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ISO 10897

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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

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 29, *Small tools,* Subcommittee SC 2, *Holding tools, adaptive items and interfaces*.

This second edition cancels and replaces the first edition (ISO 10897:1996), of which it constitutes a minor revision with the addition of Annex B, showing the relationship between the symbols in this International Standard and the symbols in the ISO 13399 series.

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.

Annex A specifies the values for AT3 tolerance and AT4 tolerance.

2 Normative references

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

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

3 Dimensions

3.1 General

All dimensions and tolerances are given in millimetres. Tolerances not specified shall be of tolerance class “m” in accordance with ISO 2768-1.

3.2 Collet

The dimensions of the collet shall be in accordance with the dimensions shown in Figure 1 and Figure 2 and given in Table 1.

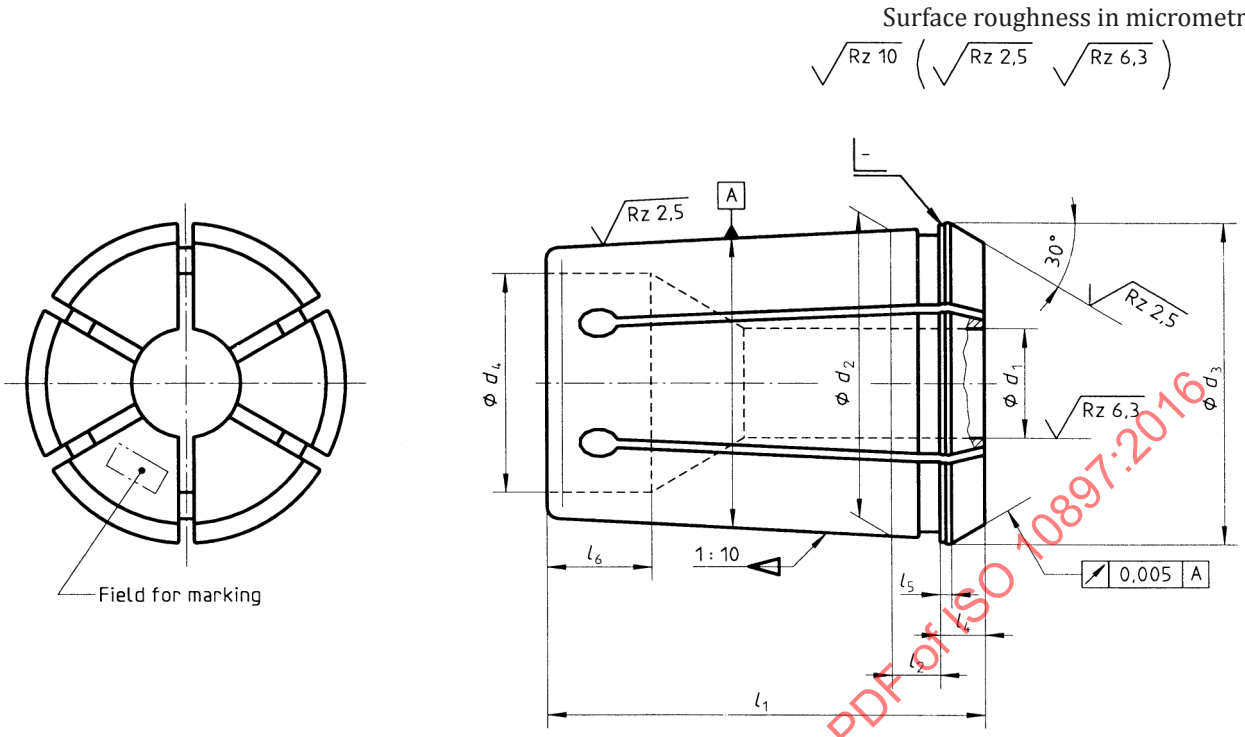


Figure 1 — Collet form A, unilaterally slotted, with short clamping bore for cylindrical shanks

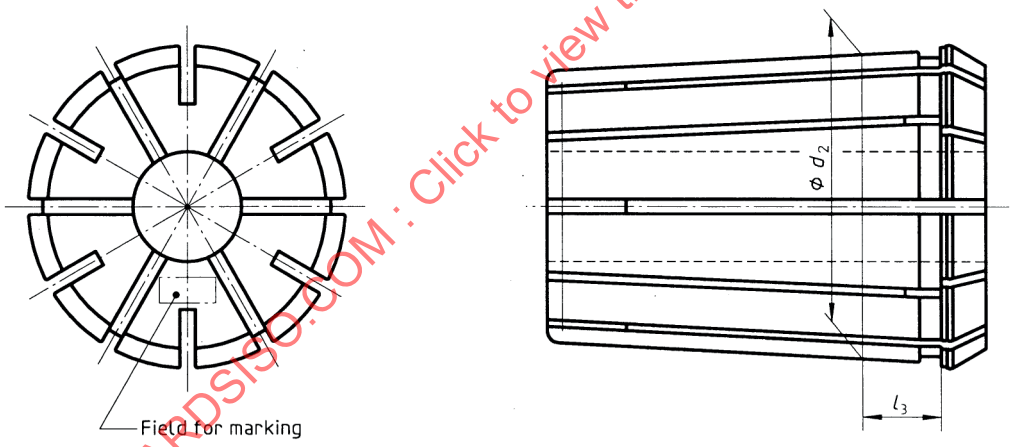


Figure 2 — Collet form B, bilaterally slotted, with continuous clamping bore for cylindrical shanks

Table 1 — Collet dimensions

Nominal size	d_1 H7 Form A[a] Nominal diameter from (incl.)	d_1 H7 Form A[a] Nominal diameter up to (incl.)	d_1 H7 Form B[b] Nominal diameter from (incl.)	d_1 H7 Form B[b] Nominal diameter up to (incl.)	d_2	d_3 0 −0,5	d_4 +0,1 0	l_1	l_2	l_3	l_4	l_5	l_6 ±0,2
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

[a] For clamping range H10.

[b] For clamping range $^{0}_{-0,5}$.

3.3 Holder

The dimensions of the holder shall be in accordance with the dimensions shown in Figure 3 and given in Table 2.

Surface roughness in micrometres

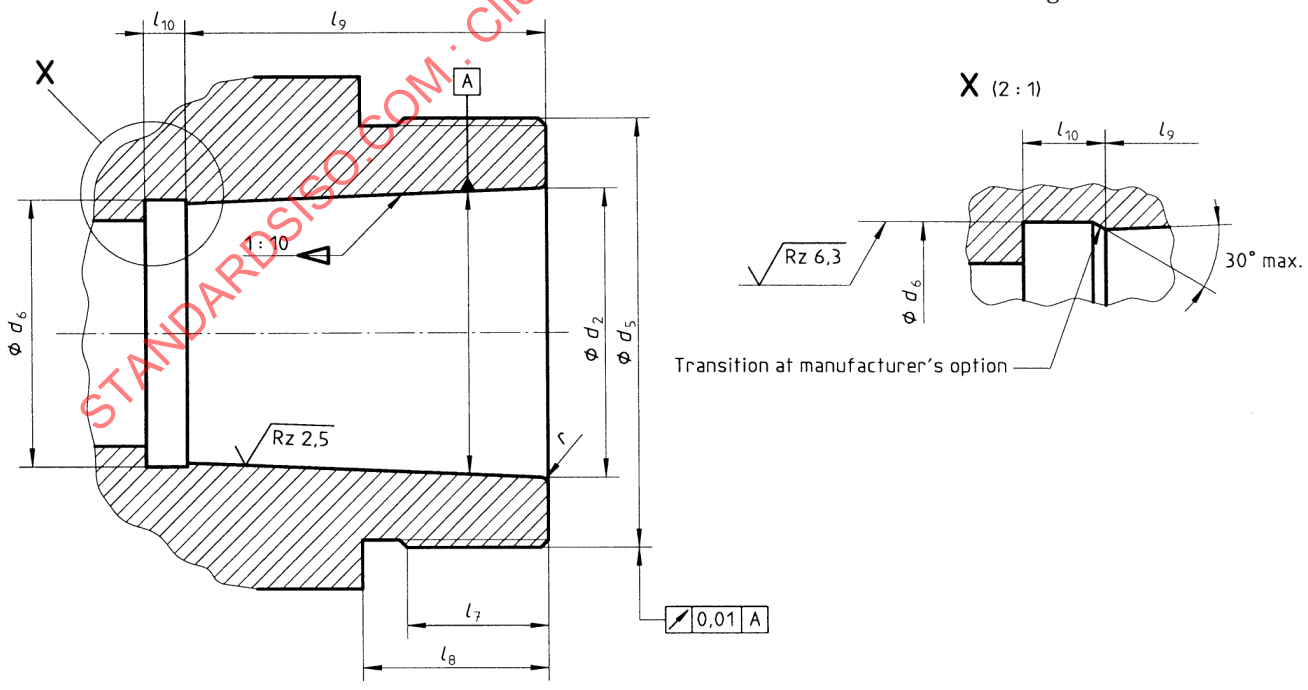


Figure 3 — Holder form C

Table 2 — Holder dimensions

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	$^{+0,5}_{0}$	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

3.4 Nut

The dimensions of the nut shall be in accordance with the dimensions shown in Figure 4 and given in Table 3.

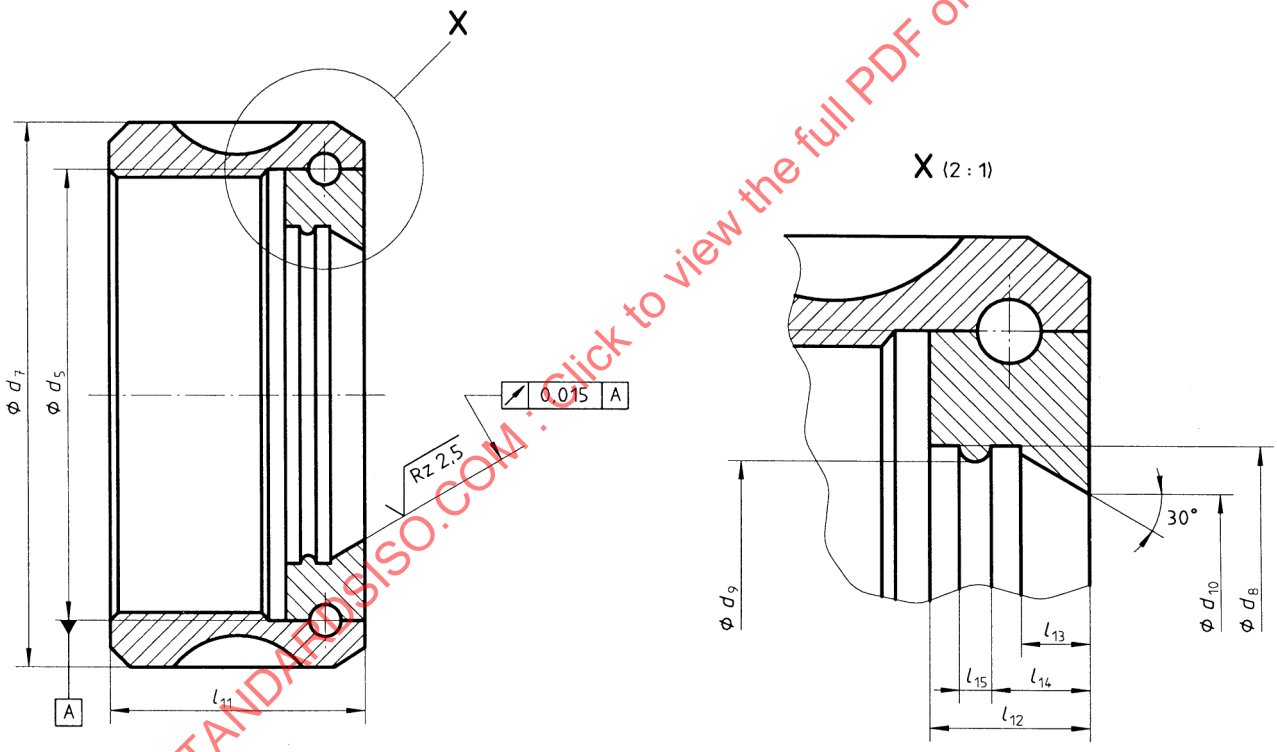


Figure 4 — Nut form D

Table 3 — Nut dimensions

Nominal size		6	8	10	12	16	20	25	32	40	50
d_5	H6	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	$^{+0,1}_{0}$	11,6	15,1	18	20,3	25,8	30,2	35,6	44,3	53,1	64,7
d_9	$^{+0,1}_{0}$	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}	$^{+0,1}_{0}$	4	4,25	4,55	5,25	5,65	6,35	6,3	6,3	7	8,25
l_{15}	$^{+0,05}_{0}$	1,2	1,5	1,5	1,5	1,5	1,5	2	2	2	2.5

3.5 Collet run-out tolerances

Table 4 specifies collet run-out tolerances. These tolerances shall be checked as 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;

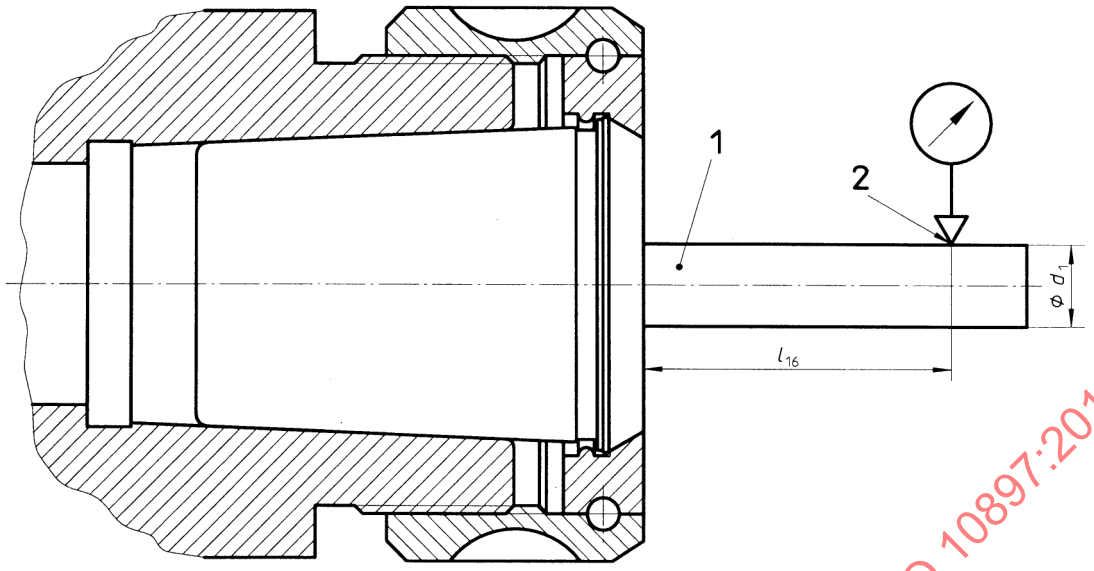
c) parallelism: 0,002 mm;

d) roundness: 0,002 mm;

e) surface without longitudinal marks;

f) maximum surface roughness Rz = 4 µm;

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

d_1 H7 Nominal diameter		l_{16}	Run-out tolerance[a]	
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) should be observed.

[a] 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 shall be at the manufacturer's discretion with a tensile strength of at least 700 N/mm^2.

4.2 Nut

Steel shall be at the 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

The design shall be at the manufacturer's discretion.

6 Designation

6.1 Collet

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

a) the term "Collet";

b) reference to this International Standard (i.e. ISO 10897);

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).

EXAMPLE 1 A collet of form A, nominal size 32 and nominal diameter d_1 = 10 mm is designated as follows

Collet ISO 10897 - A 32 × 10

EXAMPLE 2 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 × 10 Cl1

6.2 Holder

A holder in accordance with this International Standard shall be designated by the following:

a) the term "Holder";

b) reference to this International Standard (i.e. ISO 10897);

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 the following:

a) the term “Nut”;

b) reference to this International Standard (i.e. ISO 10897);

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 the following:

a) the term “Test mandrel”;

b) reference to this International Standard (i.e. ISO 10897);

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

A collet in accordance with this International Standard shall be marked with

— the relevant nominal diameter, and

— the name or trademark of the manufacturer.

8 Operational set up

The dimensions for operational set up shall be in accordance with the dimensions shown in Figure 6 and given in Table 5.

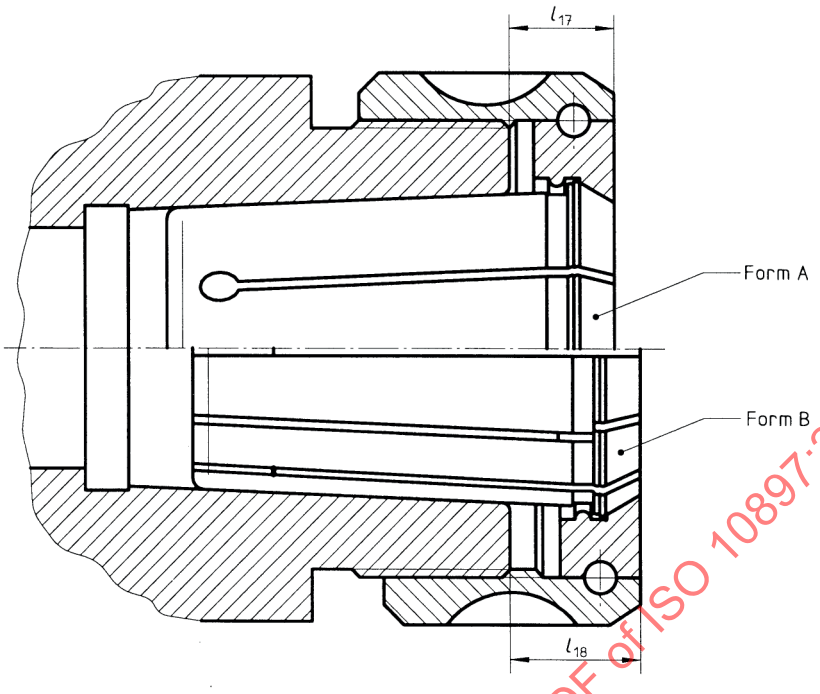


Figure 6 — Example of operational set up

Table 5 — Dimensions for operational set up

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, which has been withdrawn.

Table A.1 — Cone angle tolerance AT3

Range of cone lengths L mm		AT_α		AT_D[a]
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

[a] AT_D is calculated from the constant AT_α value within a range of cone lengths.

Table A.2 — Cone angle tolerance AT4

Range of cone lengths L mm		AT_α		AT_D[a]
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

[a] AT_D is calculated from the constant AT_α value within a range of cone lengths.