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**Medium-transfer units for tool  
interfaces —**

Part 1:  
**Transfer units for hollow taper shanks  
in accordance with the ISO 12164  
series**

*Unités de transfert de fluide pour les interfaces d'outils —*

*Partie 1: Unités de transfert pour queues à cône creux-face conformes  
à la série ISO 12164*

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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](http://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](http://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 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 in the ISO 22402 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).

# Medium-transfer units for tool interfaces —

## Part 1:

# Transfer units for hollow taper shanks in accordance with the ISO 12164 series

## 1 Scope

This document specifies the dimensions of medium-transfer units for wet processing and interfaces machine tool with insert nuts, which are used in hollow taper shanks taper in accordance with the ISO 12164 series.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

No terms and definitions are listed in this document.

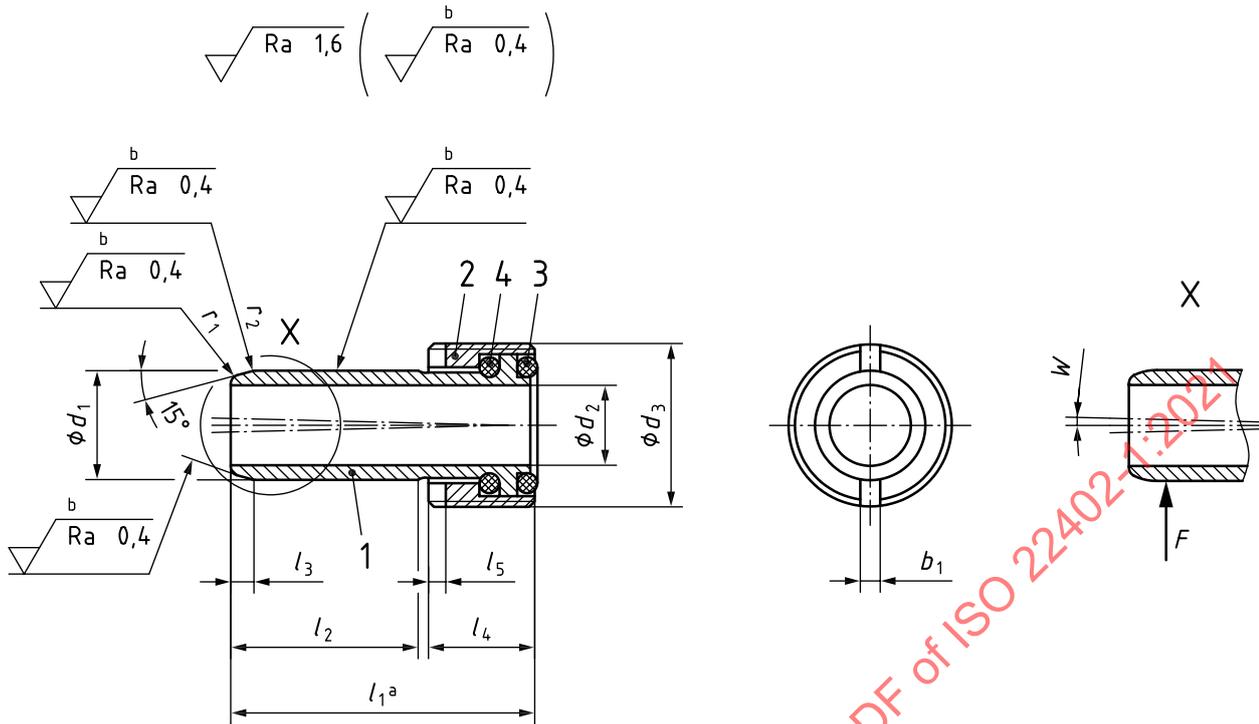
ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

## 4 Transfer units for wet machining, types and dimensions

### 4.1 Transfer unit for automatic tool change, type A

The transfer unit of the form A shall be carried out according to [Figure 1](#) and [Table 1](#).



**Key**

- 1 transfer tube
- 2 threaded bush
- 3 O-ring 1
- 4 O-ring 2
- a In installed condition.
- b Polished.

**Figure 1 — Transfer unit, type A, dimensions**

**Table 1 — Transfer unit, type A, dimensions**

HSK-type			Nominal size											
A	AB	EB	T	TA	20	25	32	40	50	63	80	100	125	160
AS	ES	—	—	—	25	32	40	50	63	80	100	125	160	—
$b_1$	$\begin{matrix} +0,2 \\ 0 \end{matrix}$	[mm]			1,5	1,5	1,5	2	2	2,5	2,5	3	4	5
$d_1$	f8	[mm]			3	5	6	8	10	12	14	16	18	20
$d_2$		[mm]			1,8	3	3,5	5	6,4	8	10	12	14	16
$d_3$		[mm]			M6 × 0,75	M8 × 1	M10 × 1	M12 × 1	M16 × 1	M18 × 1	M20 × 1,5	M24 × 1,5	M30 × 1,5	M35 × 1,5
$l_1$	$\begin{matrix} 0 \\ -0,5 \end{matrix}$	[mm]			14	17	26	29,5	33	36,5	40	44	48	52
$l_2$	min	[mm]			9	11	16	16	19	20	20	23	25	25
$l_3$		[mm]			1	2	2,5	2,5	3	3	3	3	3,5	3,5
$l_4$	$\begin{matrix} 0 \\ -0,2 \end{matrix}$	[mm]			3,85	4,5	5,5	7,5	9,5	11,5	13,5	15,5	17,5	19,4
$l_5$	$\begin{matrix} +0,2 \\ 0 \end{matrix}$	[mm]			1,4	1,5	1,5	2	2	2,5	2,5	3	3,5	3,5
$r_1$		[mm]			0,3	0,4	1	1	1	1,5	1,5	1,5	1,5	1,5
$r_2$		[mm]			1,6	1,6	2	2	2	3	3	3	3	3
$M_A$		[Nm]			3	5	5	10	15	20	25	30	30	30

Table 1 (continued)

HSK-type					Nominal size									
A	AB	EB	T	TA	20	25	32	40	50	63	80	100	125	160
AS		ES	—		25	32	40	50	63	80	100	125	160	—
W		min			1°	1°	1°	1°	1°	1°	1°	1°	1°	1°
F <sub>max</sub>		[N]			1,5	2,5	5	5	6	6	7	7	9	11
O-ring 1		[mm]			2,5 × 0,6	4,0 × 1,0	5 × 1,2	7,5 × 1,5	9,0 × 2,0	10,0 × 2,5	13,0 × 2,0	14,0 × 3,0	17,0 × 3,5	20,0 × 3,5
O-ring 2		[mm]			2,5 × 0,6	4,0 × 1,0	5 × 1,2	7,5 × 1,5	9,0 × 2,0	10,0 × 2,0	13,0 × 2,0	14,0 × 3,0	17,0 × 3,5	20,0 × 3,5

## 4.2 Material and heat treatment

### 4.2.1 General

The transfer unit shall seal a pressure of at least 70 bar<sup>1)</sup> and be neutral centred and allow an angular movement with a permissible displacement force (Table 1).

### 4.2.2 Hardness

The supply tube shall be surface hardened, hardness at least 56 HRC (Rockwell hardness C).

## 4.3 Designation

A transfer unit, type A in accordance with this document shall be designated by:

- “Transfer unit”;
- reference to this document, i.e. ISO 22402-1;
- type A;
- nominal size of the hollow taper shank in mm (e.g. 50).

EXAMPLE Designation of a transfer unit for wet machining and a hollow taper shank with the nominal size 50 mm

Transfer unit ISO 22402-1 — A — 50

## 5 Transfer units for machining with minimum quantity lubrication (MQL), types and dimensions

### 5.1 General

The transfer units described in this document are only used in single-channel MQL systems. In the case of 2-channel MQL systems, precise matching of the cross-sectional areas of the passages to the cutting tool is required and can therefore not be shown or represented in this document.

This clause describes separately transfer units for the automatic and manual (see Figure 2) tool change.

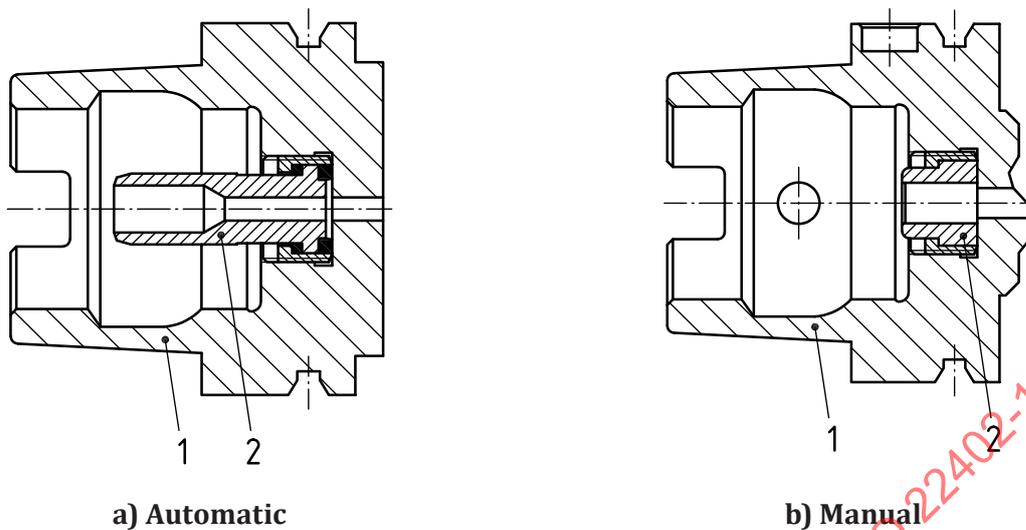
The transfer unit for the automatic tool change shall seal a pressure of at least 10 bar and be neutral centred and allow an angular movement with a permissible displacement force (Tables 2 and 3).

The selection of the design depends on:

- the continuing cooling channel cross section,
- the length adjustment system, and

1) 1 bar = 0,1 MPa = 10<sup>5</sup> Pa 1 MPa = 1 N/mm<sup>2</sup>.

— the associated sealing system.



**Key**

- 1 HSK-A
- 2 transfer unit for tool change

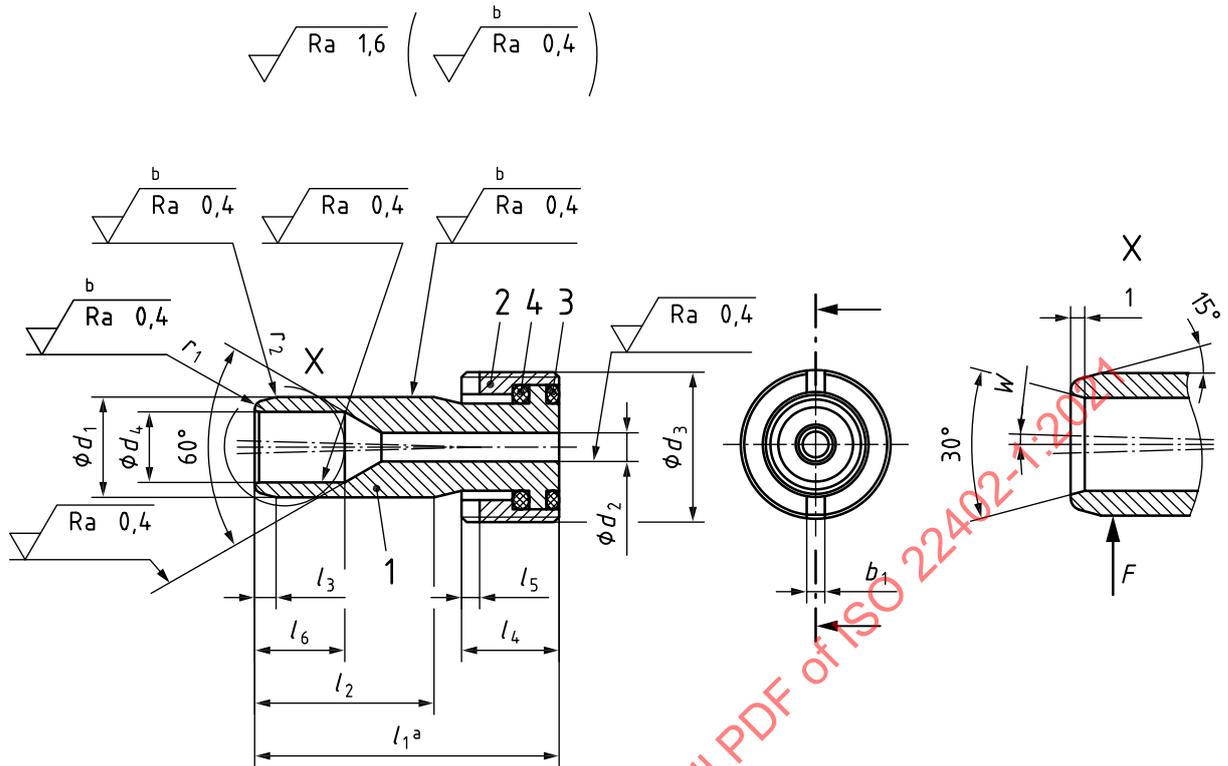
**Figure 2 — Transfer unit for tool change**

## 5.2 Transfer unit for automatic tool change

### 5.2.1 Transfer unit for automatic tool change, type B and C

#### 5.2.1.1 General

The transfer unit of the form B and C for automatic tool change shall be carried out according to [Figure 3](#) and [Table 2](#).



**Key**

- 1 transfer tube
- 2 threaded bush
- 3 O-ring 1
- 4 O-ring 2
- a In installed condition.
- b Polished.

Figure 3 — Transfer unit, type B and C

**5.2.1.2 Dimensions**

Table 2 — Transfer unit, type B and C, dimensions

HSK-type					Nominal size					Transfer unit type
A	AB	EB	T	TA	40	50	63	80	100	
AS	ES	—	—	—	50	63	80	100	125	
$b_1$	$\begin{matrix} +0,2 \\ 0 \end{matrix}$	[mm]	2	2	2,5	2,5	3	B, C		
$d_1$	f8	[mm]	8	10	12	14	16	B, C		
$d_2$	H9	[mm]	5	6,4	8	8	8	B		
$d_2$	H9	[mm]	4	4	4	4	4	C		
$d_3$		[mm]	M12 × 1	M16 × 1	M18 × 1	M20 × 1,5	M24 × 1,5	B, C		
$d_4$	$\begin{matrix} 0 \\ -0,2 \end{matrix}$	[mm]	5	6,4	8	10	12	B, C		
$l_1$	$\begin{matrix} 0 \\ -0,5 \end{matrix}$	[mm]	29,5	33	36,5	40	44	B, C		
$L_{2 \min}$		[mm]	16	19	20	20	23	B, C		

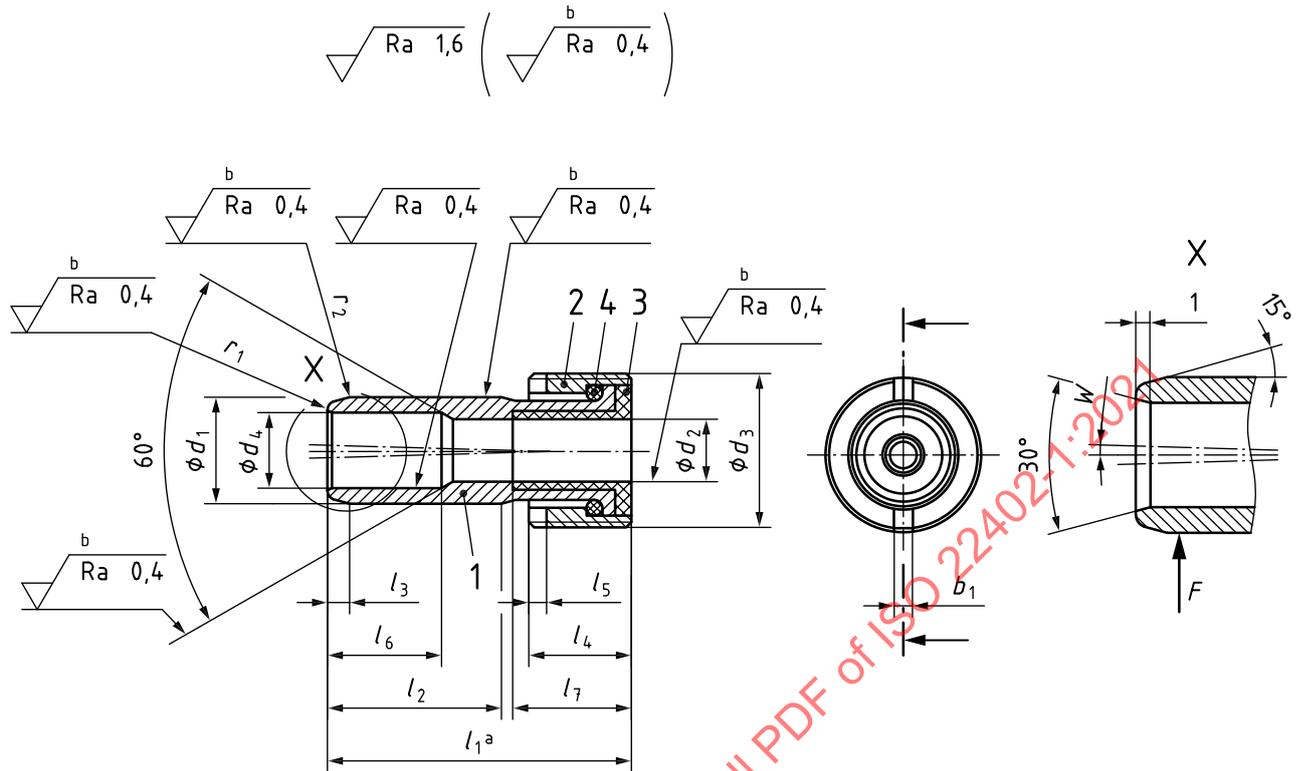
Table 2 (continued)

HSK-type					Nominal size					Transfer unit type
A	AB	EB	T	TA	40	50	63	80	100	
AS		ES	—		50	63	80	100	125	
$l_3$		[mm]			2,5	3	3	3	3	B, C
$l_4$		$\begin{matrix} 0 \\ -0,2 \end{matrix}$	[mm]		7,5	9,5	11,5	13,5	15,5	B, C
$l_5$		$\begin{matrix} +0,2 \\ 0 \end{matrix}$	[mm]		2	2	2,5	2,5	3	B, C
$l_{6 \text{ min}}$		[mm]			—	—	—	16	17	B
$l_{6 \text{ min}}$		[mm]			15	15	15	16	17	C
$r_1$		[mm]			1	1	1,5	1,5	1,5	B, C
$r_2$		[mm]			2	2	3	3	3	B, C
$M_A$		[Nm]			10	15	20	25	30	B, C
$W$		min			1°	1°	1°	1°	1°	B, C
$F_{\text{max}}$		[N]			5	6	6	7	7	B, C
O-ring 1		[mm]			7,5 × 1,5	9,0 × 2,0	10,0 × 2,5	13,0 × 2,0	14,0 × 3,0	B, C
O-ring 2		[mm]			7,5 × 1,5	9,0 × 2,0	10,0 × 2,0	13,0 × 2,0	14,0 × 3,0	B, C

### 5.2.2 Transfer unit for automatic tool change, Type D, E and F

#### 5.2.3 Transfer unit, type D

The transfer unit of the form D is suitable for all tool holders and tool body with machine interface according to ISO 12164-1. The transfer unit of the form D shall be carried out according to [Figure 4](#) and [Table 3](#).



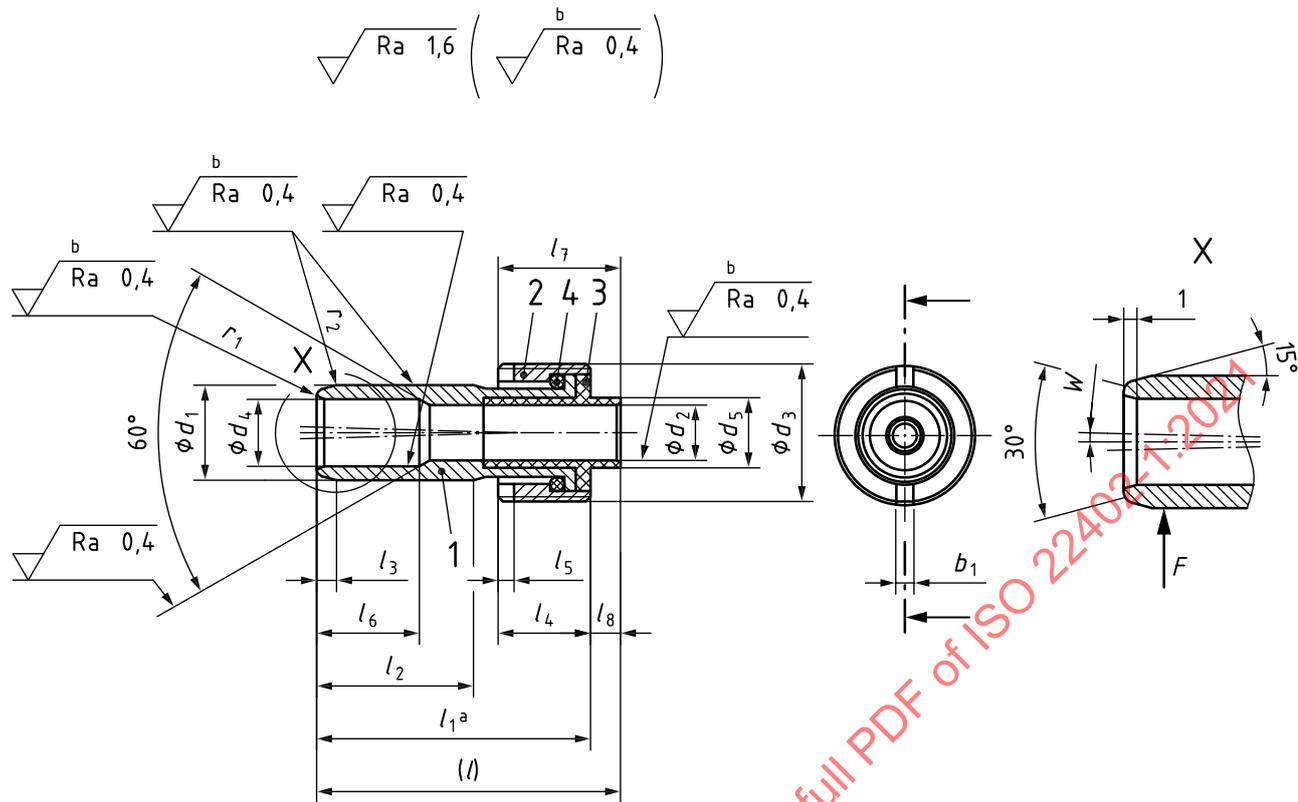
**Key**

- 1 transfer tube
- 2 threaded bush
- 3 extension transfer tube with sealing element made of elastic plastic
- 4 O-ring
- a In installed condition.
- b Polished.

**Figure 4 — Transfer unit, type D**

**5.2.4 Transfer unit, type E**

Transfer units of form E are only suitable for tool holders and tool carriers with predefined holes suitable for  $d_5$ . The transfer unit of the form E shall be carried out according to [Figure 5](#) and [Table 3](#).



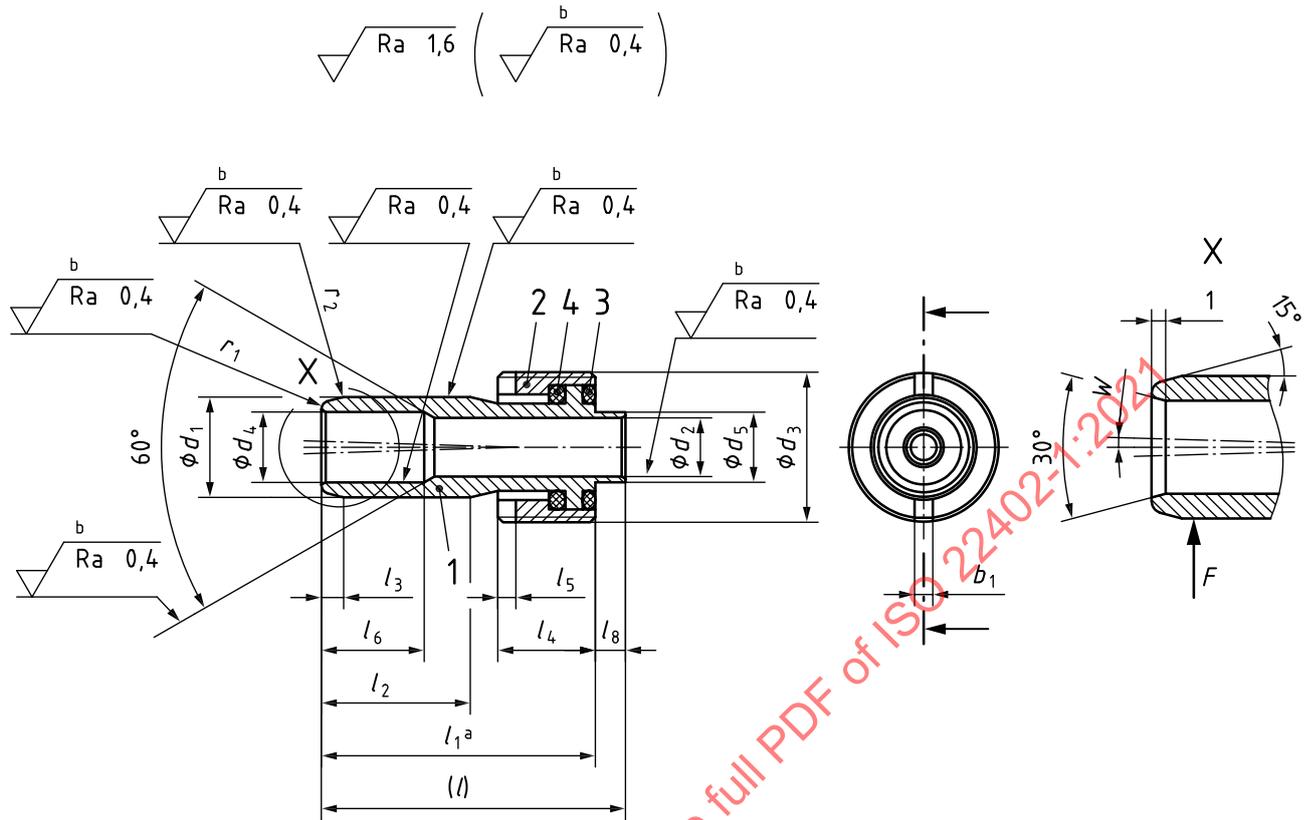
**Key**

- 1 transfer tube
- 2 threaded bush
- 3 extension transfer tube with sealing element made of elastic plastic
- 4 O-ring
- a In installed condition.
- b Polished.

**Figure 5 — Transfer unit, type E**

**5.2.5 Transfer unit, type F**

Transfer units of form F are only suitable for tool holders and tool carriers with predefined holes suitable for  $d_5$ . The transfer unit of the form F shall be carried out according to [Figure 6](#) and [Table 3](#).



**Key**

- 1 transfer tube
- 2 threaded bush
- 3 O-ring 1
- 4 O-ring 2
- a In installed condition.
- b Polished.

Figure 6 — Transfer unit, Type F

**5.2.6 Dimensions**

Table 3 — Transfer units, type D, E and F, dimensions

HSK-type					Nominal size						Transfer unit type
A	AB	EB	T	TA	32	40	50	63	80	100	
AS	ES	—	—	—	40	50	63	80	100	125	
$b_1$	$+0,2$ $0$	[mm]			1,5	2	2	2,5	2,5	3	D, E, F
$d_1$	f8	[mm]			6	8	10	12	14	16	D, E, F
$d_2^a$		[mm]			4	5,4	5,7	7	7	7	D, E
$d_2$	H9	[mm]			4	5,4	6,5	6,5	8	8	F
$d_3$		[mm]			M10 × 1	M12 × 1	M16 × 1	M18 × 1	M20 × 1,5	M24 × 1,5	D, E, F
$d_4$	H9	[mm]			3,5	5	6,4				D, E, F

<sup>a</sup> Sealing element design for adjusting screw with  $\varnothing$  tolerance  $\pm 0,05$  mm.  
<sup>b</sup> Design identical to form B/C: coolant transfer unit only with O-ring.

Table 3 (continued)

HSK-type					Nominal size						Transfer unit type
A	AB	EB	T	TA	32	40	50	63	80	100	
AS		ES	—		40	50	63	80	100	125	
$d_4$	H9		[mm]		4	5,4	6,5	8	10	12	F
$d_5$			[mm]		5,4	7	8	10	10,2	12	E
$d_5$			[mm]		4,8	6,5	7,5	9,5	9,7	11,5	F
(l)			[mm]		38,5	35	38,5	40,5	44	46	E, F
$l_1$	$0_{-0,5}$		[mm]		26	29,5	33	36,5	40	44	D, E, F
$l_{2\min}$			[mm]		16	16	19	20	20	23	D, E, F
$l_3$			[mm]		2,5	2,5	3	3	3	3	D, E, F
$l_4$	$0_{-0,2}$		[mm]		5,5	7,5	9,5	11,5	13,5	15,5	D, E, F
$l_5$	$+0,2_0$		[mm]		1,5	2	2	2,5	2,5	3	D, E, F
$l_6$			[mm]		15	15	15	15	15	15	D, E
$l_6$			[mm]		—	—	—	—	15	15	F
$l_7$			[mm]		1,25	9,5	11,5	13,5	15,5	17,5	D
$l_7$			[mm]		18	13	15	15,5	17,5	17,5	E
$l_8$			[mm]		12,5	5,5	5,5	4	4	2	E, F
$r_1$			[mm]		1	1	1	1,5	1,5	1,5	D, E, F
$r_2$			[mm]		2	2	2	3	3	3	D, E, F
$M_A^b$			[Nm]		5	10	15	20	25	30	D, E, F
$W$	min				1°	1°	1°	1°	1°	1°	D, E, F
$F_{\max}$			[N]		5	5	6	6	7	7	D, E, F
O-ring 1			[mm]		5,0 × 1,2	7,5 × 1,5	9,0 × 2,0	10,0 × 2,5	13,0 × 2,0	14,0 × 3,0	F
O-ring 2			[mm]		5,0 × 1,2	7,5 × 1,5	9,0 × 2,0	10,0 × 2,0	13,0 × 2,0	14,0 × 3,0	D, E, F

<sup>a</sup> Sealing element design for adjusting screw with  $\varnothing$  tolerance  $\pm 0,05$  mm.  
<sup>b</sup> Design identical to form B/C: coolant transfer unit only with O-ring.

### 5.3 Transfer units for machining with MQL and manual tool change

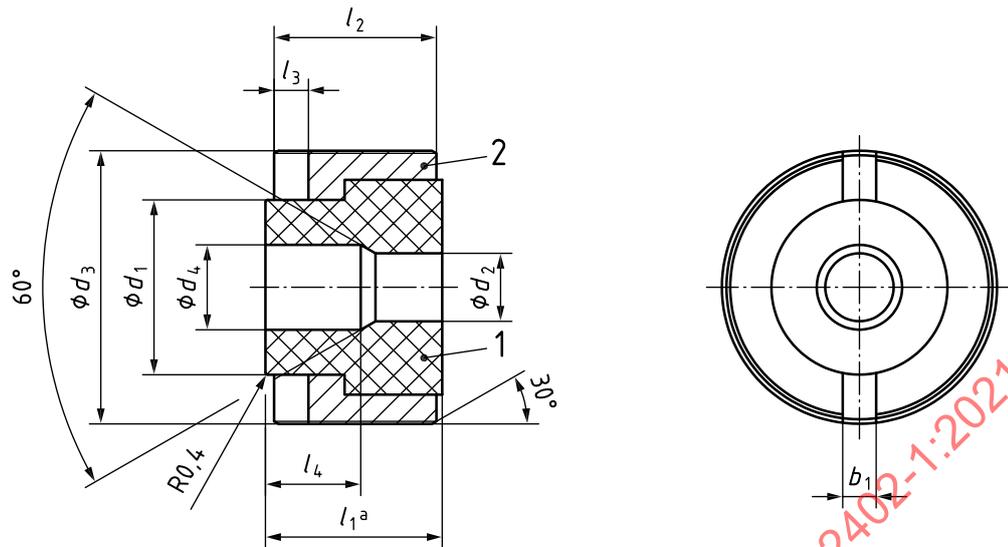
#### 5.3.1 General

Transfer unit for manual tool change are described in 5.3.2 to 5.3.5.

A seal is ensured by means of clamping system.

#### 5.3.2 Transfer unit, type G and type H

Transfer units of form G and H (see Figure 7) are only suitable for tool holders and tool cutter carriers with interfaces according to ISO 12164-1:

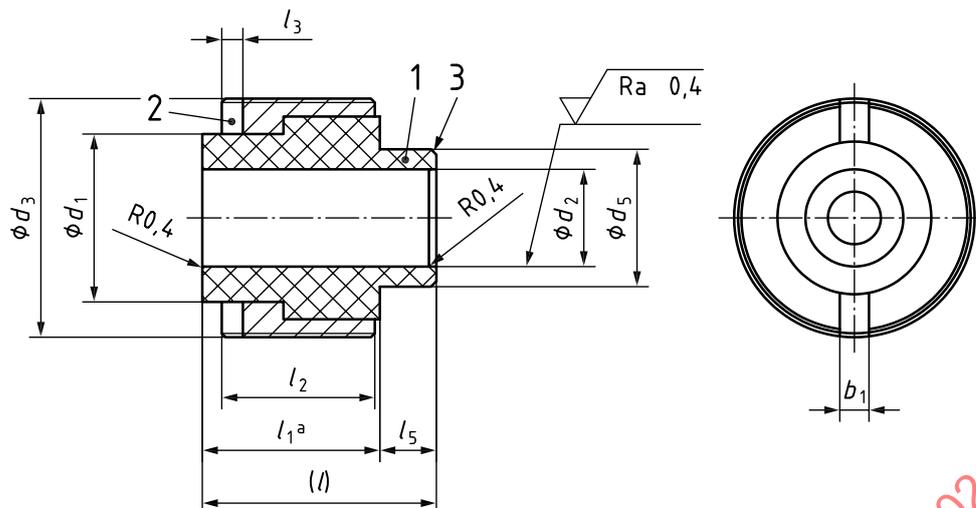
**Key**

- 1 sealing element made of temperature-resistant, chemically resistant to MQL medium and elastic material (e.g. EPDM, FPM)
- 2 threaded bush
- <sup>a</sup> In installed condition.

**Figure 7 — Transfer unit, type G and H**

### 5.3.3 Transfer unit with sealing element, type I

Transfer units of form I and J are only suitable for tool holders and tool cutter carriers with predefined holes suitable for [Table 4](#),  $d_5$ . The transfer unit of the form I shall be carried out according to [Figure 8](#) and [Table 4](#).



**Key**

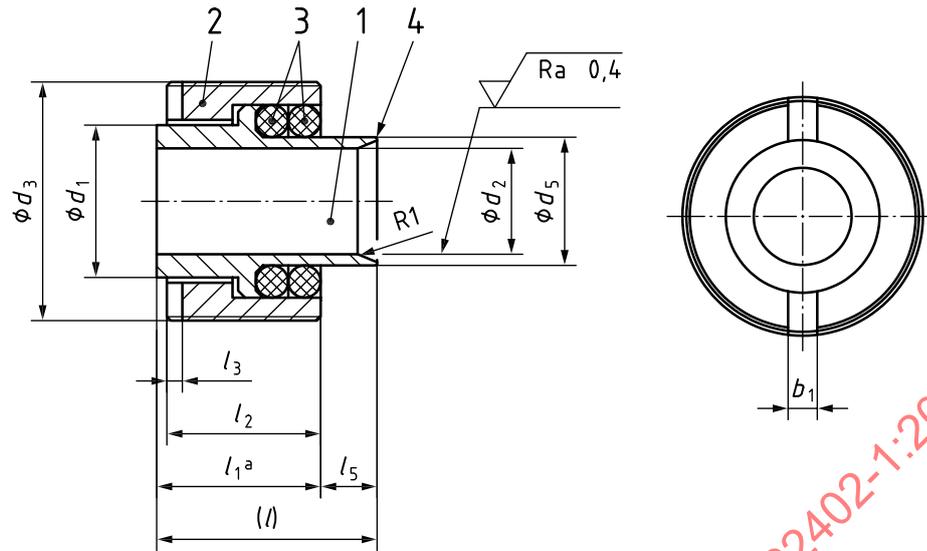
- 1 sealing element made of temperature-resistant, chemically resistant to MQL medium and elastic material (e.g. EPDM, FPM)
- 2 threaded bush
- 3 chamfer
- <sup>a</sup> In installed condition.

**Figure 8 — Transfer unit, type I**

**5.3.4 Transfer unit (steel version), type J**

The transfer unit of the form J shall be carried out according to [Figure 9](#) and [Table 4](#).

Various cooling channels are described in [Annex A](#).



**Key**

- 1 cooling channel
- 2 threaded bush
- 3 O-ring (2 pieces)
- 4 chamfer
- a In installed condition.

**Figure 9 — Transfer unit, type J**

**5.3.5 Dimensions**

**Table 4 — Transfer unit, type G, H, I and J, dimensions**

dimensions in millimetres

HSK-type					Nominal size						Transfer unit type
A	AB	EB	T	TA	32	40	50	63	80	100	
AS		ES			40	50	63	80	100	125	
$b_1$		+0,2 0			1,5	2	2	2,5	2,5	3	G, H, I, J
$d_1$					—	8,4	10,4	12,4	14,4	16,4	G, H
$d_1$					6,1	8,2	10,2	12,2	14,2	16,2	I
$d_1$					5,9	7,8	10	12	14	16	J
$d_2$	H9				—	4	4	4	4	4	H
$d_2$	H9				—	5	6,4	8	8	8	G
$d_2^a$					4	4,5	5,7	7	7	7	I
$d_2$	H9				4	5,4	6,5	6,5	8	8	J
$d_3$					M10 × 1	M12 × 1	M16 × 1	M18 × 1	M20 × 1,5	M24 × 1,5	G, H, I, J
$d_4$		0 -0,2			—	4	5	6	8	10	H
$d_5$					5,4	7	8	10	10,2	12	I
$d_5$					4,8	6,8	7,8	9,7	9,7	11,7	J
(l)					12,15	14,65	16,65	17,15	19,15	19,15	I

<sup>a</sup> Sealing element design for adjusting screw with  $\varnothing$  tolerance  $\pm 0,05$  mm.