter, d_1 in millimetres;
- f) run-out tolerance in the case of class 1.

EXAMPLES

A collet of form A nominal size 32 and nominal diameter $d_1 = 10$ mm is designated as follows:

Collet ISO 10897 - A 32 x 10

A collet of form A, nominal size 32, nominal diameter $d_1 = 10$ mm and of run-out tolerance class 1 is designated as follows:

Collet ISO 10897 - A 32 x 10 Cl1

6.2 Holder

A holder in accordance with this international Standard shall be designated by

- a) "Holder";
- b) reference to this International Standard;
- c) form C;
- d) nominal size.

EXAMPLE

A holder of form C and nominal size 32 is designated as follows:

Holder ISO 10897 - C 32

6.3 Nut

A nut in accordance with this International Standard shall be designated by:

- a) "Nut";
- b) reference to this International Standard;
- c) form D;
- d) nominal size.

EXAMPLE

A nut of form D and nominal size 32 is designated as follows:

Nut ISO 10897 - D 32

6.4 Test mandrel

A test mandrel in accordance with this International Standard shall be designated by

- a) "Test mandrel";
- b) reference to this International Standard;
- c) diameter, d_1 in millimetres.

EXAMPLE

A test mandrel of diameter $d_1 = 10$ mm is designated as follows:

Test mandrel ISO 10897 - 10

7 Marking

Collets in accordance with this International Standard shall be marked with:

- relevant nominal diameter;
- name or trademark of the manufacturer.

8 Operational set-up

See figure 6 and table 5.

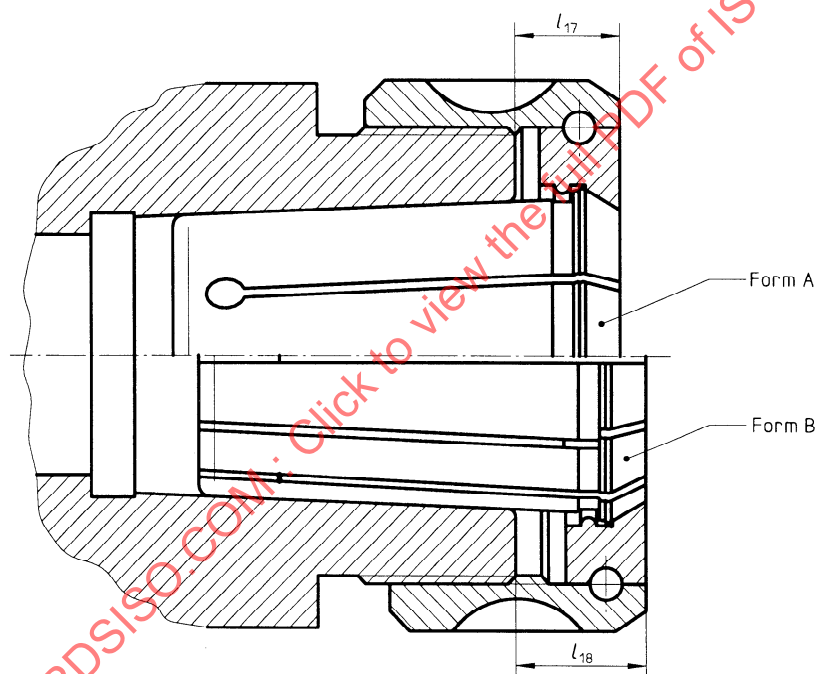


Figure 6 — Example of operational set-up

Table 5 — Dimensions

Dimensions in millimetres

Nominal size	l_{17} max.	l_{18} max.
6	7,5	-
8	8,5	-
10	9	-
12	9,5	-
16	11	15
20	12	16
25	12	16
32	13	17
40	14	18
50	16	20

Annex A

(normative)

Cone angle tolerances AT3 and AT4

This annex specifies the values for AT3 tolerance (see table A.1) and AT4 tolerance (see table A.2) from ISO 1947:1973, *System of cone tolerances for conical workpieces form C = 1:3 to 1:500 and lengths from 6 to 630 mm*, which has been withdrawn.

Table A.1 — Cone angle tolerance AT 3

Range of cone lengths L mm		AT_{α}		$AT_D^{1)}$
over	up to	μrad	seconds	μm
6	10	125	26	0,8 .. 1,3
10	16	100	21	1 1,6
16	25	80	16	1,3 .. 2
25	40	63	13	1,6 .. 2,5
40	63	50	10	2 3,2
1) AT_D is calculated from the constant AT_{α} value within a range of cone lengths.				

Tableau A.2 — Cone angle tolerance AT4

Range of cone lengths L mm		AT_{α}		$AT_D^{1)}$
over	up to	μrad	seconds	μm
6	10	200	41	1,3 ... 2
10	16	160	33	1,6 ... 2,5
16	25	125	26	2 3,2
25	40	100	21	2,5 ... 4
40	63	80	16	3,2 ... 5
1) AT_D is calculated from the constant AT_{α} value within a range of cone lengths.				