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**Tools for pressing — Guide bushes —**  
**Part 5:**  
**Form D, ball cage bushes, headed, type**  
**1**

*Outils de presse — Bagues de guidage —*

*Partie 5: Forme D, bagues à collerette pour guidage à billes, type 1*

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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. [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. [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 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 8, *Tools for pressing and moulding*.

This second edition results from the reinstatement of ISO 9448-5:1991, which was withdrawn in 2006 and with which it is technically identical.

ISO 9448 consists of the following parts, under the general title *Tools for pressing — Guide bushes*:

- Part 1: *Forms*
- Part 2: *Form A, gliding bushes, plain, type 1*
- Part 3: *Form B, ball cage bushes, plain, type 1*
- Part 4: *Form C, gliding bushes, headed, type 1*
- Part 5: *Form D, ball cage bushes, headed, type 1*
- Part 6: *Form E, gliding bushes, flanged, type 1*
- Part 7: *Form F, ball cage bushes, flanged, type 1*
- Part 8: *Form G, gliding bushes, stepped, type 1*
- Part 9: *Form B, ball cage bushes, plain, type 2*
- Part 10: *Form E, gliding bushes, flanged, type 2*
- Part 11: *Form F, ball cage bushes, flanged, type 2*

# Tools for pressing — Guide bushes —

## Part 5:

### Form D, ball cage bushes, headed, type 1

#### 1 Scope

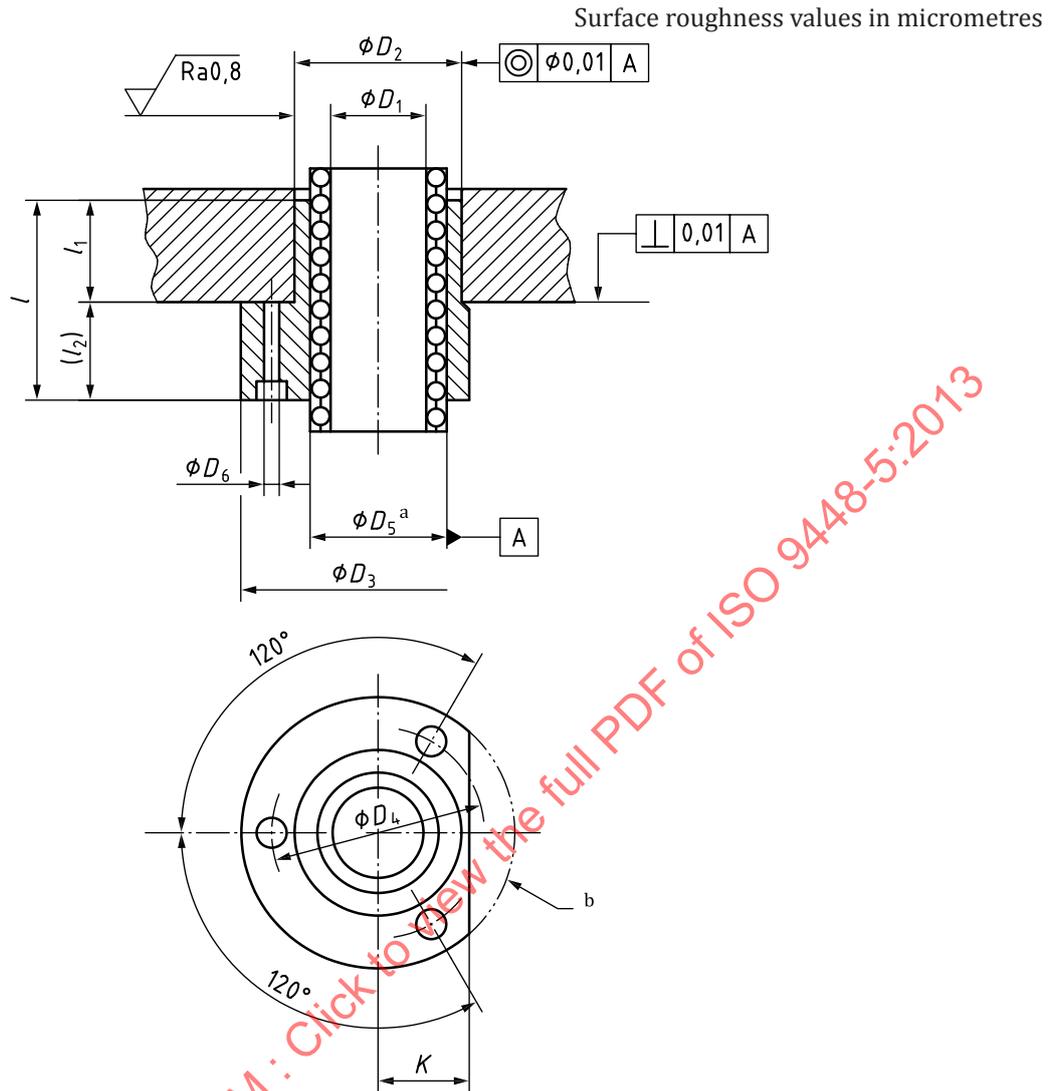
This part of ISO 9448 specifies the main dimensions and tolerances, in millimetres, of guide bushes of form D, headed ball cage bushes, type 1, intended for use in press tools and to be mounted in the clamp plate with transition fit and fixed to the plate by means of screws.

It gives guidance on the materials, and specifies the hardness and the designation of bushes in accordance with this part of ISO 9448.

#### 2 Dimensions

The dimensions of type 1 headed ball cage bushes (form D) shall conform to the indications in [Figure 1](#) and [Table 1](#).

Details not stated, such as chamfers, radii, lubrication grooves, are left to the manufacturer's discretion.



- a The manufacturer shall determine the internal diameter,  $D_5$ , of the bush, using the tolerance M5. This diameter is intended to be lapped or ground to ensure the proper preloading of the balls between the pillar and the bush, as determined by the manufacturer. This lapping or grinding operation shall be carried out to give a surface roughness  $Ra = 0,05 \mu\text{m}$  and this diameter shall act as a reference diameter for the concentricity and perpendicularity tolerances.
- b Left to the manufacturer's discretion.

**Figure 1 — Form D, headed ball cage bushes, type 1**

Table 1

$D_1$		16	20	25	32	40	50							
$D_2$ k5 <sup>a</sup>		28	32	40	48	58	70							
$D_3$		45	50	63	72	85	104							
$D_4$		35	40	50	58	70	86							
Clearance hole	$D_6$	4,5	4,5	5,5	5,5	6,6	9							
For screw		M4	M4	M5	M5	M6	M8							
$K$		15	18	23	28	33	38							
nom.	$l_1$ tol.	$l$	$(l_2)$											
25	-2,0 -2,5	31	6	40	15									
32		38	6	47	15	57	25							
40	-3 -4			55	15	65	25	65	25	70	30			
50								75	25	80	30	92	42	
63													105	42
To prevent incorrect assembly of the upper and lower plates of the die set in relation to each other, the following values of $D_1$ are recommended: 15, 19, 24, 30, 38 and 48.														
<sup>a</sup> Intended to fit into a hole having a tolerance of H7.														

### 3 Material

The material is left to the manufacturer's discretion and the hardness shall be  $(63 \pm 1)$  HRC.

### 4 Designation

A guide bush in accordance with this part of ISO 9448 shall be designated by:

- "Guide bush";
- a reference to this part of ISO 9448, i.e ISO 9448-5;
- its form;
- its guiding diameter,  $D_1$ , in millimetres;
- its length,  $l_1$ , in millimetres.

EXAMPLE A guide bush of form D, headed ball cage bush, type 1 of guiding diameter  $D_1 = 16$  mm and of length  $l_1 = 25$  mm is designated as follows:

#### Guide bush ISO 9448-5 D - 16 × 25

## Bibliography

- [1] ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

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