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Hollow taper interface with flange contact surface —

Part 6: Receivers of types AS, CS and ES for hollow taper shanks of types AS, CS and ES

Interfaces à cône creux-face —

Partie 6: Nez de broches de types AS, CS et ES pour queues de types AS, CS et ES

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Foreword

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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 document 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).

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This document was prepared by Technical Committee ISO/TC 29, *Small tools,* Subcommittee SC 9*, Tools with defined cutting edges, holding tools, cutting items, adaptive items and interfaces*.

A list of all parts of the ISO 12164 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Hollow taper interface with flange contact surface —

Part 6: Receivers of types AS, CS and ES for hollow taper shanks of types AS, CS and ES

1 Scope

This document specifies dimensions for receivers with taper and flange contact surfaces for hollow taper shanks (HSK) in accordance with ISO 12164-5 to be applied to machine tools (e.g. machines for turning, drilling, milling and grinding).

This document specifies three types of receivers:

— type AS for automatic tool change;

— type CS for manual tool change only, via radial holes in both the receiver and the tool shank;

— type ES for automatic tool change.

NOTE 1 The receivers of types AS, CS and ES fit the HSK shanks of types AS, CS and ES (according to ISO 12164-5).

NOTE 2 HSK shanks of types AS and ES can also be changed manually.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Receivers for hollow taper shanks, types and dimensions

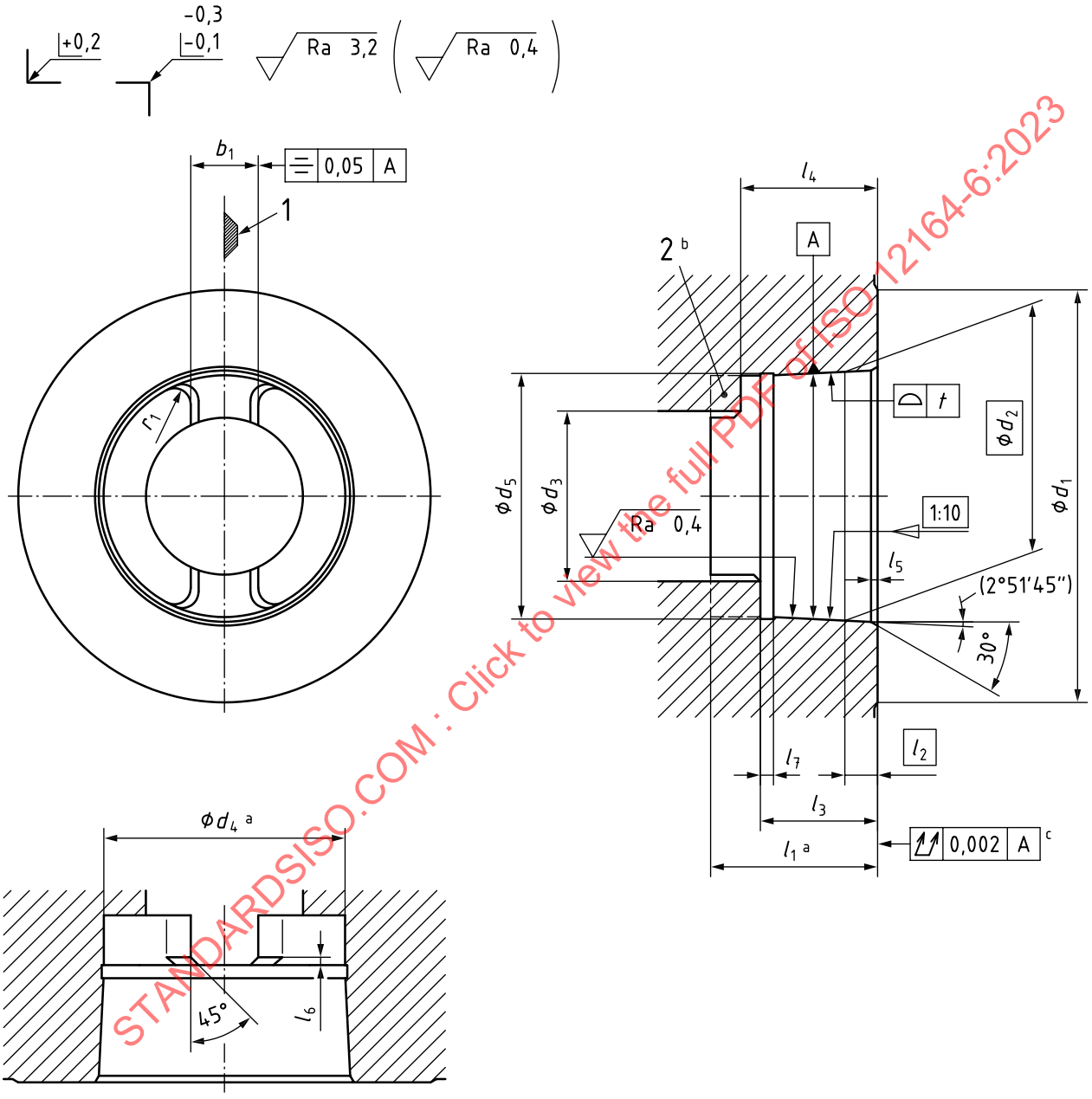
4.1 General

Dimensions of receivers for hollow taper shanks with flange contact surface of types AS, CS and ES are specified in Figures 1 to 3 and in Table 1. Details not specified shall be chosen expediently. Tolerances of form, orientation, location and run-out correspond to ISO 1101. Dimensions and tolerances of cones

are in according to ISO 3040. Tolerances not specified shall be of tolerance class “m” in accordance with ISO 2768-1. Recommendations for use and application are provided in Annex A.

4.2 Receiver of type AS for hollow taper shanks of type AS

The dimensions of a receiver for hollow taper shanks of type AS shall be in accordance with Figure 1 and Table 1.



Key

1 position of the cutting edge for right hand tools with single cutting edge

2 tenon block

a With inserted tenon blocks, the taper may extend over the total depth l_1.

b Tenon blocks, either integrated or inserted.

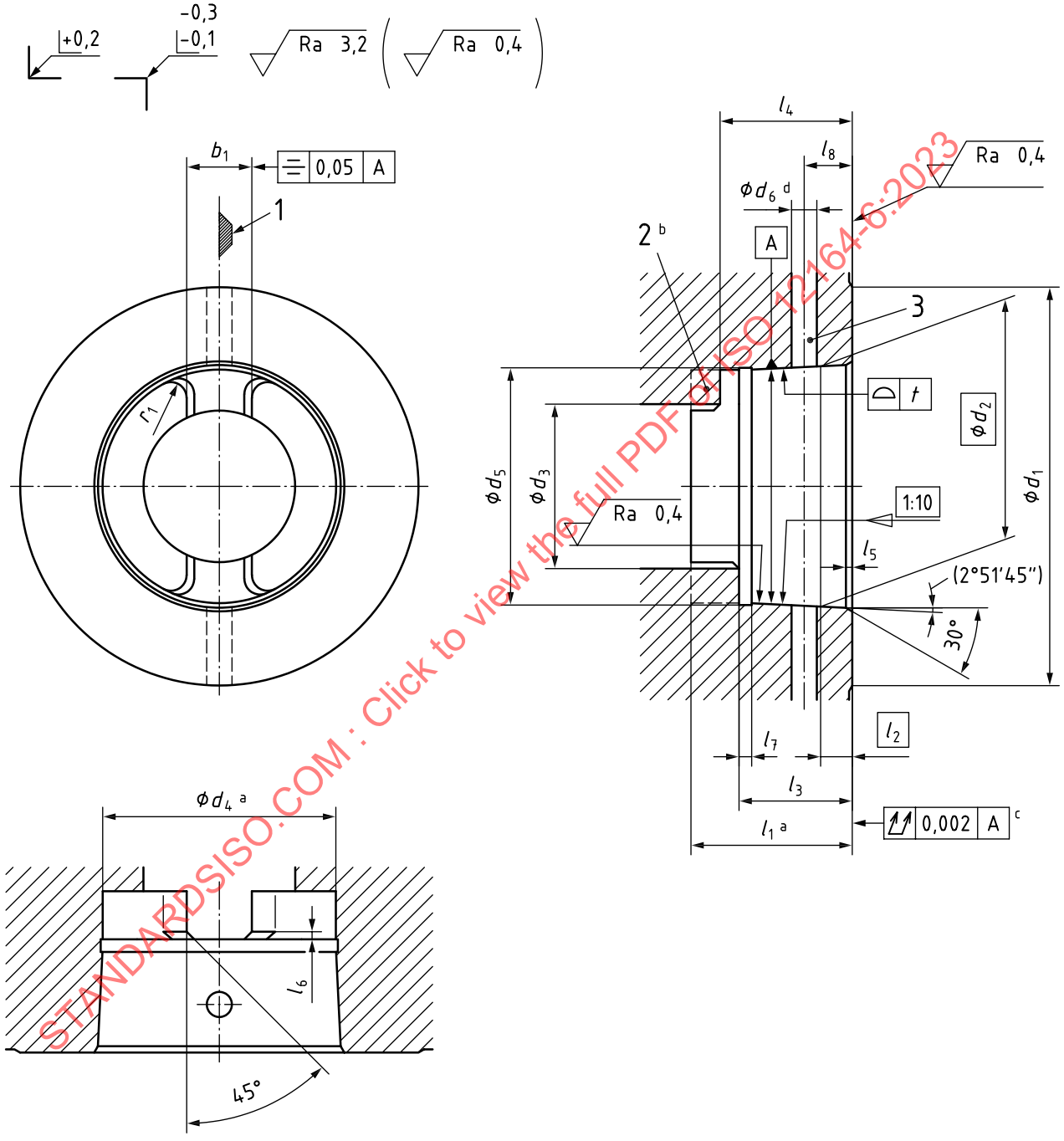
c Not convex.

Figure 1 — Receiver of type AS for hollow taper shanks of type AS

4.3 Receiver of type CS for hollow taper shanks of type CS

The dimensions of a receiver for hollow taper shanks of type CS shall be in accordance with Figure 2 and Table 1.

NOTE HSK shanks types CS can also be inserted manually into spindles with automatic tool change.



Key

1 position of the cutting edge for right hand tools with single cutting edge

2 tenon block

3 bore hole for manual clamping

a With inserted tenon blocks, the taper may extend over the total depth l_1.

b Tenon blocks, either integrated or inserted.

c Not convex.

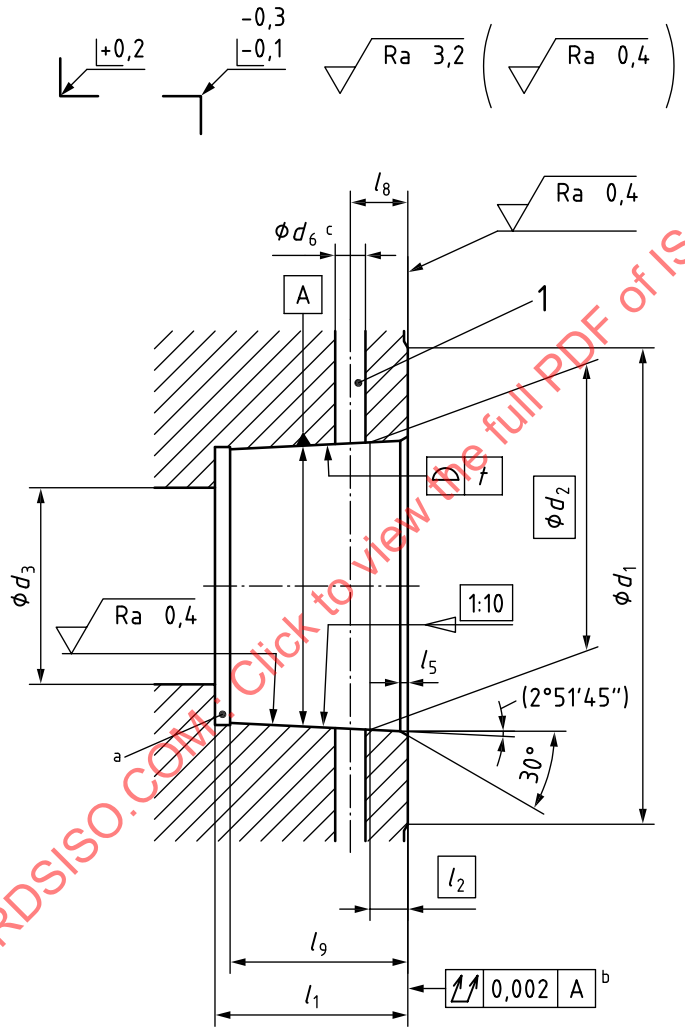
d Inside edge min. 0,5 mm × 45° chamfer.

Figure 2 — Receiver of type CS for hollow taper shanks of type CS

NOTE Mechanical lock of the manual clamping cartridge is up to the manufacturer's choice.

4.4 Receiver of type ES for hollow taper shanks of type ES

The dimensions of a receiver for hollow taper shanks of type ES shall be in accordance with Figure 3 and Table 1.



Key

1 hole for manual clamping (optional)

NOTE Manual tool change via radial hole is difficult in case of slipping due to torque overload as tenon blocks are missing.

a Relief groove to be chosen by manufacturer.

b Not convex.

c Inside edge min. 0,5 mm × 45° chamfer.

Figure 3 — Receiver of type ES for hollow shanks of type ES

4.5 Dimensions

The dimensions of receivers for hollow taper shanks of types AS, CS and ES defined in this document shall be in accordance with Table 1.

Table 1 — Receiver for hollow shank, Dimensions

Dimensions in millimetres

Nominal size		40	50	63	80	100	125	160	HSK-type
b_1	±0,05	6,8	7,8	10,3	12,3	15,8	19,78	24,78	AS, CS
d_1	min.	40	50	63	80	100	125	160	AS, CS, ES
d_2		23,998	29,998	37,998	47,998	59,997	74,997	94,996	AS, CS, ES
d_3[a]		17	21	26	34	42	53	67	AS, CS, ES
d_4[b]	+0,1 0	23,28	29,06	36,85	46,53	58,1	72,6	92,05	AS, CS
d_5	+0,2 0	23,8	29,6	37,5	47,2	58,8	73,4	93	AS, CS
d_6		4	4,6	6	7,5	8,5	12	14,5	CS
l_1[b]	+0,2 0	16,5	20,5	25,5	33	41	51	64	AS, CS, ES
l_2		3,2	4	5	6,3	8	10	12,5	AS, CS, ES
l_3	+0,2 0	11,4	14,4	17,9	22,4	28,4	35,4	44,4	AS, CS
l_4	+0,2 0	13,4	16,9	20,9	26,4	32,4	40,4	51,4	AS, CS
l_5		0,8	0,8	1	1	1,5	1,5	2	AS, CS, ES
l_6	+0,1 0	1	1	1,5	1,5	2	2	2,5	AS, CS
l_7	±0,1	2	2	2	2,5	3	3	4	AS, CS
l_8	±0,1	5	6	7,5	9	12	15	18,5	CS
l_9		15,1	18,8	23,6	30,8	-	-	-	ES
	tol	+0,9 0	+1,2 0	+1,4 0	+1,7 0	-	-	-	
r_1[c]	0 -0,05	1,5	2	2,5	3	4	5	6	AS, CS
t		0,001 5	0,001 5	0,002	0,002	0,002 5	0,003	0,003 5	AS, CS, ES

[a] Depending on the clamping system.

[b] See footnote [a] in Figure 1.

[c] r_1 tangent to either b_1 or b_2 and d_4.

5 Design

5.1 HSK Sizes and types

Table 2 shows the range of preferred sizes of receivers for hollow taper shanks described in this document.

Table 2 — Sizes and types

Nominal Size	40	50	63	80	100	125	160
HSK-AS	X	X	X	X	X	X	X
HSK-CS	X	X	X	X	X	X	o
HSK-ES	X	X	X	X	-	-	-
X preferred o applicable - not defined							

5.2 Material and heat treatment

HSK receivers shall be made from either tempering or case hardening steel with a minimum core strength of 800 N/mm^2 and a minimum surface hardness of 50 HRC after hardening, tempering and finish grinding.

6 Designation

A receiver for hollow taper shanks (HSK) in accordance with this document shall be designated by:

a) Receiver ISO 12164-6 — HSK;

b) AS, CS or ES;

c) nominal size, in millimetres (e.g. 63).

EXAMPLE 1 A receiver of type AS for hollow taper shanks (HSK), of type AS, nominal size 80, is designated as follows:

Receiver ISO 12164-6 — HSK-AS 80

EXAMPLE 2 A receiver of type CS for hollow taper shanks (HSK), of type CS, nominal size 63, is designated as follows:

Receiver ISO 12164-6 — HSK-CS 63

EXAMPLE 3 A receiver of type ES for hollow taper shanks (HSK), of type ES, nominal size 40, is designated as follows:

Receiver ISO 12164-6 — HSK-ES 40

Annex A
(informative)

Recommendations for use and application

A.1 Clamping system

The clamping system should be specified by the manufacturer of the receiver or machine tool spindle. The system should provide sufficient clamping force to ensure contact of the shank flange with the receiver face, as well as seating the taper by elastic deformation. The torque transmitting capacity of the interface is substantially determined by the size of the clamping force.

A.2 Clamping forces

Hollow taper shanks (tools) and receivers, varying within the specified limits of tolerance, also cause the part of the clamping force acting on the flange face to vary. However, the clamping forces given in Table A.1 ensure the part acting on the flange face to be not less than 75 % of the total amount. The flange contact surface is decisive for the torque transmitting capacity and the stiffness of the hollow taper shank interface.

The clamping forces listed in Table A.1 only apply to hollow taper shanks types AS, CS and ES.

Table A.1 — Clamping forces

Nominal size	mm	25	32	40	50	63	80	100	125	160
Clamping force	kN	1,2	2,8	5	6,8	11	18	28	45	70

Lower clamping forces may be sufficient when operational loads are also low (e.g. cutting and feed forces in finish machining). Higher clamping forces however may be required when high operational loads occur (e.g. cutting and feed forces in heavy machining).

A.3 Information about rotary speeds and torques

The manufacturer should provide information regarding permissible rotary speeds and torque transmitting capacities.