

冲模 圆柱头直杆或缩杆凸模 **Tools for pressing — Punches with cylindrical head and straight or reduced shank**

1 范围 **Scope**

本文件规定了圆柱头直杆和缩杆凸模的基本尺寸和公差，单位为毫米。

本文件对圆形、长圆形、正方形和长方形的圆柱头缩杆凸模进行了标准化。

本文件还给出了材料及其硬度的例子，并规定了按照本国际标准的凸模的标记。

本文件适用于杆径 D 在3 mm~32 mm之间的凸模。

本文件规定的凸模主要用于钢板冲孔，也可用于其它材料的冲裁。

This International Standard specifies the basic dimensions and tolerances, in millimetres, of punches with cylindrical head and straight or reduced shank.

Cylindrical head punches with reduced shank are standardized in round, oblong, square and rectangular shapes.

This International Standard gives examples of materials and their hardness, and specifies the designation of punches.

These punches are available with shank diameters, D , from 3 mm to 32 mm.

The main use of the punches specified in this International Standard is for punching holes in steel sheet. They may also be used for punching in other materials.

2 规范性引用文件 **Normative references**

下列文件中的内容通过文中的规范性引用而构成本文件必不可少的条款。其中，注日期的引用文件，仅该日期对应的版本适用于本文件；不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

ISO 8695: 1987, 冲模 凸模 名词术语

ISO 2768-1: 1989, 通用公差 第1部分：未注公差的线和角度尺寸的公差

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 8695:1987, *Tools for pressing — Punches — Nomenclature and terminology*

ISO 2768-1:1989, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

3 术语和定义 **Terms and definitions**

ISO 8695界定的术语和定义适用于本文件。

For the purposes of this International Standard, the terms and definitions given in ISO 8695 apply.

4 尺寸 Dimensions

4.1 冲孔凸模 Perforating punches

4.1.1 A型直杆凸模 Punches with straight shank — Type A

见图1和表1。See Figure 1 and Table 1.

通用公差：ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers

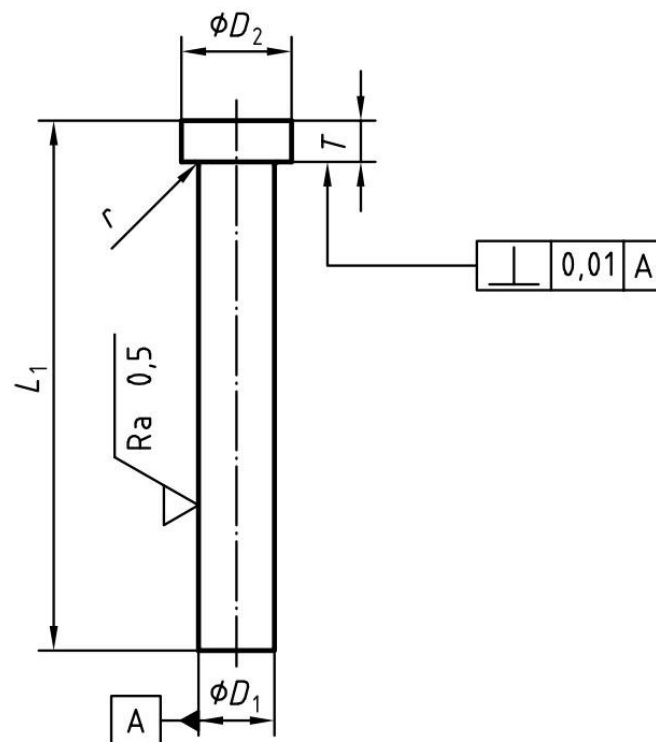


图1

表1

D_1 m5	D_2 $\begin{smallmatrix} 0 \\ -0.25 \end{smallmatrix}$	T $\begin{smallmatrix} +0.25 \\ 0 \end{smallmatrix}$	r $\begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$	L_1 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$						
				56	63	71	80	90	100	120
3	5	3	0.2	×	×	×	×	×		
4	6			×	×	×	×	×		
5	8	5	0.3	×	×	×	×	×	×	×
6	9			×	×	×	×	×	×	×
8	11			×	×	×	×	×	×	×
10	13			×	×	×	×	×	×	×
13	16		0.4			×	×	×	×	×
16	19					×	×	×	×	×
20	23					×	×	×	×	×
25	28					×	×	×	×	×
32	35					×	×	×	×	×

4.1.2 缩杆凸模 Punches with reduced shank

4.1.2.1 B型圆形凸模 Punches with round shape — Type B

见图2和表2。See Figure 2 and Table 2.

通用公差: ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers

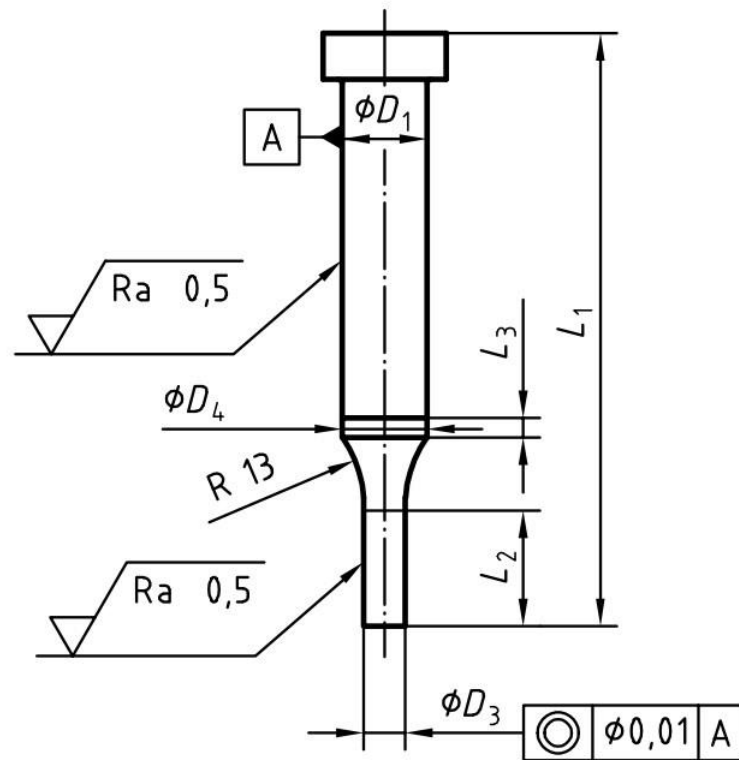


图2

表2

D_1 m5	D_3 ± 0.01	L_1 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$						
		56	63	71	80	90	100	120
3	$0.8 \leq D_3 \leq 2.9$	×	×	×	×			
4	$1 \leq D_3 \leq 3.9$	×	×	×	×			
5	$1.5 \leq D_3 \leq 4.9$	×	×	×	×	×		
6	$1.6 \leq D_3 \leq 5.9$	×	×	×	×	×		
8	$2.5 \leq D_3 \leq 7.9$	×	×	×	×	×	×	×
10	$4 \leq D_3 \leq 9.9$	×	×	×	×	×	×	×
13	$5 \leq D_3 \leq 12.9$			×	×	×	×	×
16	$8 \leq D_3 \leq 15.9$			×	×	×	×	×
20	$12 \leq D_3 \leq 19.9$			×	×	×	×	×
25	$16.5 \leq D_3 \leq 24.9$			×	×	×	×	×
32	$20 \leq D_3 \leq 31.9$			×	×	×	×	×

注：刃口长度 L_2 、直径 D_4 和长度 L_3 由制造者自行确定。所有其它尺寸（ D_2 、 r 和 T ）见 4.1.1。

NOTE The point length L_2 , diameter D_4 and length L_3 are left to the manufacturer's discretion. See 4.1.1 for all other dimensions (D_2 , r , and T).

4.1.2.2 正方形 (S)、长方形 (R) 和长圆形 (O) 凸模 BS、BR 和 BO 型 Punches with square (S), rectangular (R) and oblong (O) shapes — Types BS, BR and BO

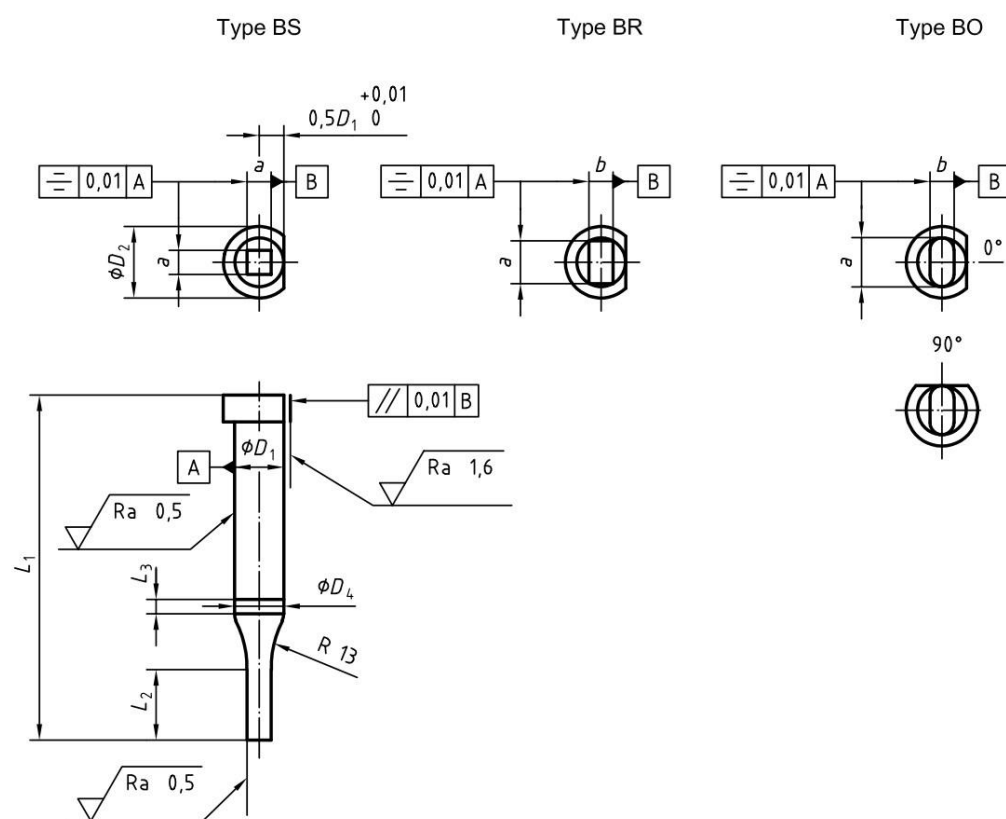
见图3和表3。See Figure 3 and Table 3.

通用公差：ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers



注：定位装置的标准位置为 0° 。

NOTE Standard position of location device is 0° .

图3

表3

D_1 m5	BS 型 a ± 0.01	BR 和 B0 型 a 和 b ± 0.01	L_1 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$						
			56	63	71	80	90	100	120
5	$1 \leq a \leq 3.5$	$1 (a, b) \leq 4.9$	×	×	×	×	×		
6	$1.6 \leq a \leq 4.2$	$1.6 (a, b) \leq 5.9$	×	×	×	×	×		
8	$2 \leq a \leq 5.6$	$2 (a, b) \leq 7.9$	×	×	×	×	×	×	×
10	$3.5 \leq a \leq 7$	$3.5 (a, b) \leq 9.9$	×	×	×	×	×	×	×
13	$4.5 \leq a \leq 9.1$	$4.5 (a, b) \leq 12.9$			×	×	×	×	×
16	$6 \leq a \leq 11.2$	$6 (a, b) \leq 15.9$			×	×	×	×	×
20	$8 \leq a \leq 14.1$	$8 (a, b) \leq 19.9$			×	×	×	×	×
25	$10 \leq a \leq 17.6$	$10 (a, b) \leq 24.9$			×	×	×	×	×
32	$10 \leq a \leq 22.5$	$10 (a, b) \leq 31.9$			×	×	×	×	×
注：刃口长度 L_2 、直径 D_1 和长度 L_3 由制造者自行确定。所有其它尺寸（ D_2 、 r 和 T ）见 4.1.1。 NOTE The point length L_2 , diameter D_1 and length L_3 are left to the manufacturer's discretion. See 4.1.1 for all other dimensions (D_2 , r , and T).									

4.2 导正凸模 Pilot punches

4.2.1 C 型导正凸模 Pilot punches — Type C

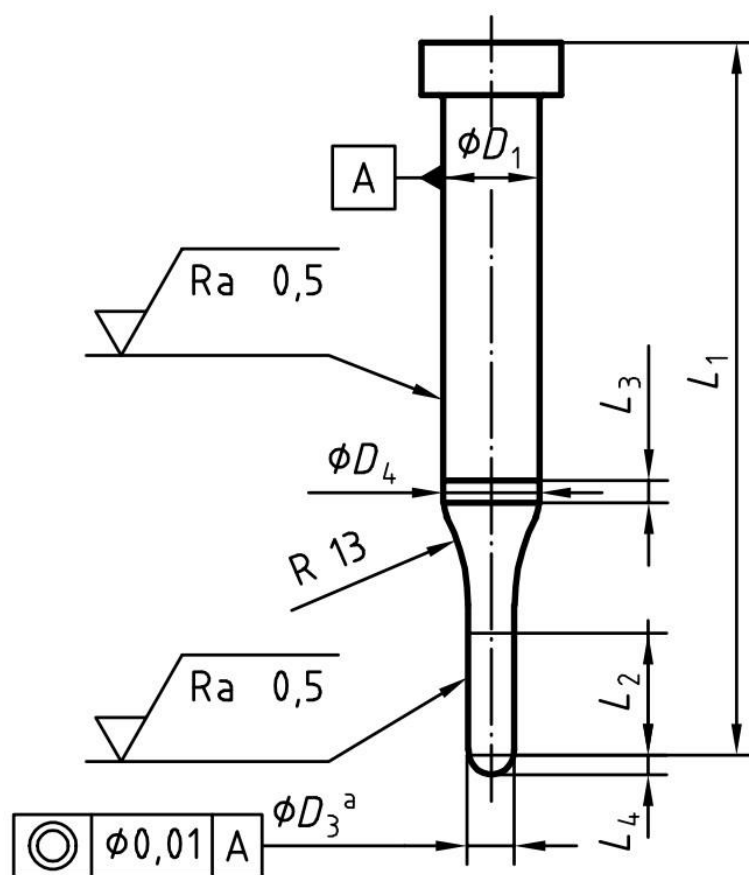
见图4和表4。See Figure 4 and Table 4.

通用公差：ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers



^a 导向头直径 D_3 应比同等凸模的直径小。

The diameter D_3 of the pilot shall be smaller than the diameter of the equivalent punch.

图4

表4

D_1 m5	D_3 ± 0.01	L_1						
		56	63	71	80^{+1}_0	90	100	120
5	$1 \leq D_3 \leq 4.9$	×	×	×	×	×		
6	$1.6 \leq D_3 \leq 5.9$	×	×	×	×	×		
8	$2.5 \leq D_3 \leq 7.9$	×	×	×	×	×	×	×
10	$4 \leq D_3 \leq 9.9$	×	×	×	×	×	×	×
13	$5 \leq D_3 \leq 12.9$			×	×	×	×	×
16	$8 \leq D_3 \leq 15.9$			×	×	×	×	×
20	$12 \leq D_3 \leq 19.9$			×	×	×	×	×

25	$16.5 \leq D_3 \leq 24.9$			×	×	×	×	×
32	$20 \leq D_3 \leq 31.9$			×	×	×	×	×

注：刃口长度 L_2 和 L_4 、直径 D_4 、长度 L_3 和刃口形状由制造者自行确定。所有其它尺寸（ D_2 、 r 和 T ）见 4.1.1。

NOTE The point length L_2 and L_4 , diameter D_4 and length L_3 are left to the manufacturer's discretion. See 4.1.1 for all other dimensions (D_2 , r , and T).

4.2.2 D 型正向导正凸模 Positive pilot punches — Type D

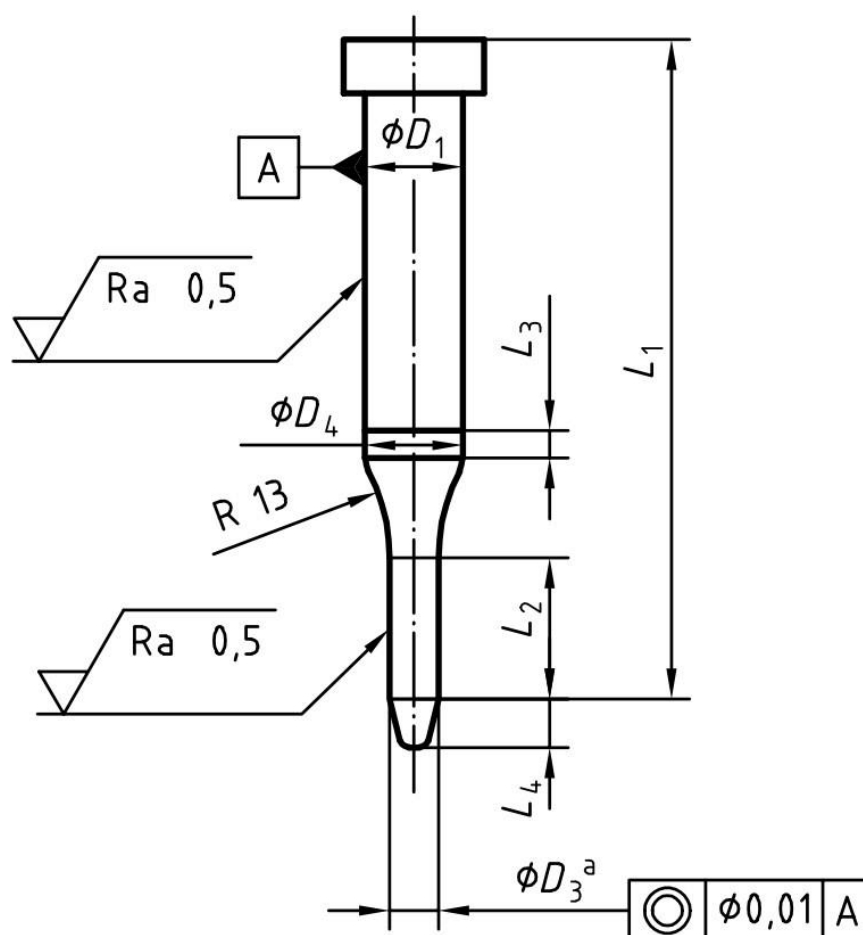
见图5和表5。See Figure 5 and Table 5.

通用公差：ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers



^a 导向头直径 D_3 应比同等凸模的直径小。

The diameter D_3 of the pilot shall be smaller than the diameter of the equivalent punch.

图5

表5

D_1 m5	D_3 ± 0.01	L_1 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$						
		56	63	71	80	90	100	120
5	$1 \leq D_3 \leq 4.9$	×	×	×	×	×		
6	$1.6 \leq D_3 \leq 5.9$	×	×	×	×	×		
8	$2.5 \leq D_3 \leq 7.9$	×	×	×	×	×	×	×
10	$4 \leq D_3 \leq 9.9$	×	×	×	×	×	×	×
13	$5 \leq D_3 \leq 12.9$			×	×	×	×	×
16	$8 \leq D_3 \leq 15.9$			×	×	×	×	×
20	$12 \leq D_3 \leq 19.9$			×	×	×	×	×
25	$16.5 \leq D_3 \leq 24.9$			×	×	×	×	×
32	$20 \leq D_3 \leq 31.9$			×	×	×	×	×
<p>注：刃口长度 L_2 和 L_4、直径 D_1、长度 L_3 和刃口形状由制造者自行确定。所有其它尺寸（D_2、r 和 T）见 4.1.1。</p> <p>NOTE The point length L_2 and L_4, diameter D_1 and length L_3 are left to the manufacturer's discretion. See 4.1.1 for all other dimensions (D_2, r, and T).</p>								

4.3 带推出装置的凸模 Punches with ejector

4.3.1 E 型带推出装置的直杆凸模 Punches with ejector with straight shank — Type E

见图6和表6。See Figure 6 and Table 6.

通用公差：ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers

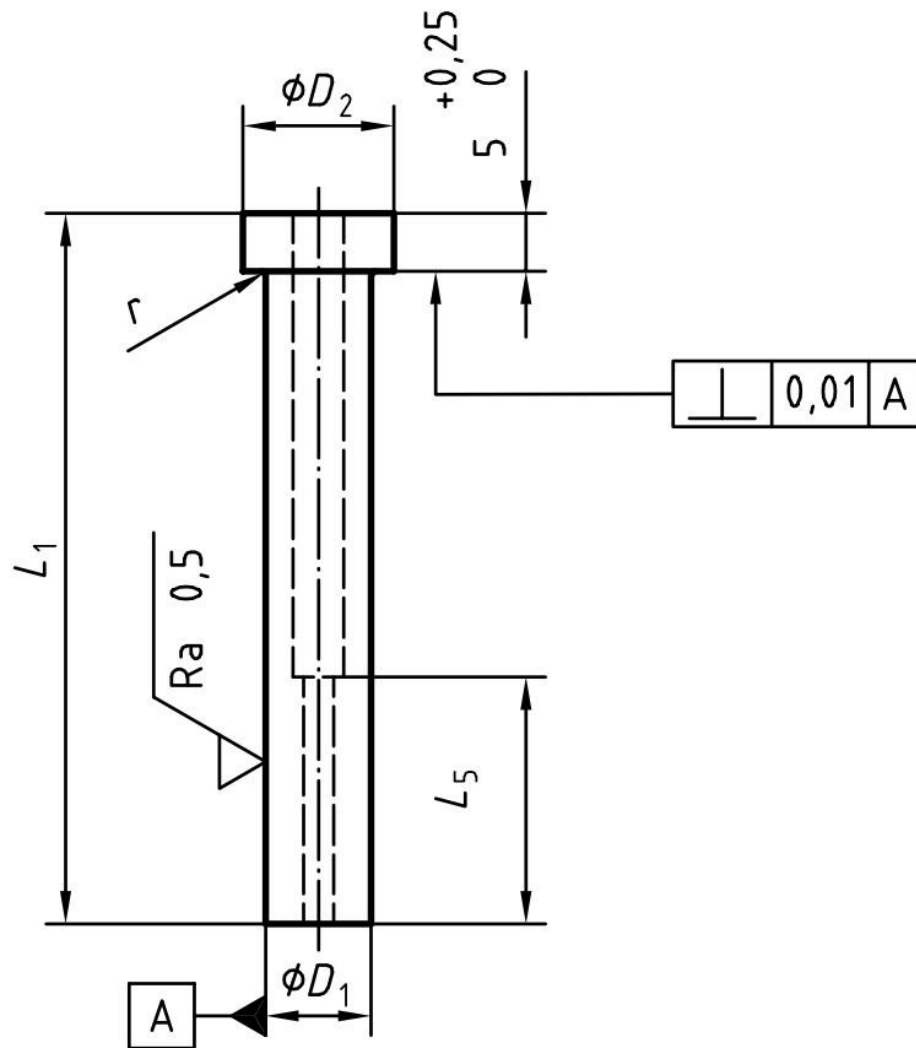


图6

表6

D_1 m5	D_2 $\begin{smallmatrix} 0 \\ -0.25 \end{smallmatrix}$	r $\begin{smallmatrix} +0.1 \\ 0 \end{smallmatrix}$	L_1 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$						
			56	63	71	80	90	100	120
5	8	0.3	×	×	×	×	×		
6	9		×	×	×	×	×		
8	11		×	×	×	×	×	×	×
10	13		×	×	×	×	×	×	×
13	16	0.4			×	×	×	×	×
16	19				×	×	×	×	×
20	23				×	×	×	×	×

25	28				×	×	×	×	×
32	35				×	×	×	×	×

注：长度 L_s 、推出装置零部件和锁紧孔由制造者自行确定。

NOTE The length L_s , the ejector components and the locking hole are left to the manufacturer's discretion.

4.3.2 带推出装置的缩杆凸模 Punches with ejector with reduced shank

4.3.2.1 F型带推出装置的圆凸模 Punches with ejector with round shape — Type F

见图7和表7。See Figure 7 and Table 7.

通用公差：ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers

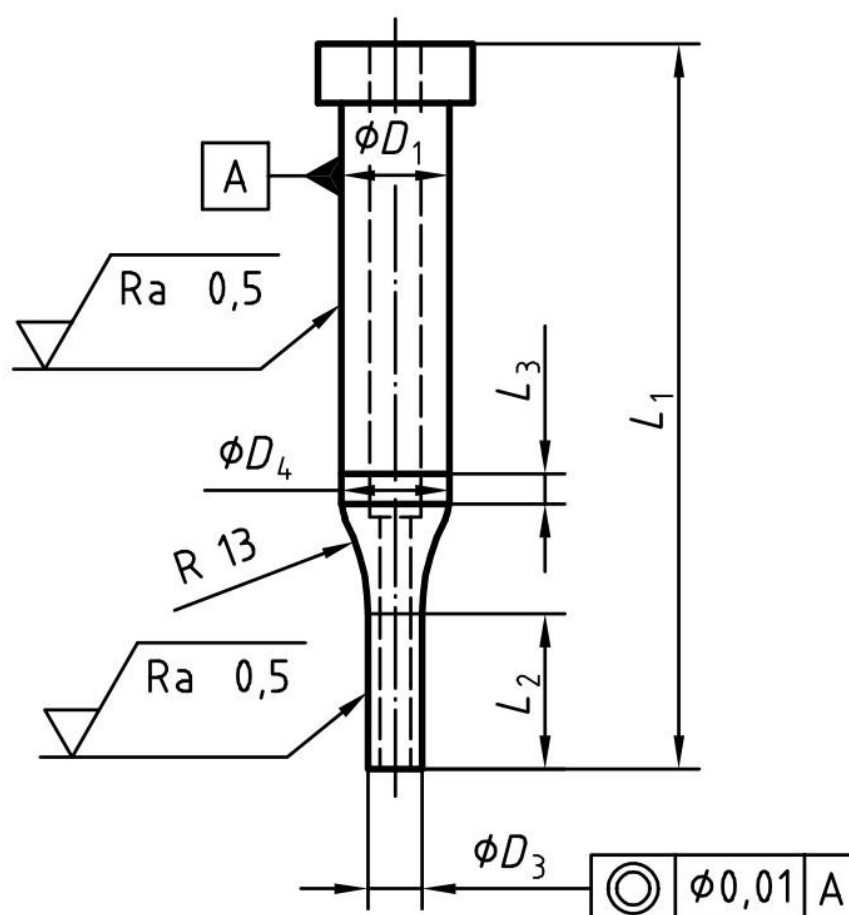


图7

表7

D_1 m5	D_3 ± 0.01	L_1 $\begin{smallmatrix} +1 \\ 0 \end{smallmatrix}$						
		56	63	71	80	90	100	120
5	$1 \leq D_3 \leq 4.9$	×	×	×	×	×		
6	$1.6 \leq D_3 \leq 5.9$	×	×	×	×	×		
8	$2.5 \leq D_3 \leq 7.9$	×	×	×	×	×	×	×
10	$4 \leq D_3 \leq 9.9$	×	×	×	×	×	×	×
13	$5 \leq D_3 \leq 12.9$			×	×	×	×	×
16	$8 \leq D_3 \leq 15.9$			×	×	×	×	×
20	$12 \leq D_3 \leq 19.9$			×	×	×	×	×
25	$16.5 \leq D_3 \leq 24.9$			×	×	×	×	×
32	$20 \leq D_3 \leq 31.9$			×	×	×	×	×
<p>注：刃口长度 L_2、直径 D_4、长度 L_3、推出装置零部件和锁紧孔由制造者自行确定。所有其它尺寸（D_2、r 和头部厚度）见 4.3.1。</p> <p>NOTE The point length L_2, diameter D_4, length L_3, the ejector components and the locking hole are left to the manufacturer's discretion. See 4.3.1 for all other dimensions (D_2, r, and the head thickness).</p>								

4.3.2.2 带推出装置的正方形（S）、长方形（R）和长圆形（O）凸模 FS、FR 和 FO 型 Punches with ejector with square (S), rectangular (R) and oblong (O) shapes — Types FS, FR and FO

见图8和表8。See Figure 8 and Table 8.

通用公差：ISO 2768m

表面粗糙度单位为微米

General tolerance: ISO 2768m

Surface roughness values in micrometers

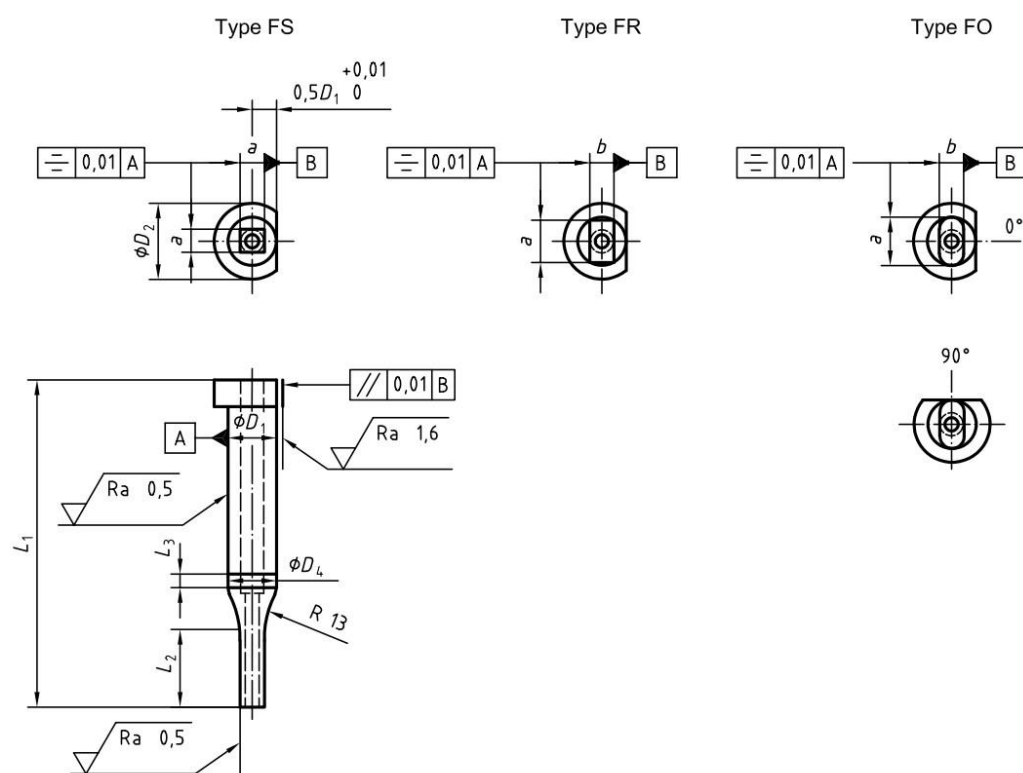


图8

表8

D_1 m5	FS 型	FR 和 FO 型	L_1						
	a ± 0.01	a 和 b ± 0.01	56	63	71	80^{+1}_0	90	100	120
5	$1 \leq a \leq 3.5$	$1' (a, b) \leq 4.9$	×	×	×	×	×		
6	$1.6 \leq a \leq 4.2$	$1.6' (a, b) \leq 5.9$	×	×	×	×	×		
8	$2 \leq a \leq 5.6$	$2' (a, b) \leq 7.9$	×	×	×	×	×	×	×
10	$3.5 \leq a \leq 7$	$3.5' (a, b) \leq 9.9$	×	×	×	×	×	×	×
13	$4.5 \leq a \leq 9.1$	$4.5' (a, b) \leq 12.9$			×	×	×	×	×
16	$6 \leq a \leq 11.2$	$6' (a, b) \leq 15.9$			×	×	×	×	×
20	$8 \leq a \leq 14.1$	$8' (a, b) \leq 19.9$			×	×	×	×	×
25	$10 \leq a \leq 17.6$	$10' (a, b) \leq 24.9$			×	×	×	×	×
32	$10 \leq a \leq 22.5$	$10' (a, b) \leq 31.9$			×	×	×	×	×

注：刃口长度 L_2 、直径 D_1 、长度 L_3 、推出装置零部件和锁紧孔由制造者自行确定。所有其它尺寸（ D_2 、 r 和头部厚度）见 4.3.1。

NOTE The point length L_2 , diameter D_1 , length L_3 , the ejector component and the locking hole are left to the manufacturer's discretion. See 4.3.1 for all other dimensions (D_2 , r , and head thickness).

5 材料和硬度 Material and hardness

材料由制造者自行确定。下面给出的硬度值仅作示例参考：

a) 含 Cr5% ~ 12% 的冷作合金钢

——刃口：(60 ± 2) HRC

——头部：(45 ± 5) HRC

b) 高速钢

——刃口：(62 ± 2) HRC

——头部：(52 ± 5) HRC

The material is left to the manufacturer's discretion. The following hardness value are given as examples:

a) alloyed cold work steel with to

— point: (60 ± 2) HRC

— head: (45 ± 5) HRC

b) high speed steel

— point: (62 ± 2) HRC

— head: (52 ± 5) HRC

6 标记 Designation

符合本国际标准的凸模应有下列标记：

a) “凸模”；

b) 本国际标准的代号，即 ISO 8020；

c) 凸模的类型（A、B、BS、BR、BO、C、D、E、F、FS、FR 或 FO）；

d) 杆径 D_1 ，单位为毫米；

e) 对于 B、BS、BR、BO、C、D、F、FS、FR 和 FO 型，刃口尺寸（ D_2 、 a 或 $a \times b$ ），单位为毫米；

f) 对于 BS、BR、BO、FS、FR 和 FO，定位装置的角度位置（0°，90°）；

g) 总长度 L_1 ，单位为毫米；

h) 材料（含 Cr5% ~ 12% 的冷作合金钢或高速钢）。

示例1：

杆径 $D_1 = 5\text{mm}$ 、刃口直径 $D_2 = 2\text{mm}$ 、总长度 $L_1 = 71\text{mm}$ 的冷作合金钢圆形冲孔凸模（B型）的标记表示如下：

凸模 ISO 8020 - B - 5 × 2 × 71 - 冷作合金钢

示例2：

杆径 $D_1 = 5\text{mm}$ 、刃口尺寸 $a \times b = 2\text{mm} \times 3\text{mm}$ 、带一个 90° 的定位装置、总长度 $L_1 = 90\text{mm}$ 的高速钢长方形冲孔凸模（BR 型）的标记表示如下：

凸模 ISO 8020 – BR – $5 \times 2 \times 3 \times 90^\circ \times 90$ – 高速钢

A punch in accordance with this International Standard shall be designated by:

- a) “Punch”;
- b) reference to this International Standard, i.e. ISO 8020;
- c) the type of punch (A, B, BS, BR, BO, C, D, E, F, FS, FR or FO);
- d) its shank diameter, ϕ , in millimetres;
- e) for types B, BS, BR, BO, C, D, F, FS, FR and FO, its point dimensions (a , b or r), in millimetres;
- f) for types BS, BR, BO, FS, FR and FO, the angle position of the location device (α , β);
- g) its overall length, L , in millimetres;
- h) its material (alloyed cold work steel with to or high speed steel).

EXAMPLE 1 A round perforating punch (type B) of shank diameter ϕ , of point diameter d and of overall length L in alloyed cold work steel is designated as follows:

Punch ISO 8020-B- ϕ 2 71-alloyed cold work steel

EXAMPLE 2 A rectangular perforating punch (type BR) of shank diameter $\phi = 5\text{mm}$, of point dimensions $a \times b = 2\text{ mm} \times 3\text{ mm}$, with a location device at α and of overall length L in high speed steel is designated as follows:

Punch ISO 8020-BR- ϕ 5 2 3 90° 90-high speed steel
