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**Hollow taper interface with flange  
contact surface —**

**Part 5:  
Shanks of types AS, CS and ES**

*Interfaces à cône creux-face —*

*Partie 5: Queues de type AS, CS et ES*

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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 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](http://www.iso.org/directives)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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](http://www.iso.org/members.html).

# Hollow taper interface with flange contact surface —

## Part 5: Shanks of types AS, CS and ES

### 1 Scope

This document specifies the dimensions of hollow taper shanks with flange contact surface (HSK). These shanks are the male part of the interface to the machine tools (e.g. milling/drilling and grinding machines).

This document specifies three types of shanks:

- types AS and ES have a peripherally grooved flanges for automatic tool change;
- type CS has a flange without peripheral groove and can only be changed manually.

HSK types AS and ES can also be changed manually via radial bore holes in the hollow shank taper.

This document provides information for dynamically balanced HSK-AS and HSK-CS shanks balancing according to ISO 16084.

### 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 Hollow taper shanks, types and dimensions

#### 4.1 General

All dimensions of the different hollow taper shank sizes with flange contact surface (also called “HSK” or “HSK shank” in this document) are specified in [Figure 1](#) for type AS, [Figure 9](#) for type CS and [Figure 10](#) for type ES.

[Table 1](#) provides the parameters of all types and sizes. Details of the types CS and ES, not specified in [Figures 9](#) and [10](#), shall be taken from [Figure 1](#) and [Table 1](#).

The recess inside the low HSK taper groove including the two recesses left and right of it (see [Figures 1 and 9](#)) and the corresponding additional balancing measures of [4.2.2](#) lead to dynamically balanced HSK shank types AS and CS without changing their functionality.

Preferred zones for further (fine) balancing measures are specified in [Clause 5](#).

Clamping forces for HSK shanks of types A, AB, C, CB and EB are provided in [Annex A](#).

Hollow taper shanks of types C and CB with medium - transfer unit are provided in [Annex B](#).

Balancing measures and tool handling equipment are provided in [Annex C](#).

An overview of all different types of shanks is provided in [Annex D](#).

Tolerances of form, orientation, location and run-out correspond to ISO 1101. Dimensions and tolerances of cones are according to ISO 3040. Tolerances not specified shall be of tolerance class “m” in accordance with ISO 2768-1.

## 4.2 Hollow taper shanks of type AS

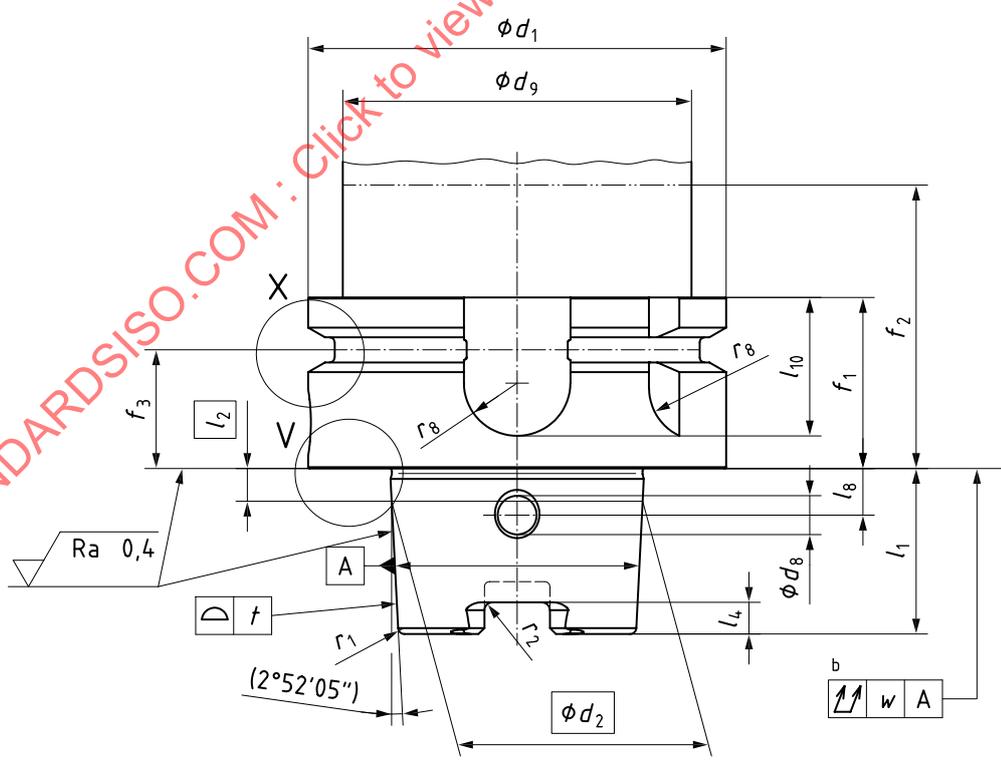
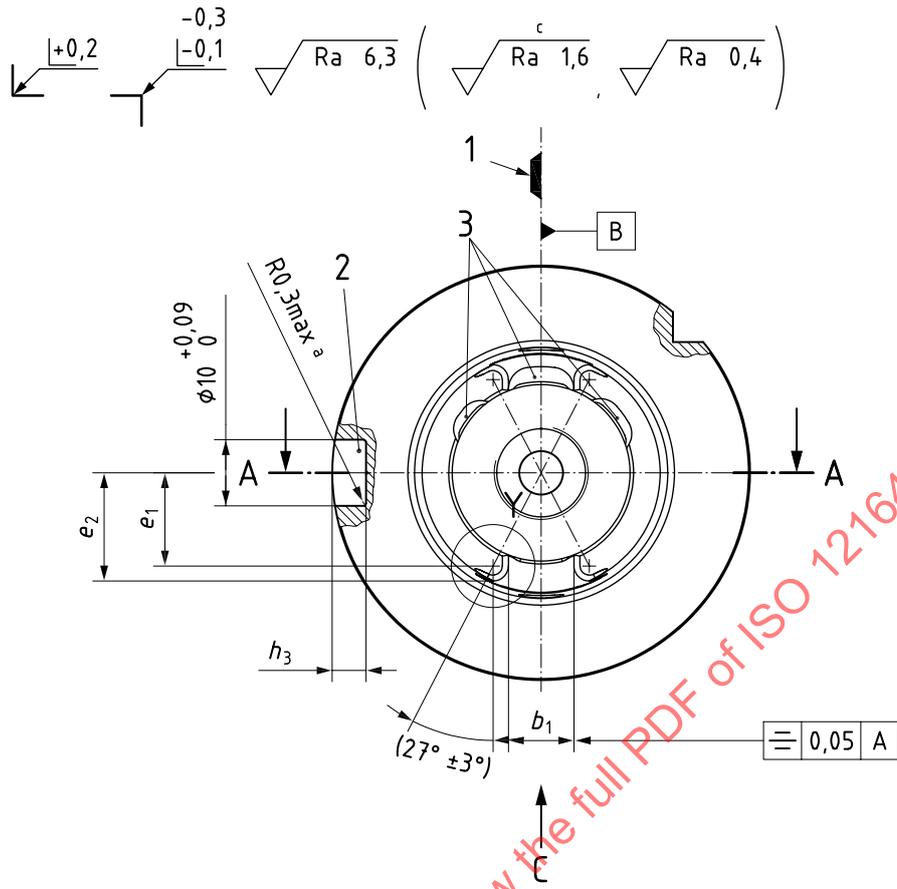
### 4.2.1 General

The HSK of type AS is a dynamically balanced hollow taper shank for automatic tool change.

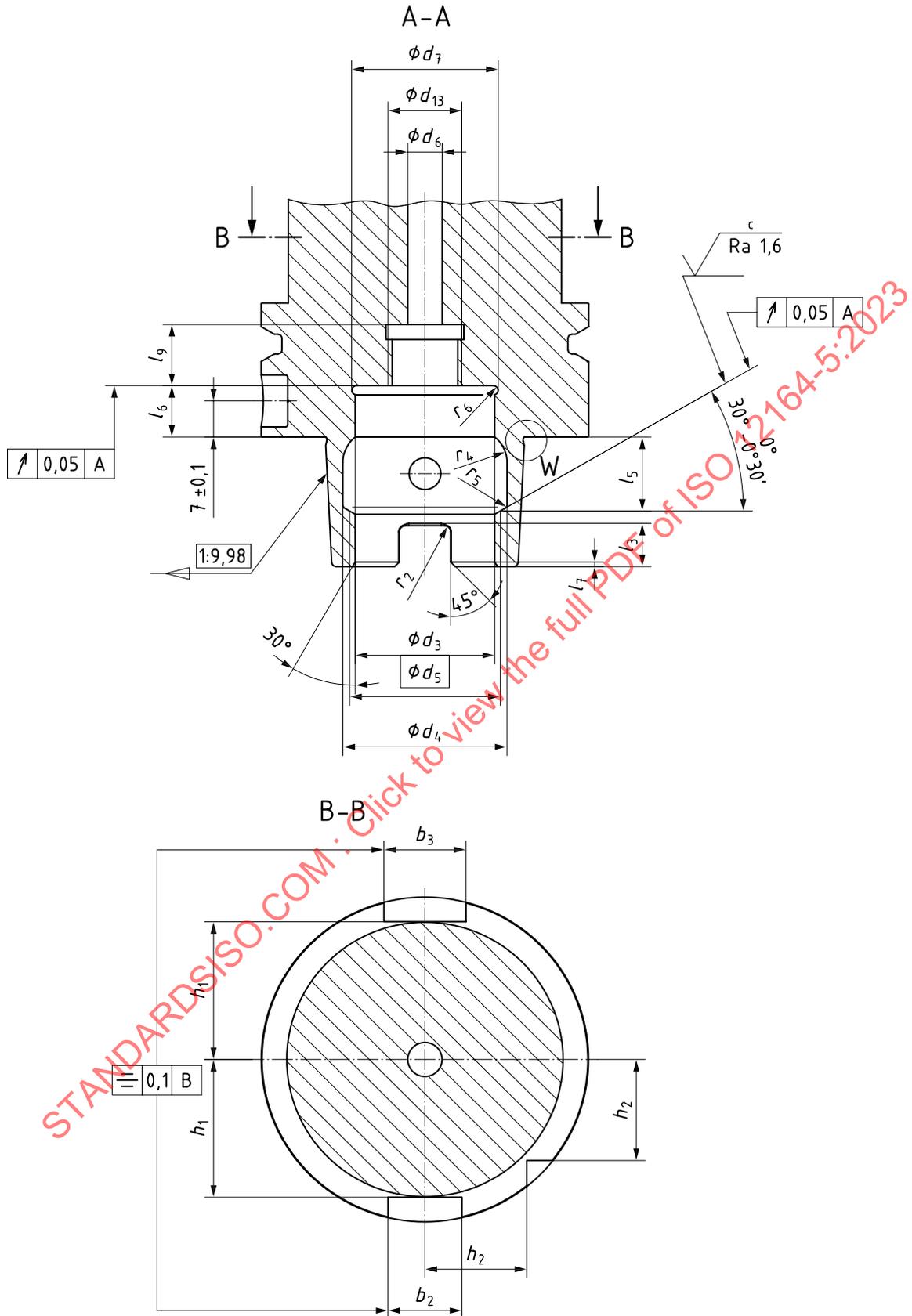
Many products with HSK-shanks, e.g. adapters and/or cutting tools, have symmetrical front parts of short length and/or small diameters. They can only be balanced dynamically, i.e. in two balancing planes, by applying the measures of the HSK-AS as described in this document. There are either no other areas available for sufficient and sensible mass compensation, or restrictions of tool handling mechanisms of existing machine tools make alternative measures impossible.

[Figure 1](#) and [Table 1](#) show all general parameters and values of the different HSK-AS sizes. The positions of the balancing bore holes at the HSK shank collar (see [4.2.2](#)) take mechanical restrictions of known automatic tool changing systems into account.

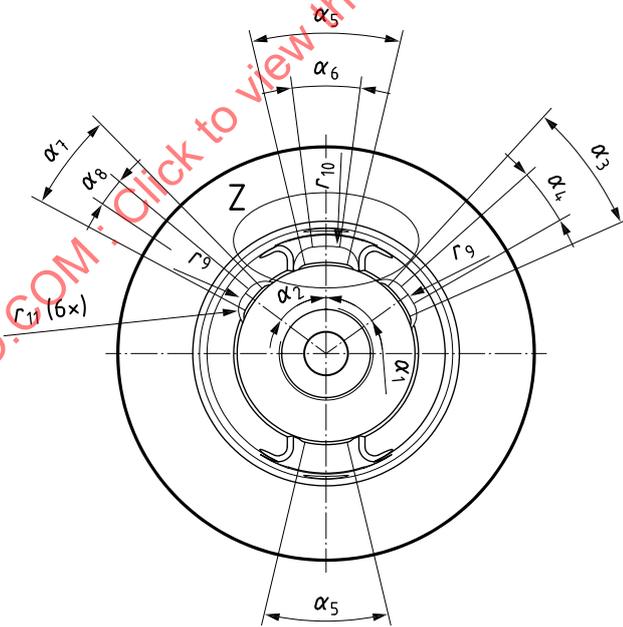
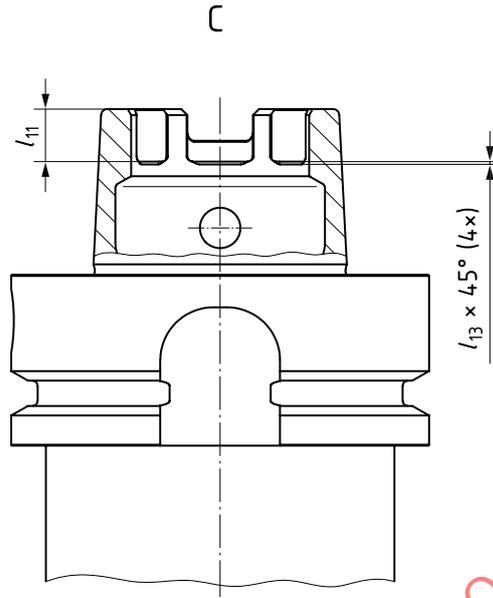
In case of choosing different balancing bore hole geometries at the shank flange, it is mandatory to remove the same unbalances at the same axial positions of their centres of gravity.



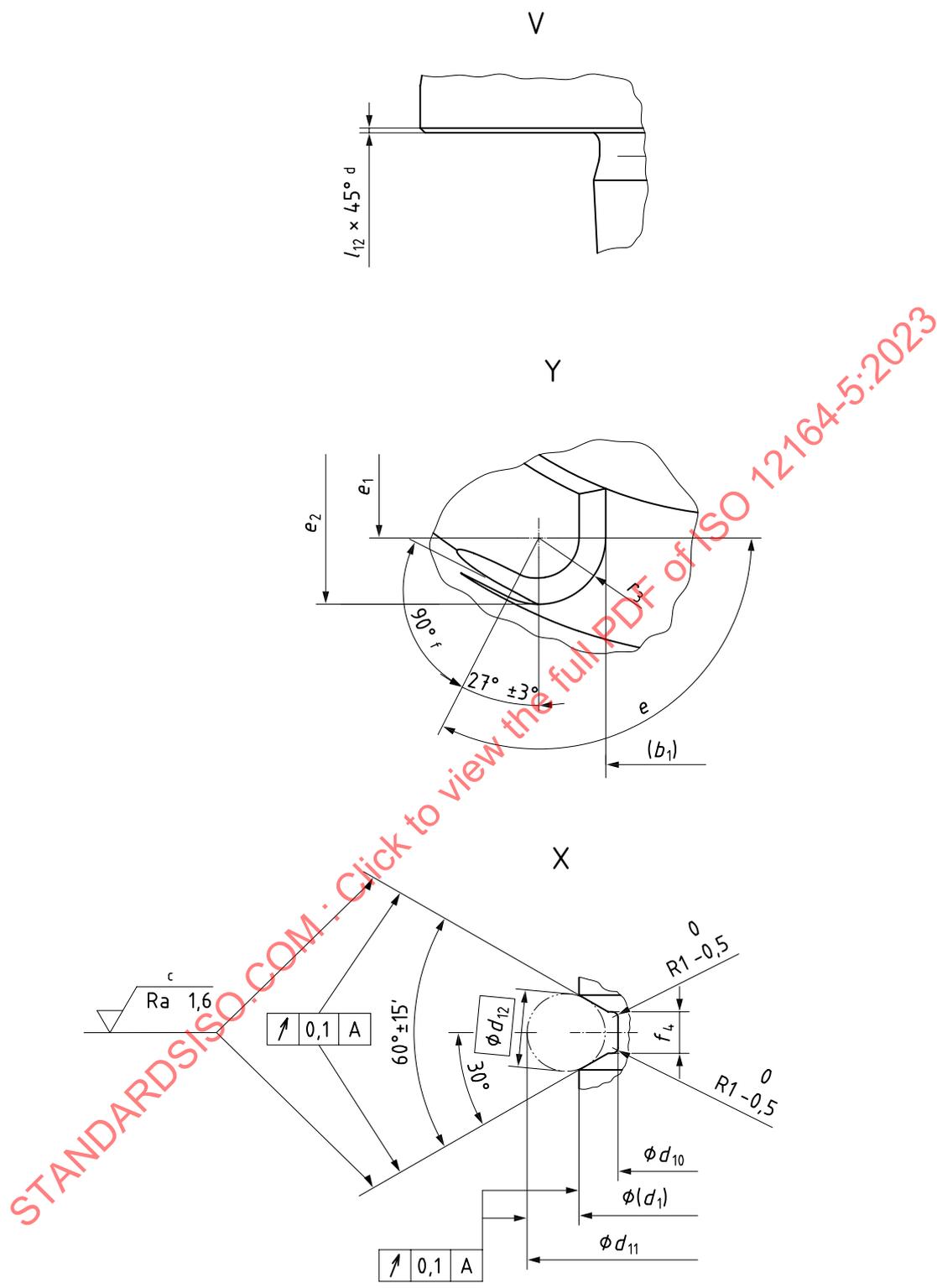
a) HSK-AS main and side view



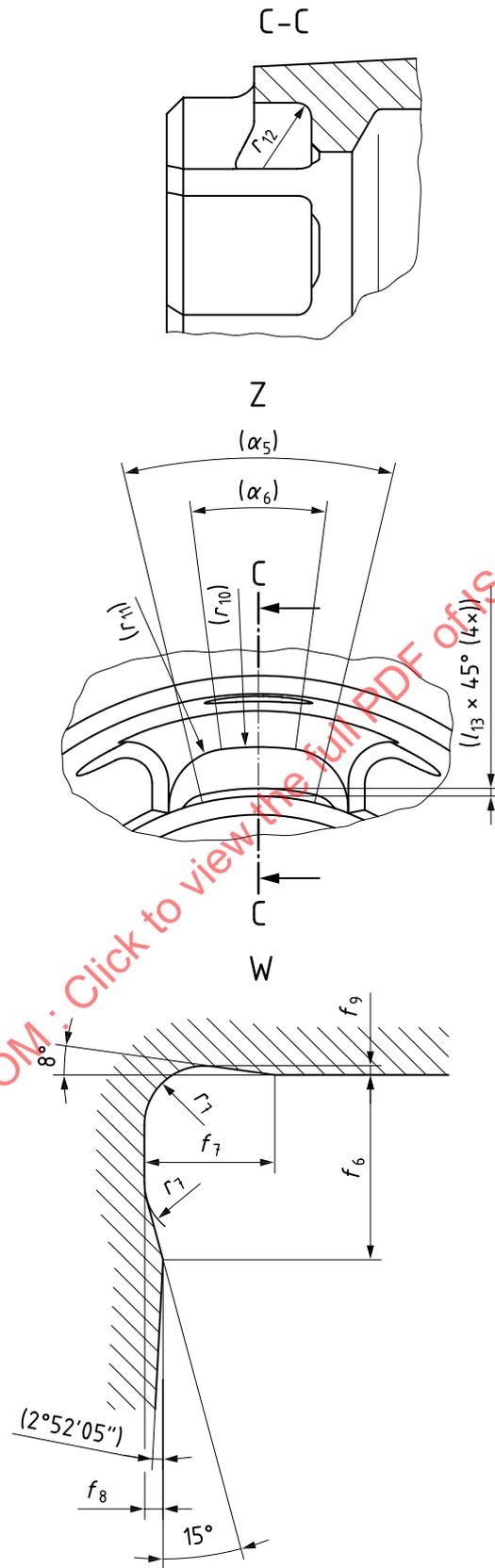
b) HSK-AS section A-A and section B-B



c) HSK-AS recesses



d) HSK-AS details



e) HSK-AS details

**Key**

- 1 position of the cutting edge for right hand tools with single cutting edge
- 2 bore hole for data chip (also see [4.2.2](#) for data chip mass compensations)
- 3 balancing recesses

All radial bore holes shall be deburred.

- a Or max. chamfer  $0,3 \times 45^\circ$ .
- b Not convex.
- c Fine turning.
- d Or radius.
- e Area of  $r_3$ .
- f Leadout of  $r_3$ .

**Figure 1 — HSK-AS**

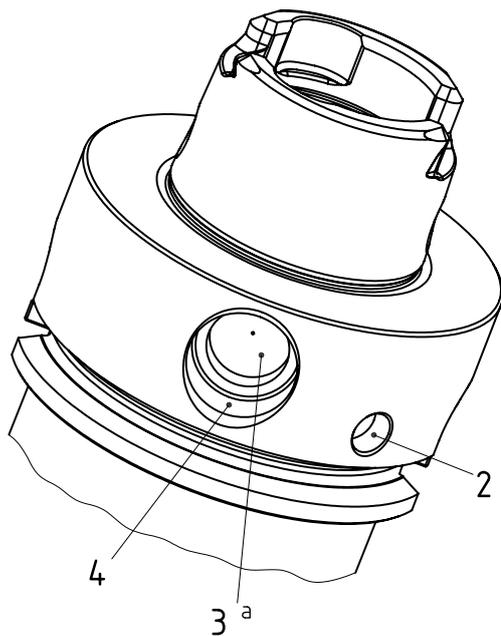
**4.2.2 Balancing measures at the HSK-AS taper shank flange**

The balancing measures of this subclause and [Table 1](#) and the recesses included in [4.2.1](#) and [4.2.2](#) have been set up for HSK-AS taper shanks manufactured to the middle of their tolerance ranges. As the dimensions of these balancing measures depend on this condition, tolerances have not been defined. For example, the unbalance compensation of a mounted data chip (assumed data chip mass 700 mg) depends on diameter  $d_1$  of the HSK taper shank flange.

The shape of the balancing measures can be chosen freely to the manufacturer's discretion, but within the proposed areas. If the theoretical dimensions in [Table 1](#) are to be modified by the manufacturer's discretion, the stability as well as the functionality shall not be negatively affected.

NOTE The borehole for balancing to mount the data chip is marked with the footnote "a".





**b) HSK-AS 40 position of balancing and data chip bore holes**

**Key**

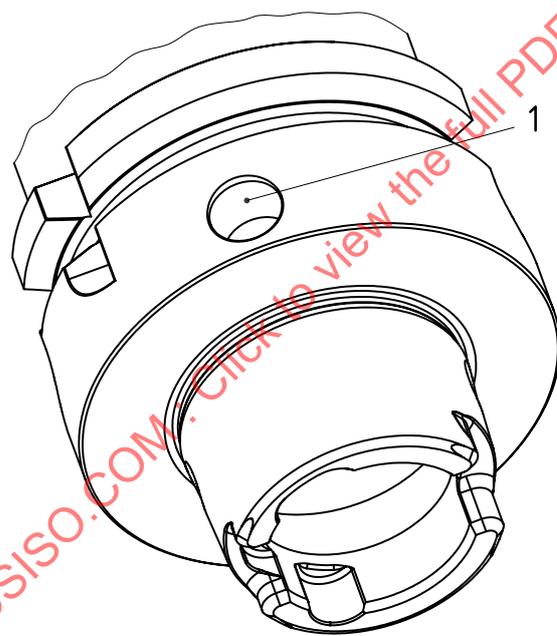
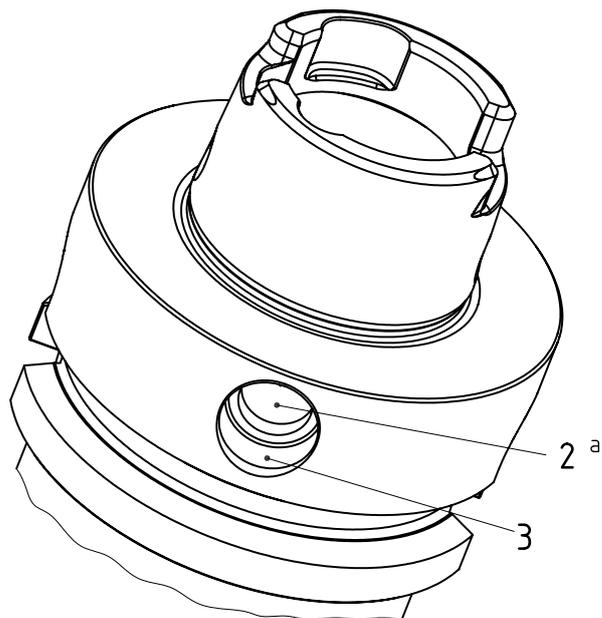
1, 2, 3 balancing bore hole

4 bore hole for data chip

<sup>a</sup> Bore hole is only required if the data chip is mounted (bore holes sideways of data chip bore also possible).

**Figure 2 — HSK-AS 40**





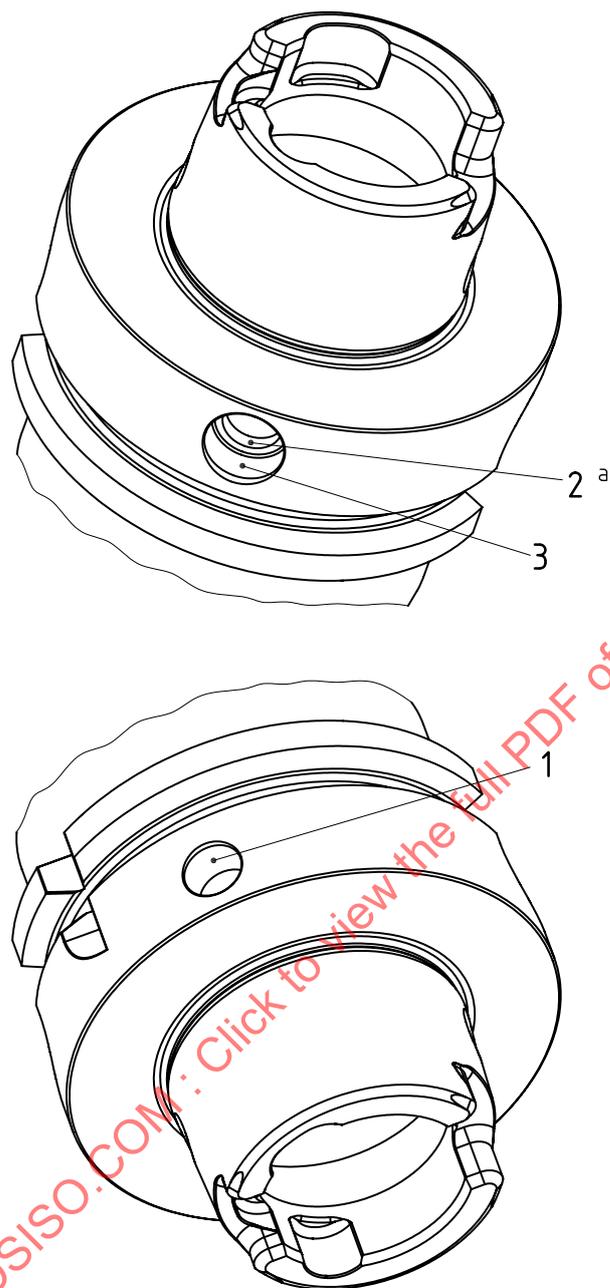
b) HSK-AS 50 position of balancing and data chip bore holes

**Key**

- 1, 2 balancing bore hole
- 3 bore hole for data chip
- a Bore hole only required if data chip mounted.

**Figure 3 — HSK-AS 50**





**b) HSK-AS 63 position of balancing and data chip bore holes**

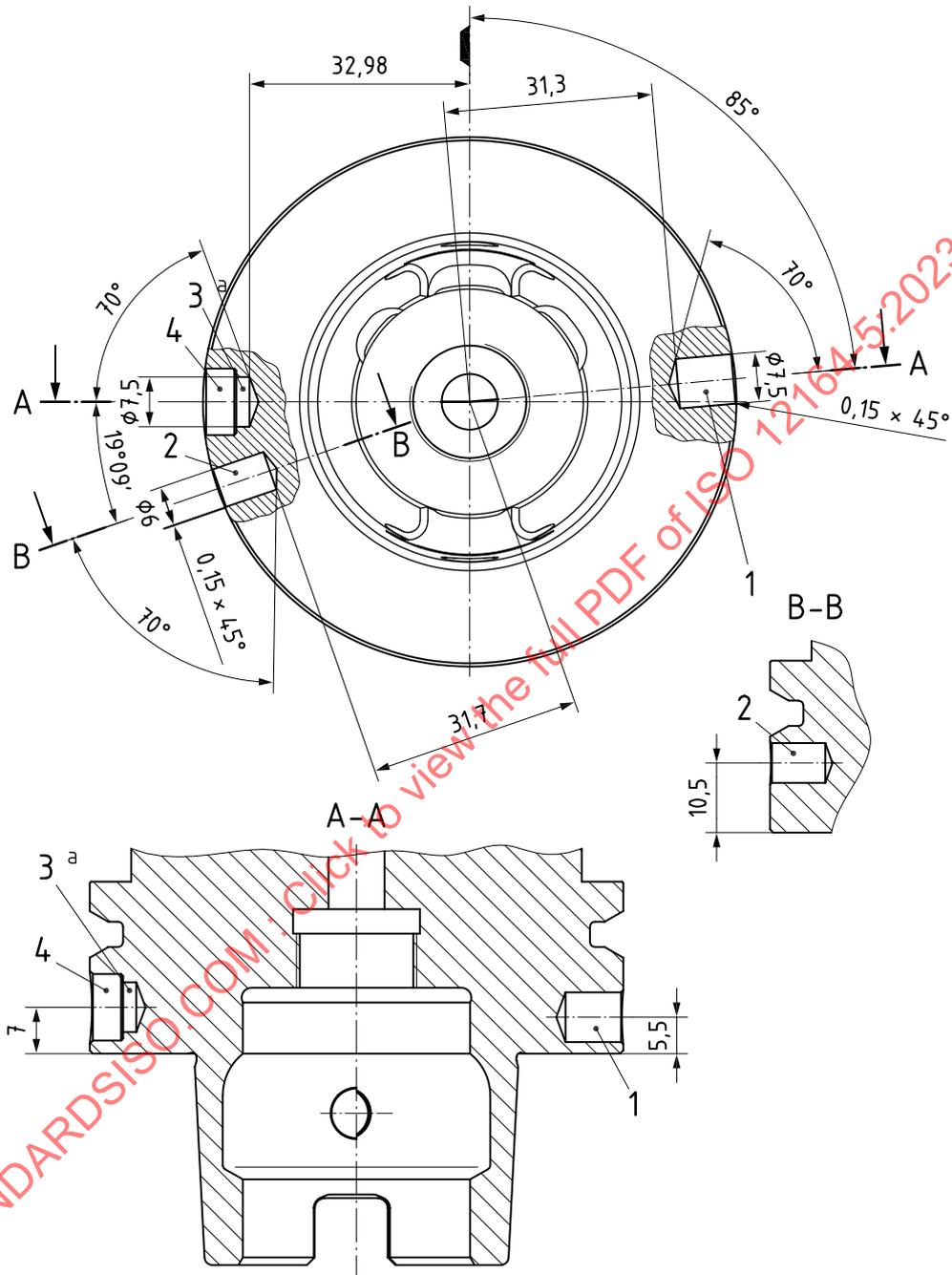
**Key**

- 1, 2 balancing bore hole
- 3 bore hole for data chip
- <sup>a</sup> Bore hole only required if data chip mounted (bore holes sideways of data chip bore also possible).

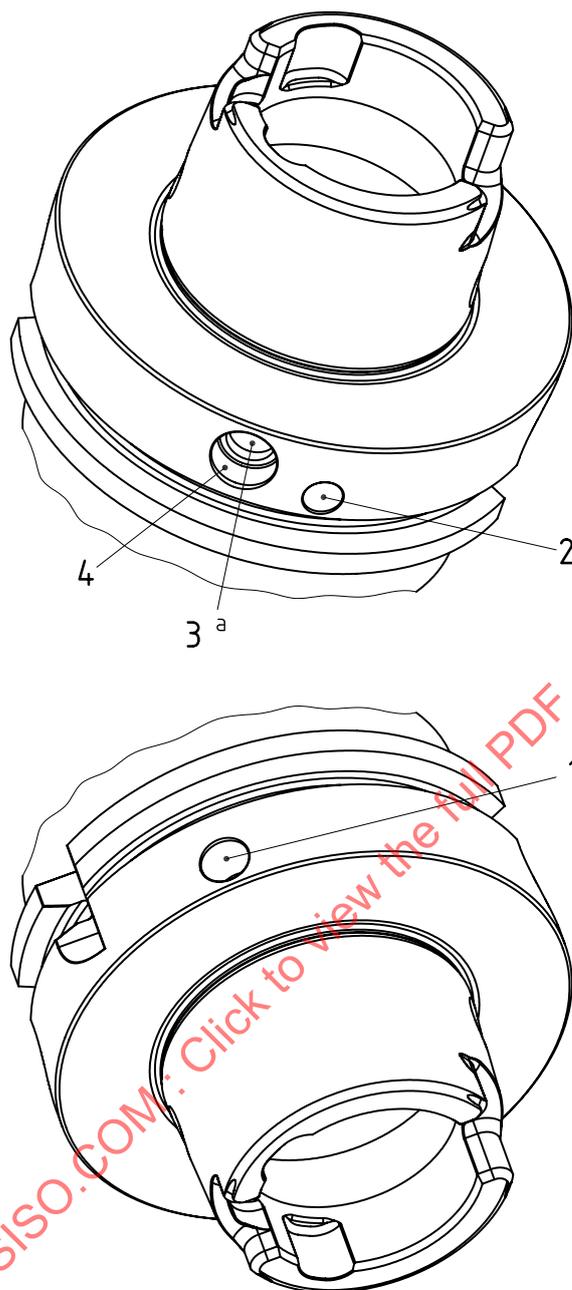
**Figure 4 — HSK-AS 63**

4.2.2.4 HSK-AS 80

Figure 5 is applied to HSK-AS 80 only.



a) HSK-AS 80 side view and section A-A



**b) HSK-AS 80 position of balancing and data chip bore holes**

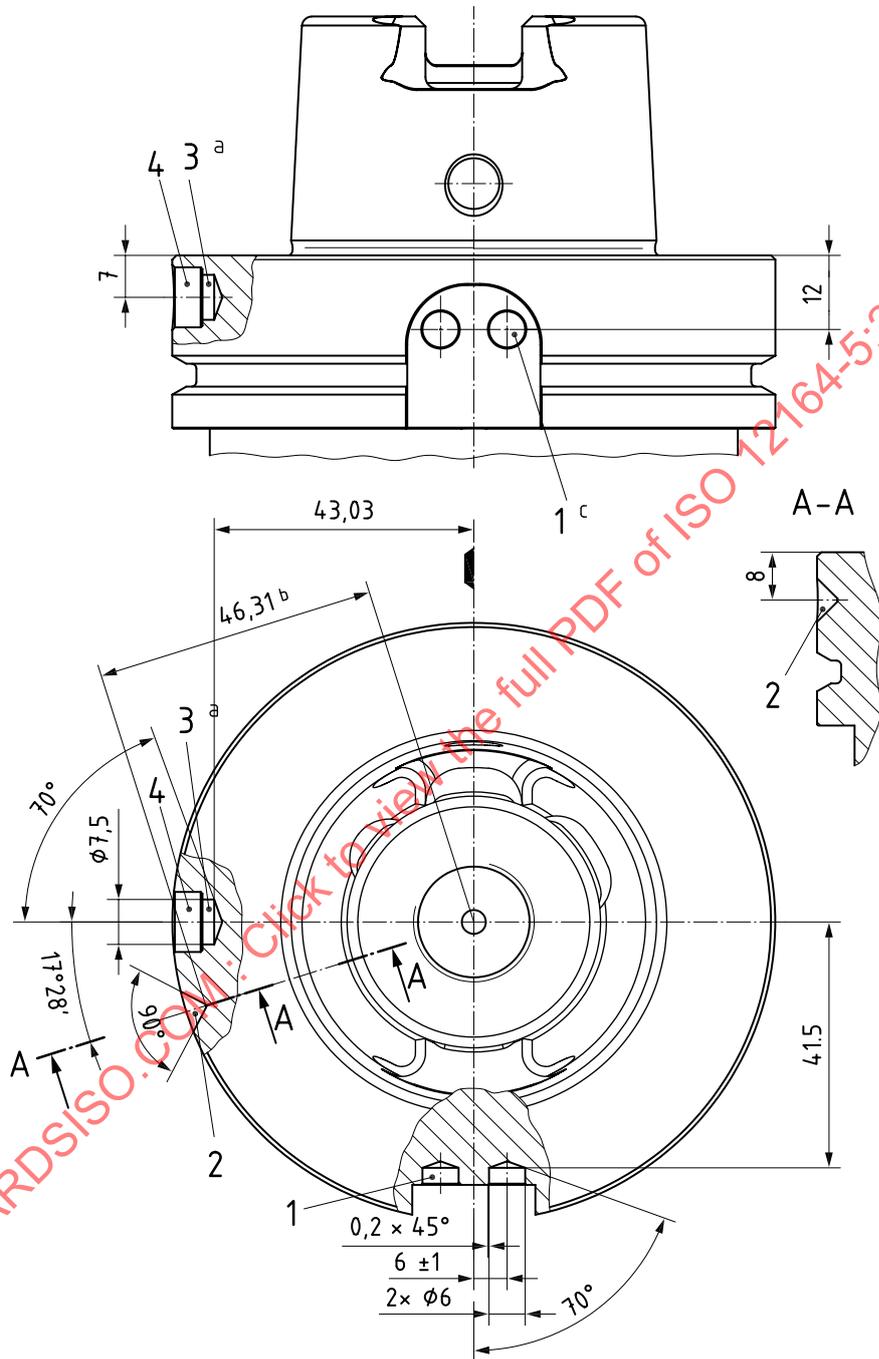
**Key**

- 1, 2, 3 balancing bore hole
- 4 bore hole for data chip
- <sup>a</sup> Bore hole only required if data chip mounted (bore holes sideways of data chip bore also possible).

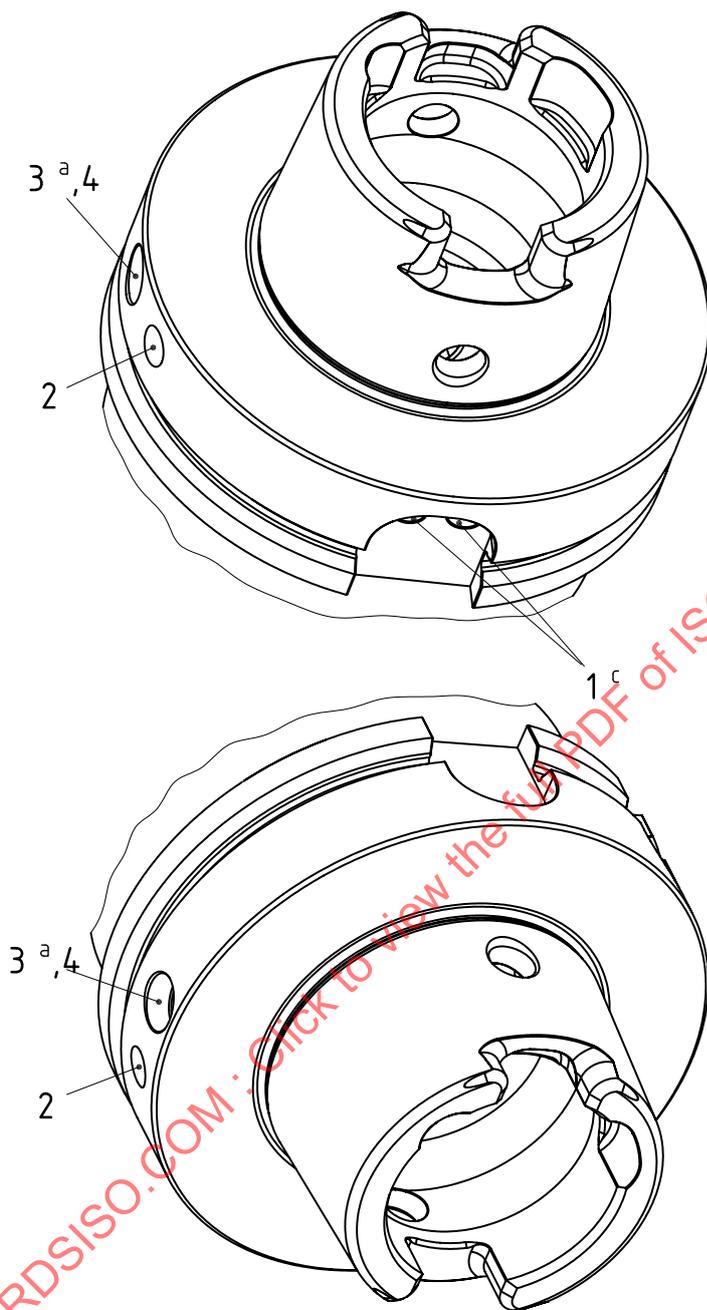
**Figure 5 — HSK-AS 80**

4.2.2.5 HSK-AS 100

Figure 6 is applied to HSK-AS 100 only.



a) HSK-AS 100 main and side view



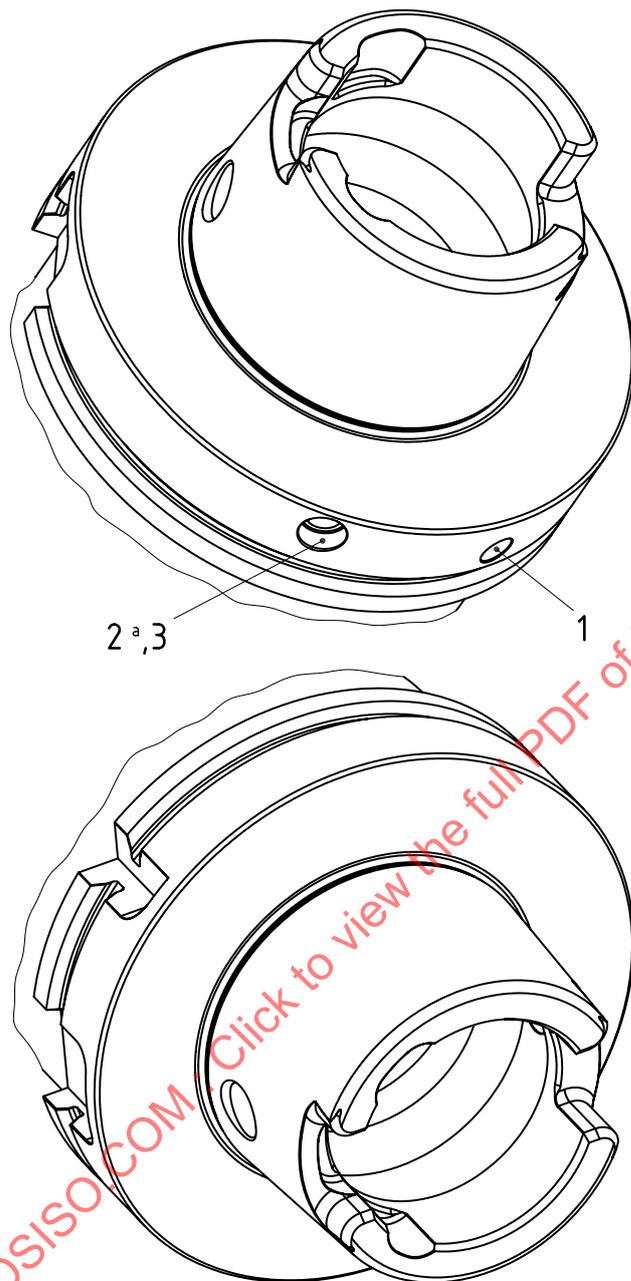
b) HSK-AS 100 position of balancing and data chip bore holes

**Key**

- 1, 2, 3 balancing bore hole
- 4 bore hole for data chip
- a Bore hole only required if data chip mounted (bore holes sideways of data chip bore also possible).
- b Dimension refers to the virtual point of the 90° balancing counter bore.
- c Bore holes sideways of keyway also possible.

**Figure 6 — HSK-AS 100**





**b) HSK-AS 125 position of balancing and data chip bore holes**

**Key**

1, 2 balancing bore hole

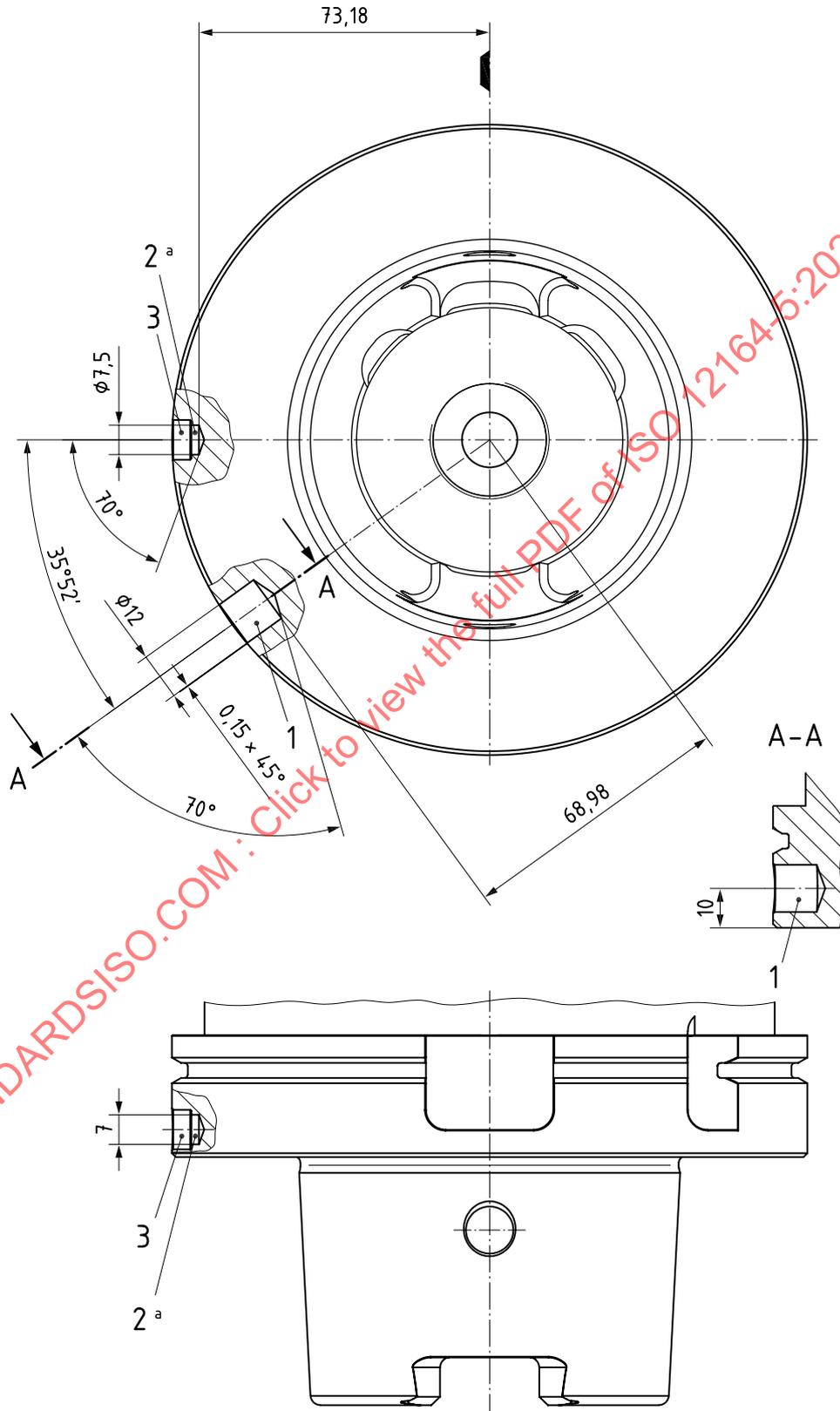
3 bore hole for data chip

<sup>a</sup> Bore hole only required if data chip mounted (bore holes sideways of data chip bore also possible).

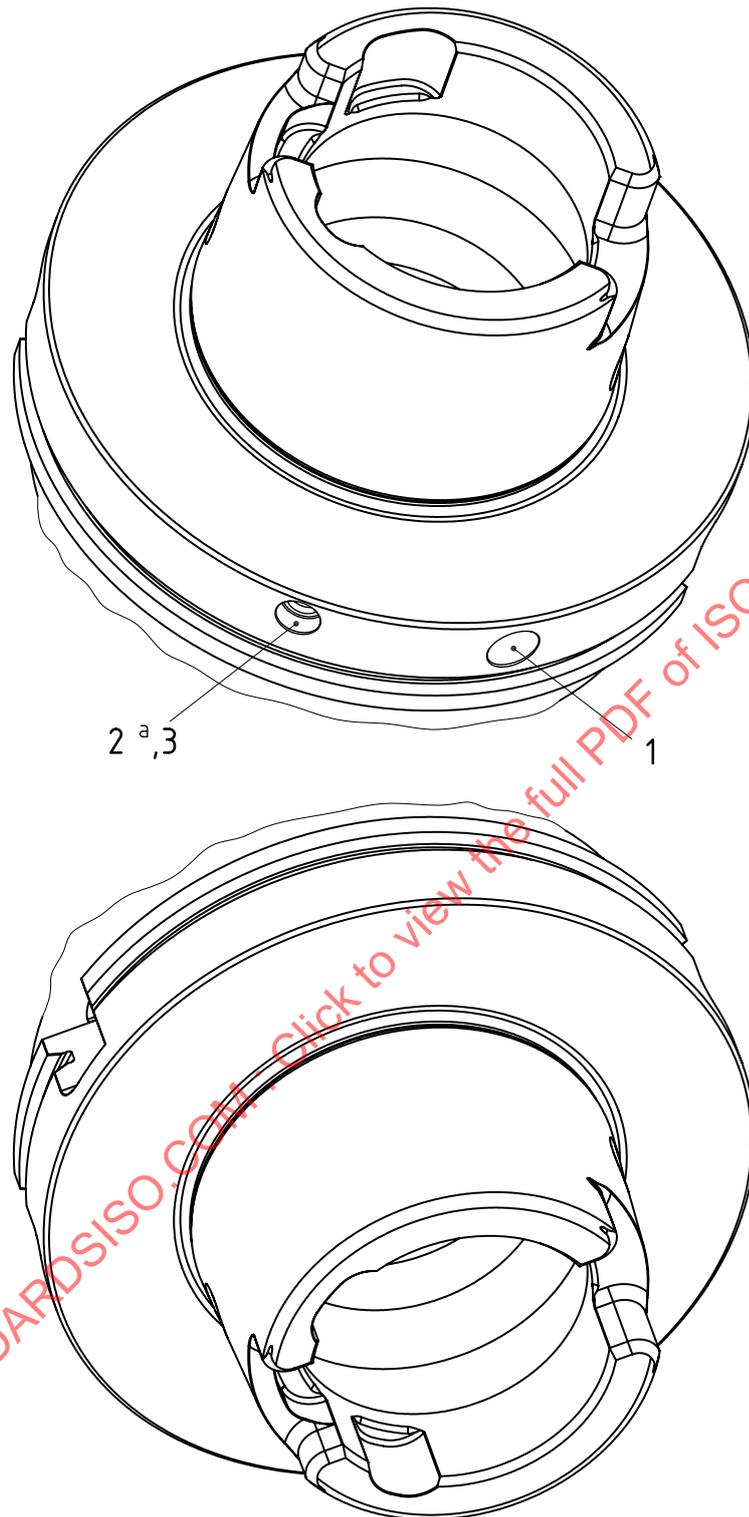
**Figure 7 — HSK-AS 125**

4.2.2.7 HSK-AS 160

Figure 8 is applied to HSK-AS 160 only.



a) HSK-AS 160 main and side view



**b) HSK-AS 160 position of balancing and data chip bore holes**

**Key**

1, 2 balancing bore hole

3 bore hole for data chip

<sup>a</sup> Bore hole only required if data chip mounted (bore holes sideways of data chip bore also possible).

**Figure 8 — HSK-AS 160**

### 4.3 Hollow taper shank of type CS

#### 4.3.1 General

Shanks of type CS are dynamically balanced by design according to the same principle such as shanks of type AB, see ISO 12164-1.

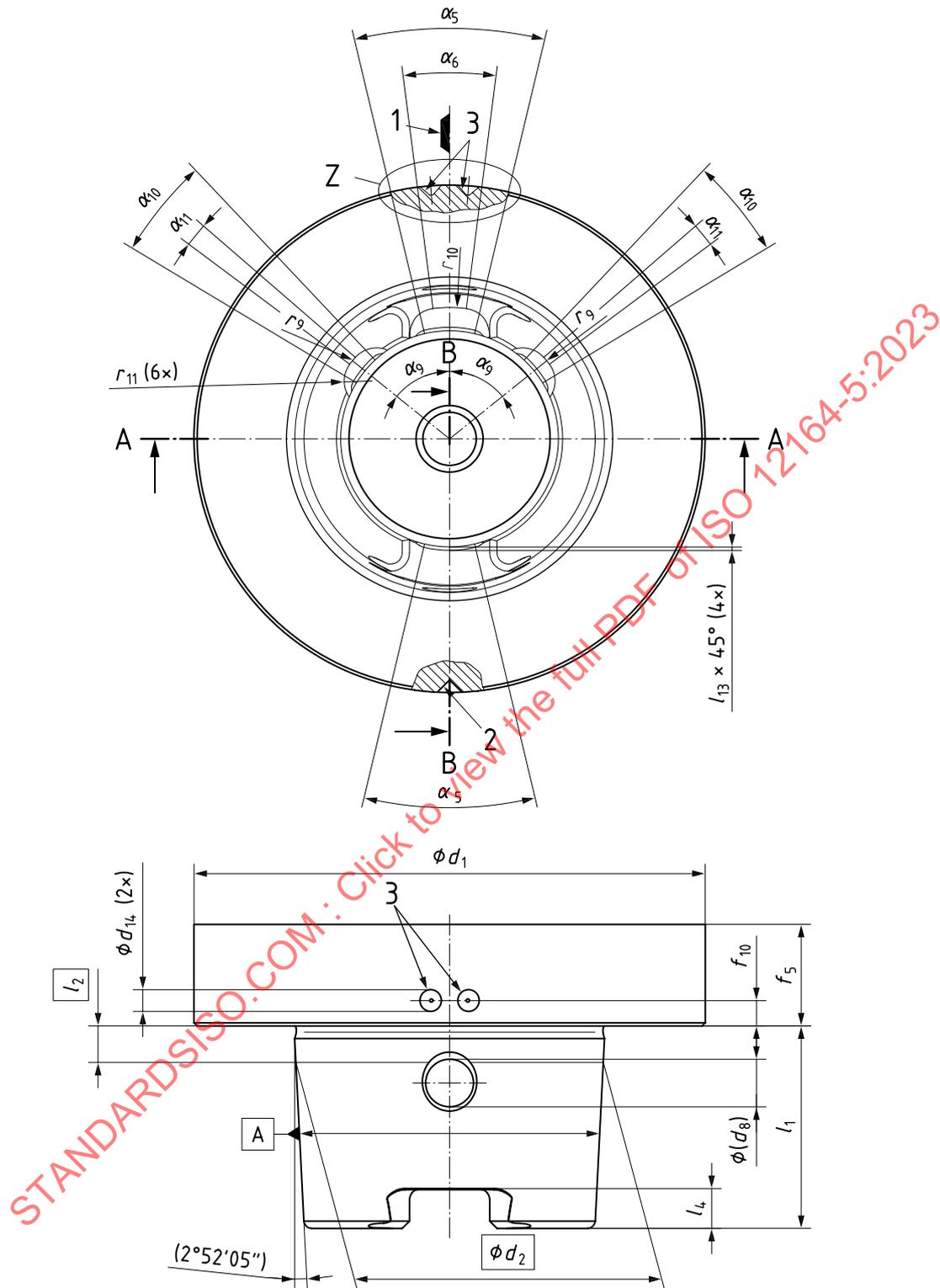
#### 4.3.2 Basic dimensions

The dimensions of hollow taper shanks type CS shall be in accordance with [Figure 9](#) and [Table 1](#).

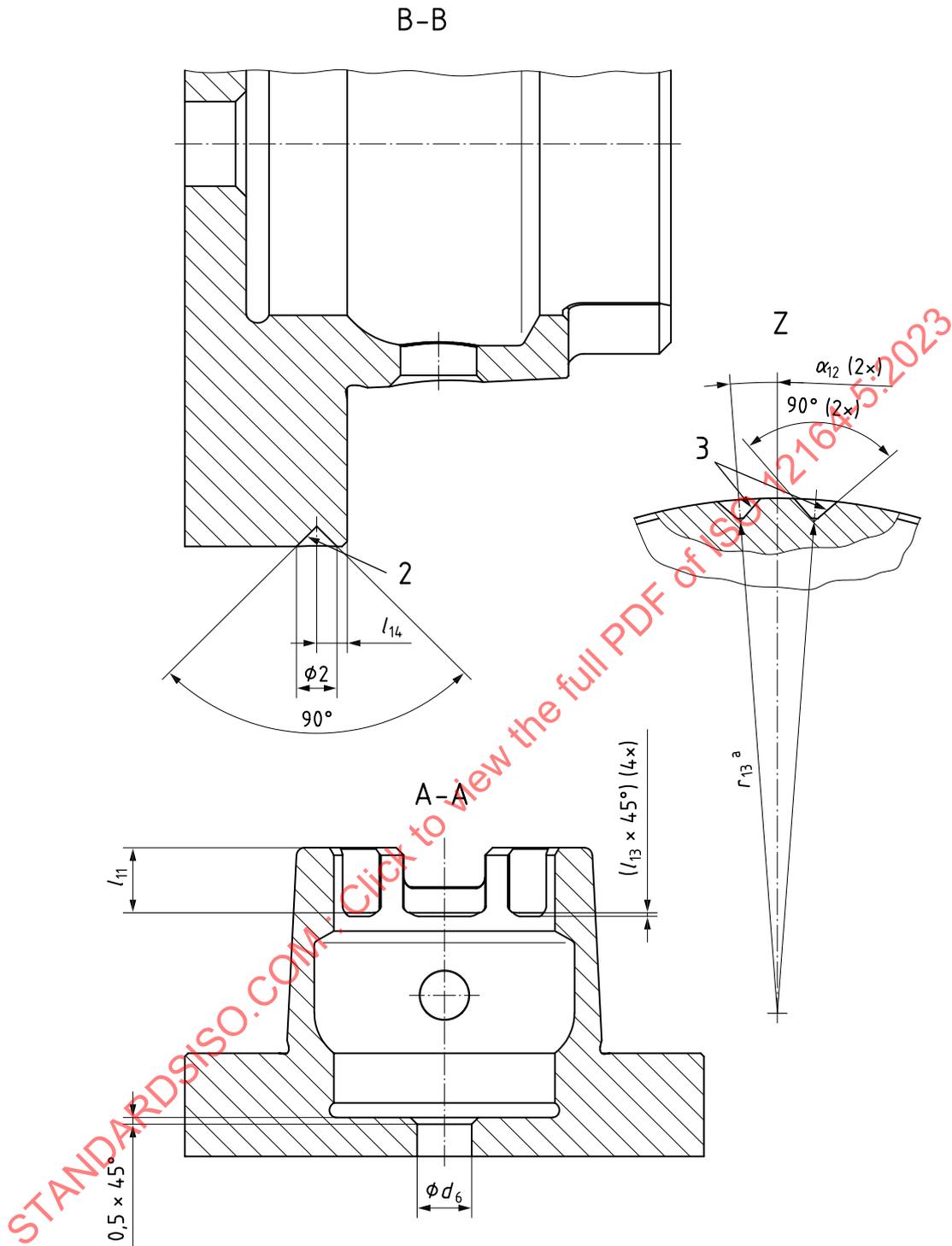
The three recesses inside the HSK-CS hollow taper shanks are symmetrical because HSK-CS shank flanges are symmetrical as well and do not cause unbalances (different to HSK-AS). The two small 90°-counterbores (#3) next to each other at the shank flanges remove the small unbalance of the opposite marking bore as well as a minor dynamical unbalance caused by the little axial difference between the centres of gravity of the left respectively right recess and the removed mass at the low taper groove.

All unspecified dimensions shall be in accordance with [Figure 1](#) and [Table 1](#).

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a) HSK-CS main and side view



**b) HSK-CS section A-A and section B-B**

**Key**

- |   |  |   |   |
|---|--|---|---|
| 1 | position of the cutting edge for right hand tools with single cutting edge | 3 | 90°- balancing counter bore hole  |
| 2 | marking bore of the clamping hole position                                 | a | Radius $r_{13}$ refers to the virtual point of the two 90° balancing counter bores. |

**Figure 9 — Hollow taper shank of type CS**

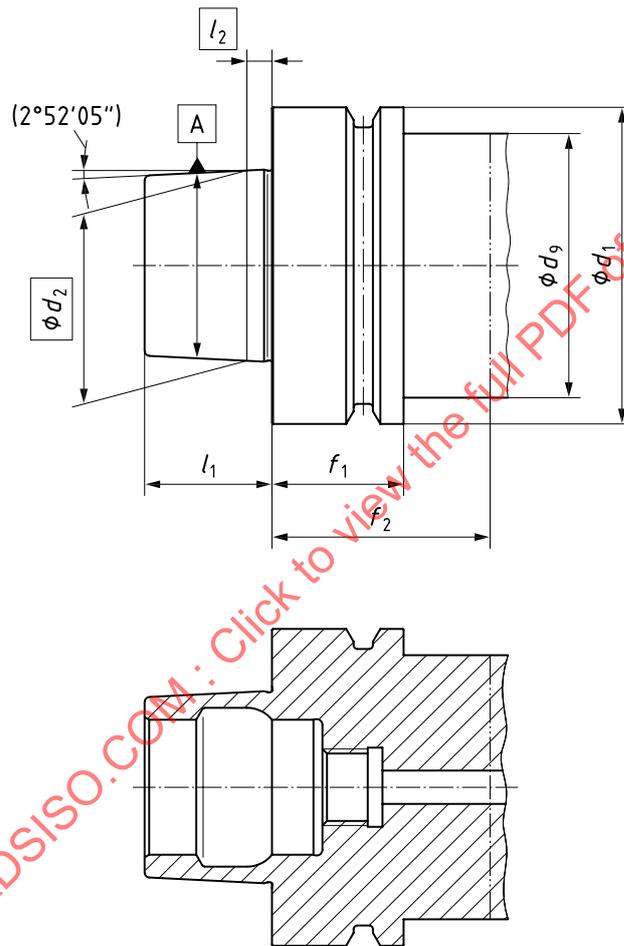
**4.4 Hollow taper shank of type ES**

The dimensions of hollow taper shanks of type ES are shown in [Figure 10](#) and shall be in accordance with [Figure 1](#) and [Table 1](#) for unspecified dimensions. The tolerance of reference diameter  $d_2$  of the shanks of type ES has been standardized to the same value of the types AS and CS.

NOTE 1 The shank of type ES is completely symmetrical and thus dynamically balanced.

In case of the need for manual tool change of shanks of type ES, the radial access bore holes in the hollow taper may be manufactured according to [Figure 1](#).

NOTE 2 The angular position of a HSK, type ES, is not mechanically defined (e.g. by a drive key) which can make manual unclamping/clamping difficult.



**Figure 10 — Hollow taper shank type ES**

#### 4.5 Dimensions

The dimensions of hollow taper shanks defined in this document shall be in accordance with [Table 1](#).

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Table 1 — HSK hollow taper shanks, dimensions

Dimensions in millimetre

Nominal size	See Figure <sup>c</sup>	40	50	63	80	100	125	160	HSK-type
$b_1$ ±0,04	1a, t	7,05	8,05	10,54	12,54	16,04	20,02	25,02	AS, CS
$b_2$ H10 (E)	1b, B-B	9	12	16	18	20	25	32	AS, CS
$b_3$ H10 (E)	1b, B-B	11	14	18	20	22	28	36	AS, CS
$d_1$ H10 (E)	1a, b	40	50	63	80	100	125	160	AS, CS, ES
$d_2$	1a, b	24,007	30,007	38,009	48,01	60,012	75,013	95,016	AS, CS, ES
$d_3$ H10 (E)	1b, A-A	17	21	26	34	42	53	67	AS, CS, ES
$d_4$ H11 (E)	1b, A-A	20,5	25,5	32	40	50	63	80	AS, CS, ES
$d_5$	1b, A-A	19	23	29	37	46	58	73	AS, CS, ES
$d_6$ max.	1b, A-A	4,2	5	6,8	8,4	10,2	12	14	AS, CS, ES
$d_6^b$ max.	1b, A-A	5,4	7	8	10	10,2	12	14	only for MQL
$d_7$ <sup>0</sup> -0,1	1b, A-A	17,4	21,8	26,6	34,5	42,5	53,8	68,1	AS, CS, ES
$d_8$	1a, b	4	4,6	6	7,5	8,5	12	14,5	AS, CS
$d_9$ max.	1a, b	34	42	53	68	88	111	144	AS, ES
$d_{10}$ <sup>0</sup> -0,1	1d, X	34,8	43	55	70	92	117	152	AS, ES
$d_{11}$ <sup>0</sup> -0,1	1d, X	45	59,3	72,3	88,8	109,75	134,75	169,75	AS, ES
$d_{12}$	1d, X	4	7	7	7	7	7	7	AS, ES
$d_{13}^a$	1b, A-A	M10 × 1	M12 × 1	M16 × 1	M18 × 1	M20 × 1,5	M24 × 1,5	M30 × 1,5	AS, CS, ES
$d_{14}$	9a, b	1,99	2,31	2,85	3,42	4,1	5,15	6,51	CS
$e_1$	1a, t	8,82	11	13,88	17,99	21,94	27,37	35,37	AS, CS
$e_2$ <sup>0</sup> -0,05	1a, t	10,2	12,88	16,26	20,87	25,82	32,25	41,25	AS, CS

<sup>a</sup> Thread for mounting of a medium-transfer unit (see Annex B).

<sup>b</sup> Maximum diameter only in case of MQL (minimum quantity lubrication) required.

<sup>c</sup> Indicates the drawing of the first appearance of a parameter; e.g. '1a, b' → Figure 1a), bottom drawing; '9b, Z', → Figure 9b), view Z; '1b, B-B' → Figure 1b), cross section B-B.

<sup>d</sup> The need of the O-ring depends on the used clamping system (is not part of the delivery).

Table 1 (continued)

Nominal size	See Figure <sup>c</sup>	40	50	63	80	100	125	160	HSK-type
$f_1$ 0 -0,1	1a, b	20	26	26	26	29	29	31	AS, ES
$f_2$ min.	1a, b	35	42	42	42	45	45	47	AS, ES
$f_3$ $\pm 0,1$	1a, b	16	18	18	18	20	20	22	AS, ES
$f_4$ $+0,15$ 0	1d, X	2	3,75	3,75	3,75	3,75	3,75	3,75	AS, ES
$f_5$	9a, b	10	12,5	12,5	16	16	20	20	CS
$f_6$	1d, W	1	2	2	2	2,5	2,5	4	AS, CS, ES
$f_7$ $\approx$	1d, W	0,9	1,1	1,4	1,4	1,8	1,8	3,1	AS, CS, ES
$f_8$ $+0,1$ 0	1d, W	0,1	0,2	0,2	0,2	0,2	0,2	0,3	AS, CS, ES
$f_9$ $+0,05$ 0	1d, W	0,1	0,1	0,1	0,1	0,1	0,1	0,2	AS, CS, ES
$f_{10}$ $\pm 0,1$	9a, b	3	3	4	4	6	6	7	CS
$h_1$ 0 -0,2	1b, B-B	17	21	26,5	34	44	55,5	72	AS
$h_2$ 0 -0,3	1b, B-B	12	15,5	20	25	31,5	39,5	50	AS
$h_3$ $+0,2$ 0	1a, t	5,2	5,1	5	4,9	4,9	4,8	4,8	AS
$l_1$ 0 -0,2	1a, b	16	20	25	32	40	50	63	AS, CS, ES
$l_2$	1a, b	3,2	4	5	6,3	8	10	12,5	AS, CS, ES
$l_3$ $+0,2$ 0	1b, A-A	5	6	7,5	10	12	15	19	AS, CS
$l_4$ $+0,2$ 0	1a, b	3	3,5	4,5	6	8	10	12	AS, CS

<sup>a</sup> Thread for mounting of a medium-transfer unit (see Annex B).

<sup>b</sup> Maximum diameter only in case of MQL (minimum quantity lubrication) required.

<sup>c</sup> Indicates the drawing of the first appearance of a parameter; e.g. '1a, b' → Figure 1 a), bottom drawing; '9b, Z', → Figure 9 b), view Z; '1b, B-B' → Figure 1 b), cross section B-B.

<sup>d</sup> The need of the O-ring depends on the used clamping system (is not part of the delivery).

Table 1 (continued)

Nominal size	See Figure <sup>c</sup>	40	50	63	80	100	125	160	HSK-type
$l_5$	1b, A-A	8,92	11,42	14,13	18,13	22,85	28,56	36,27	AS, CS, ES
$l_6$	1b, A-A	8	8	10	10	12,5	12,5	16	AS, CS, ES
$l_7$	1b, A-A	0,8	0,8	1	1	1,5	1,5	2	AS, CS, ES
$l_8$	1a, b	5	6	7,5	9	12	15	18,5	AS, CS
$l_9$	1b, A-A	6	8	10	12	14	16	18	AS, CS, ES
$l_{10}$	1a, b	12	19	21	22	24	24	24	AS
$l_{11}$	1c, C	5,1	6,1	7,6	10,1	12,1	15,1	19,1	AS, CS
$l_{12}$	1d, V	0,5	0,5	0,5	0,5	0,5	0,5	0,5	AS, CS, ES
$l_{13}$	1c, C	0,3	0,35	0,45	0,55	0,7	0,85	1,1	AS, CS
$l_{14}$	9b, B-B	2	2	2	2	2	2	2	CS
O-ring <sup>d</sup>	-	16 × 1	18,77 × 1,78	21,89 × 2,62	29,82 × 2,62	36,09 × 3,53	47,6 × 3,53	61,91 × 3,53	AS, CS, ES
$r_1$	1a, b	0,6	0,8	1	1,2	1,6	2	2,5	AS, CS, ES
$r_2$	1a, b	1	1	1,5	1,5	2	2	2,5	AS, CS
$r_3$	1d, Y	1,38	1,88	2,38	2,88	3,88	4,88	5,88	AS, CS, ES
$r_4$	1b, A-A	4	5	6	8	10	12	16	AS, CS, ES
$r_5$	1b, A-A	0,4	0,4	0,5	0,6	0,8	1	1,2	AS, CS, ES
$r_6$	1b, A-A	0,5	1	1,5	1,5	2	2	2	AS, CS, ES
$r_7$	1d, W	0,2	0,4	0,6	0,6	1	1	1,6	AS, CS, ES
$r_8$	1a, b	4,5	6	8	9	10	5	5	AS
$r_9$	1c, b	9,9	12,4	15,3	19,35	23,9	29,8	38	AS, CS
$r_{10}$	1c, b	10,1	12,6	15,9	20,49	25,6	31,65	40	AS, CS
$r_{11}$	1c, b	3,2	3,2	4,2	4,2	6,2	6,2	8,2	AS, CS
<sup>a</sup> Thread for mounting of a medium-transfer unit (see Annex B).									
<sup>b</sup> Maximum diameter only in case of MQL (minimum quantity lubrication) required.									
<sup>c</sup> Indicates the drawing of the first appearance of a parameter; e.g. '1a, b' → Figure 1.a), bottom drawing; '9b, Z', → Figure 9.b), view Z; '1b, B-B' → Figure 1.b), cross section B-B.									
<sup>d</sup> The need of the O-ring depends on the used clamping system (is not part of the delivery).									

Table 1 (continued)

Nominal size	See Figure <sup>c</sup>	40	50	63	80	100	125	160	HSK-type
$r_{12}$	1d, C-C	0,5	0,5	1	1	1	1	1	AS, CS
$r_{13}$	9b, Z	18,98	23,82	30,05	38,26	47,92	59,89	76,71	CS
$t$	1a, b	0,002	0,002	0,002 5	0,003	0,004	0,004	0,005	AS, CS, ES
$w$	1a, b	0,002	0,002	0,002	0,003	0,003	0,004	0,004	AS, CS, ES
$\alpha_1$	1c, b	65°24'	67°10'	65°00'	54°06'	58°53'	55°09'	52°38'	AS
$\alpha_2$	1c, b	64°00'	56°30'	57°00'	53°00'	52°45'	50°00'	51°00'	AS
$\alpha_3$	1c, b	27°00'	35°48'	32°06'	23°30'	32°16'	26°12'	25°06'	AS
$\alpha_4$	1c, b	10°24'	20°36'	15°54'	12°00'	17°12'	14°12'	13°36'	AS
$\alpha_5$	1c, b	23°12'	23°48'	26°24'	26°36'	26°00'	28°48'	29°24'	AS, CS
$\alpha_6$	1c, b	8°00'	10°30'	10°36'	14°30'	10°48'	17°12'	15°30'	AS, CS
$\alpha_7$	1c, b	26°36'	15°48'	17°12'	17°30'	15°40'	17°00'	19°30'	AS
$\alpha_8$	1c, b	10°00'	0°36'	1°00'	6°00'	0°36'	5°00'	4°00'	AS
$\alpha_9$	9a, t	64°40'	56°30'	57°00	51° 00'	52°45'	50°00'	51°00'	CS
$\alpha_{10}$	9a, t	25°36'	16°12'	19°48'	15° 38'	16°08'	17°16'	20°06'	CS
$\alpha_{11}$	9a, t	9°00'	1°00'	3°36'	4°08'	1°04'	5° 16'	4°36'	CS
$\alpha_{12}$	9b, Z	5°00'	5°00'	4°30'	4°15'	4°15'	4°15'	4°00'	CS

<sup>a</sup> Thread for mounting of a medium-transfer unit (see [Annex B](#)).

<sup>b</sup> Maximum diameter only in case of MQL (minimum quantity lubrication) required.

<sup>c</sup> Indicates the drawing of the first appearance of a parameter; e.g. '1a, b' → [Figure 1 a](#)), bottom drawing; '9b, Z', → [Figure 9 b](#)), view Z; '1b, B-B' → [Figure 1 b](#)), cross section B-B.

<sup>d</sup> The need of the O-ring depends on the used clamping system (is not part of the delivery).