



BSI Standards Publication

## **Tools for moulding — Ejector sleeves with cylindrical head — Basic series for general purposes**

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INTERNATIONAL  
STANDARD

**ISO**  
**8405**

Fourth edition  
2020-10

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**Tools for moulding — Ejector sleeves  
with cylindrical head — Basic series  
for general purposes**

*Outillage de moulage — Éjecteurs tubulaires à tête cylindrique —  
Série de base pour usages généraux*



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## Foreword

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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 8, *Tools for pressing and moulding*.

This fourth edition cancels and replaces the third edition (ISO 8405:2013) which has been technically revised.

The main changes compared to the previous edition is as follows:

- addition of ejector sleeves of diameter 0,8, 1,2, 1,5, 1,6, 1,7, 3,5, 3,7, 4,5, 7, 8,5, 9, 10,5, 11, 14 and 16;
- correction of the formulae giving the value of concentricity tolerance,  $t$ ;
- addition of a surface roughness of 1,6 at the end of the ejector sleeve shaft and of 3,2 on diameter  $D_3$ ;
- modification of the indication of the hardness of shaft for hot worked steel.

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).



# Tools for moulding — Ejector sleeves with cylindrical head — Basic series for general purposes

## 1 Scope

This document specifies the dimensions and tolerances, in millimetres, of ejector sleeves with cylindrical head which are used in compression and injection moulds and in diecasting dies.

It also gives material guidelines and hardness requirements, and specifies the designation of ejector sleeves with cylindrical head.

## 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 6751, *Tools for moulding — Ejector pins with cylindrical head*

## 3 Terms and definitions

No terms and definition are listed in this document

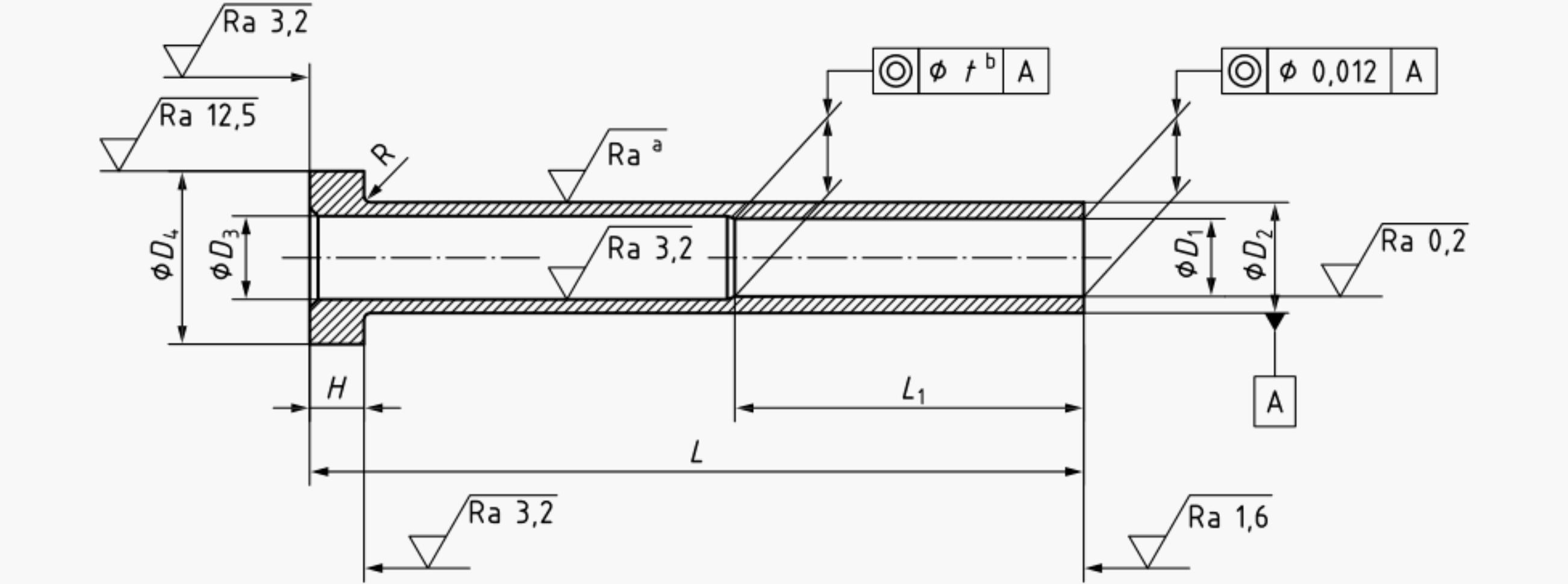
ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

## 4 Dimensions

The dimensions of ejector sleeves with cylindrical head shall be in accordance with the indications of [Figure 1](#) and [Table 1](#).

Surface roughness values in micrometres



- a  $Ra\ 0,8$  for hot worked steel.  $Ra\ 0,4$  for alloyed cold worked steel.
- b  $t = 0,012\ (L_1 \times 10^{-1})$   
where  $L_1$  is expressed in millimeters.

Figure 1 — Ejector sleeves

Table 1 — Ejector sleeves

Dimensions in millimetres

$D_1^a$ H5		$D_2$ g6	$D_3$	$D_4$ 0 −0,2	$L_1$ $+1$ 0	$L$ $+1$ 0										$H^b$ 0 −0,05	$R$ $+0,2$ 0	
Standard size	Over- size					75	100	125	150	175	200	225	250	275	300			
0,8		4	$2,4^{+0,1}_{-0,1}$	8	12	×	×								3	0,3		
1,2					20	×	×											
1,5						×	×	×	×									
1,6						×	×	×	×	×								
1,7						×	×	×	×	×								
2			$2,5^{+0,2}_{-0,1}$	35	×	×	×											
	2,2	×			×	×	×	×	×	×	×							
2,5		5	$3^{+0,2}_{-0,1}$	10		×	×	×										
	2,7				×	×	×	×	×	×	×							
3			$3,5^{+0,2}_{-0,1}$		×	×	×	×										
	3,2				×	×	×	×	×	×	×	×	×	×				

**Key**  
x standardized dimensions

NOTE Tolerance classes and limit deviations are defined in ISO 286-2.

a For repair, the following diameters for  $D_1$  are recommended: 2,2; 2,7; 3,2; 3,7; 4,2; 5,2; 6,2; 8,2; 10,2; 12,5.

b For shaft diameters,  $D_2$ , larger than those given in this table, up to 32 mm, the ratio of head height and diameter shall be the same as for ejector pins given in ISO 6751.

Table 1 (continued)

$D_1^a$ H5		$D_2$ g6	$D_3$	$D_4$ 0 −0,2	$L_1$ +1 0	$L$ +1 0										$H^b$ 0 −0,05	$R$ +0,2 0
Standard size	Over- size					75	100	125	150	175	200	225	250	275	300		
3,5		6	$4^{+0,2}_{-0,1}$	12	45	×	×	×	×	×	×	×	×	×		5	0,5
	3,7					×	×	×	×	×	×	×	×				
4		8	$4,5^{+0,2}_{-0,1}$	14		×	×	×	×	×	×						
	4,2					$5^{+0,2}_{-0,1}$	×	×	×	×	×	×	×	×			
4,5			$5,5^{+0,3}_{-0,1}$				×	×	×	×	×	×	×	×			
5							×	×	×	×	×	×	×	×			
	5,2					×	×	×	×	×	×	×	×				
6		10	$6,5^{+0,3}_{-0,1}$	16			×	×	×	×	×	×					
	6,2					×	×	×	×	×	×	×	×	×	×		
7		12	$7,5^{+0,3}_{-0,1}$	20			×		×		×		×		×	7	0,8
8						$8,5^{+0,3}_{-0,1}$		×	×	×	×	×	×	×	×		
	8,2		$9^{+0,3}_{-0,1}$				×	×	×	×	×	×	×	×	×		
8,5							×	×	×	×	×	×	×	×	×		
9		14	$9,5^{+0,3}_{-0,1}$	22			×		×		×		×		×		
10						$10,5^{+0,3}_{-0,1}$		×	×	×	×	×	×	×	×		
	10,2						×	×	×	×	×	×	×	×	×		
10,5			$11^{+0,3}_{-0,1}$					×	×	×	×	×	×	×	×		
11			$11,5^{+0,3}_{-0,1}$				×		×		×		×		×		
12		16	$12,5^{+0,3}_{-0,1}$	26				×	×	×	×	×	×	×	×		
	12,5					$13^{+0,3}_{-0,1}$		×	×	×	×	×	×	×	×		
14		18	$14,5^{+0,3}_{-0,1}$	26		55		×	×	×	×	×	×	×	×	×	
16		20	$16,5^{+0,3}_{-0,1}$				×	×	×	×	×	×	×	×	×	8	1
Key																	
× standardized dimensions																	
NOTE Tolerance classes and limit deviations are defined in ISO 286-2.																	
<sup>a</sup> For repair, the following diameters for $D_1$ are recommended: 2,2; 2,7; 3,2; 3,7; 4,2; 5,2; 6,2; 8,2; 10,2; 12,5.																	
<sup>b</sup> For shaft diameters, $D_2$ , larger than those given in this table, up to 32 mm, the ratio of head height and diameter shall be the same as for ejector pins given in ISO 6751.																	

5 Material and hardness

Ejector sleeves with cylindrical head shall be made of hot worked steel or alloyed cold worked steel. The hardness of the shaft and head, respectively, are given in [Table 2](#).



Table 2 — Material and hardness

Material	Hardness <sup>a</sup>	
	Shaft	Head
Hot worked steel	min. 1 400 MPa core strength Nidriting min. 950 HV 0,3	(45 ± 5) HRC hot-forged
Alloyed cold worked steel	(60 ± 2) HRC	
NOTE 1 Rockwell C hardness (HRC) is defined in ISO 6508 (all parts).		
NOTE 2 Vickers hardness (HV) is defined in ISO 6507 (all parts).		
<sup>a</sup> The point at which hardness is measured is left to the manufacturer's discretion.		

6 Designation

Ejector sleeves with cylindrical head according to this document shall be designated by the following:

- a) “Ejector sleeve with cylindrical head”;
- b) a reference to this document (i.e. ISO 8405);
- c) the diameter,  $D_1$ , in millimetres;
- d) the length,  $L$ , in millimetres;
- e) the material.

EXAMPLE An ejector sleeve with cylindrical head with diameter  $D_1 = 2$  mm, length  $L = 75$  mm, and made of hot worked steel is designated as follows:

Ejector sleeve with cylindrical head ISO 8405 - 2 - 75 - Hot worked steel

## **Bibliography**

- [1] ISO 286-2, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts*
- [2] ISO 6507 (all parts), *Metallic materials — Vickers hardness test*
- [3] ISO 6508 (all parts), *Metallic materials — Rockwell hardness test*



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