

冲模 凹模 Tools for pressing — Matrixes

1 范围 Scope

本文件规定了外径5~50毫米的不带头和带头凹模的基本尺寸和公差，单位为毫米。
本文件还给出了有关材料和硬度的实例，并规定了符合本国际标准要求的凹模的标记。
本文件规定的凹模尺寸和公差与ISO 8020规定的凸模尺寸和公差相符。

This International Standard lays down the basic dimensions and tolerances in millimetres for headless and headed matrixes, in the outside diameter range of 5 mm to 50 mm.

It gives examples of material and hardness, and specifies a designation for matrixes that meet the requirements of this International Standard.

The dimensions and tolerances of the matrixes specified in this International Standard are adapted to conform to those for punches specified in ISO 8020.

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 8020: 2002 冲模 圆柱头直杆或缩杆凸模

The following normative document contains 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 edition of the normative document 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 8020:2002, *Tools for pressing — Punches with cylindrical head and straight or reduced shank*

3 术语和定义

请选择适当的引导语

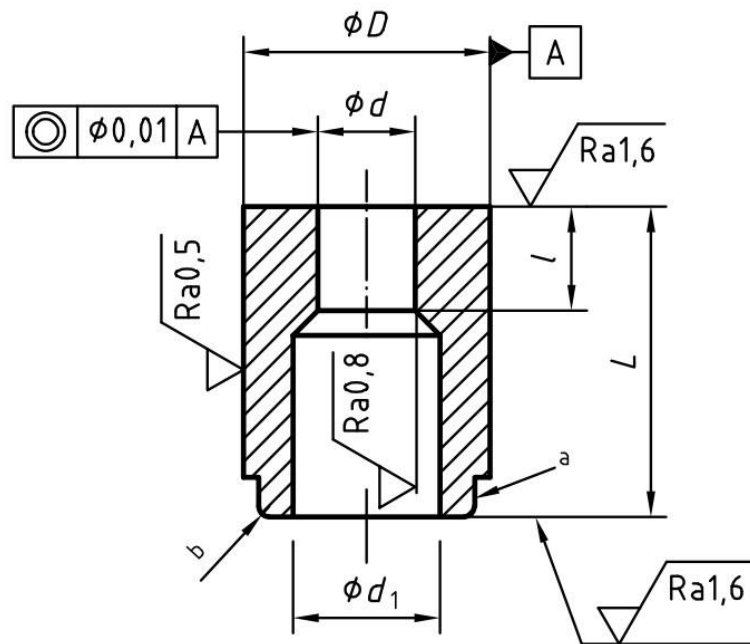
4 尺寸 Dimensions

4.1 冲切圆形零件的凹模 Matrixes with round cutting shapes

见图1、图2和表1。See Figures 1 and 2 and Table 1.

表面粗糙度值单位为微米

Surface roughness values in micrometres



^a 可选导向端。

^b 倒角由制造者自行决定。

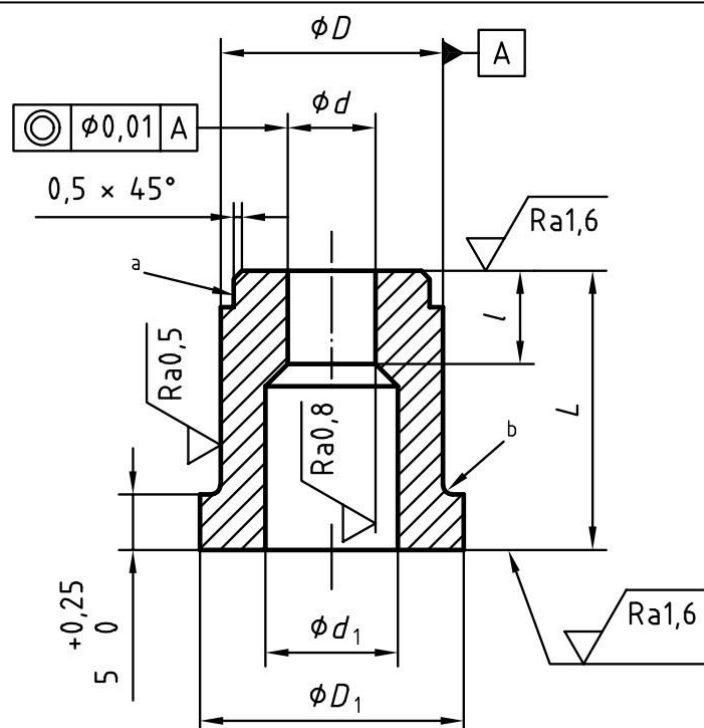
^a Optional lead.

^b Chamfer left to the manufacturer's discretion.

图1 A 型 冲切圆形零件的不带头凹模 Figure 1 — Type A — Headless matrix with round cutting shape

表面粗糙度值单位为微米

Surface roughness values in micrometres



^a 可选导向端。

^b 圆角由制造者自行决定。

^a Optional lead.

^b Execution left to the manufacturer's discretion.

图2 B型 冲切圆形零件的带头凹模 Figure 2 — Type B — Headed matrix with round cutting shape

表1 尺寸 Dimensions

尺寸单位为毫米

Dimensions in millimeters

| A 型 n5 ^a | D | B 型 m5 ^a | d $+0.02$ 0 | D_1 0 -0.25 | L $+0.5$ 0 | | | l | | d_1 |
|------------------------|----|------------------------|-----------------------|-------------------------|--------------------|----|----|----|----|-------|
| | | | | | 20 | 25 | 32 | 最小 | 最大 | |
| | 5 | | $1 \leq d \leq 2.4$ | 8 | × | | | 2 | | 2.8 |
| | 6 | | $1.6 \leq d \leq 3$ | 9 | × | × | | 3 | | 3.5 |
| | 8 | | $2 \leq d \leq 3.5$ | 11 | × | × | | 4 | | 4 |
| | 10 | | $2.5 \leq d \leq 5$ | 13 | × | × | × | 4 | 8 | 5.8 |
| | 13 | | $4 \leq d \leq 7$ | 16 | × | × | × | 5 | 8 | 8 |
| | 16 | | $6 \leq d \leq 9$ | 19 | × | × | × | 5 | 8 | 9.5 |
| | 20 | | $8 \leq d \leq 11$ | 23 | × | × | × | 8 | 20 | 12 |
| | 25 | | $10.7 \leq d \leq 16$ | 28 | × | × | × | 8 | 20 | 17.3 |

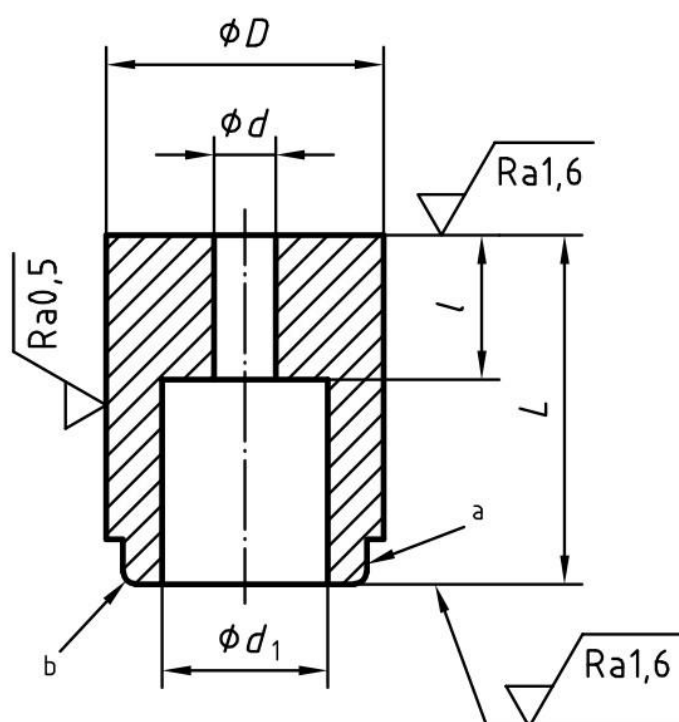
| | | | | | | | | |
|---|---------------------|----|---|---|---|---|----|------|
| 32 | $15 \leq d \leq 20$ | 35 | × | × | × | 8 | 20 | 20.7 |
| 40 | $19 \leq d \leq 27$ | 43 | | × | × | 8 | 20 | 27.7 |
| 50 | $26 \leq d \leq 36$ | 53 | | | × | 8 | 20 | 37 |
| ^a 有特殊要求可取 h5。 ^a h5 on special request. | | | | | | | | |

4.2 用于异形冲切的凹模 Blank matrixes for shaped cutting shapes

见图3、图4和表2。See Figures 3 and 4 and Table 2.

表面粗糙度值单位为微米

Surface roughness values in micrometres



^a 可选导向端。

^b 倒角由制造者自行决定。

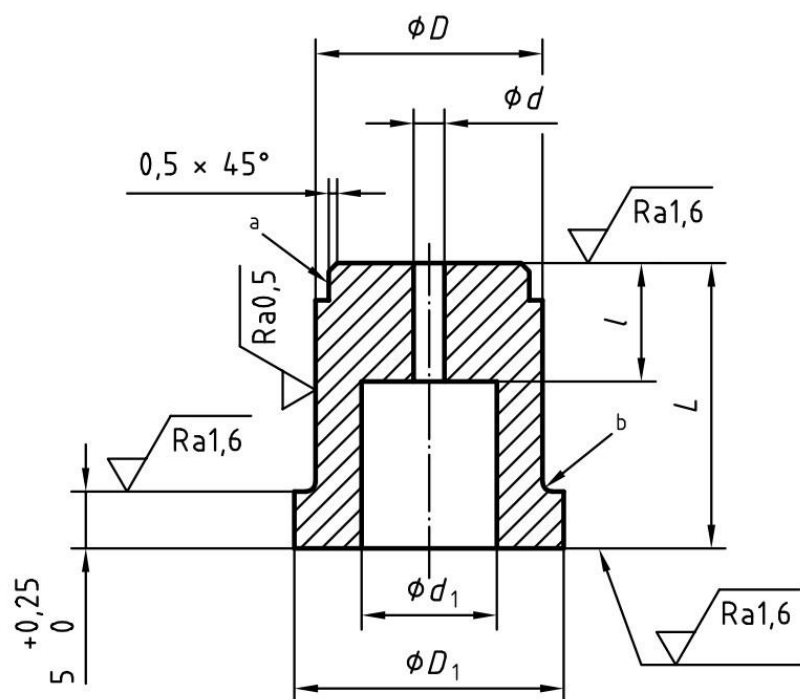
^a Optional lead.

^b Chamfer left to the manufacturer's discretion.

图3 C型 冲切圆形零件的不带头凹模 Figure 3 — Type C — Blank headless matrix with shaped cutting shape

表面粗糙度值单位为微米

Surface roughness values in micrometres



^a 可选导向端

^b 圆角由制造者自行决定。

^a Optional lead.

^b Execution left to the manufacturer's discretion.

图4 D 型 冲切圆形零件的带头凹模 Figure 4 — Type D — Blank headed matrix with shaped cutting shape

表2 尺寸 Dimensions

尺寸单位为毫米

Dimensions in millimeters

| D C 型 $n5^a$ | D 型 $m5^a$ | d | D_1 $\begin{smallmatrix} 0 \\ -0.25 \end{smallmatrix}$ | L $\begin{smallmatrix} +0.5 \\ 0 \end{smallmatrix}$ | | | l | | d^b 最大 |
|----------------------|-----------------|-----|---|--|----|----|-----|----|-------------|
| | | | | 20 | 25 | 32 | 最小 | 最大 | |
| 8 | | 1 | 11 | × | × | | 4 | | 4 |
| 10 | | 1 | 13 | × | × | × | 4 | 8 | 5.8 |
| 13 | | 1.2 | 16 | × | × | × | 5 | 8 | 8 |
| 16 | | 1.2 | 19 | × | × | × | 5 | 8 | 9.5 |
| 20 | | 1.5 | 23 | × | × | × | 8 | 20 | 12 |
| 25 | | 1.5 | 28 | × | × | × | 8 | 20 | 17.3 |
| 32 | | 1.5 | 35 | × | × | × | 8 | 20 | 20.7 |
| 40 | | 1.5 | 43 | | × | × | 8 | 20 | 27.7 |

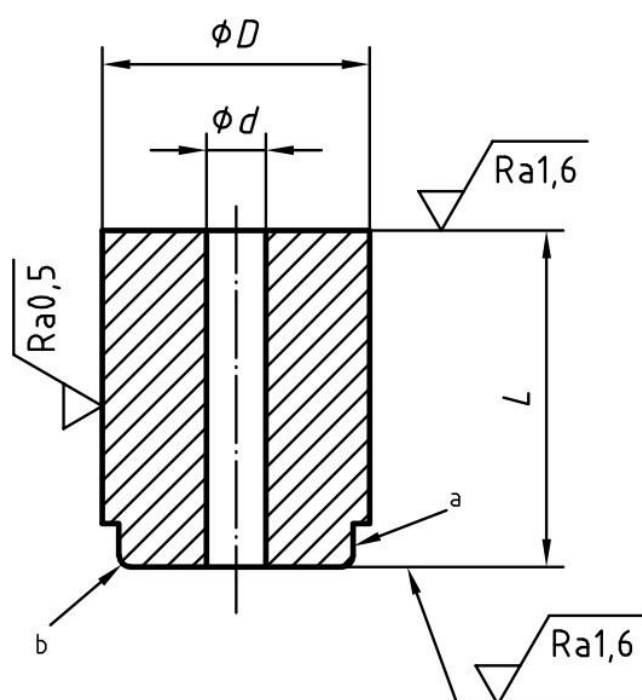
| | | | | | | | | |
|---|-----|----|--|--|---|---|----|----|
| 50 | 1.5 | 53 | | | × | 8 | 20 | 37 |
| ^a 有特殊要求可取 h5。 ^b 镗孔形状由制造者自行确定。 ^a h5 on special request. ^b Shape of the bore is left to the manufacturer's discretion. | | | | | | | | |

4.3 凹模坯件 Matrix blanks

见图5、图6和表3。See Figures 5 and 6 and Table 3.

表面粗糙度值单位为微米

Surface roughness values in micrometres



^a 可选导向端。

^b 倒角由制造者自行决定。

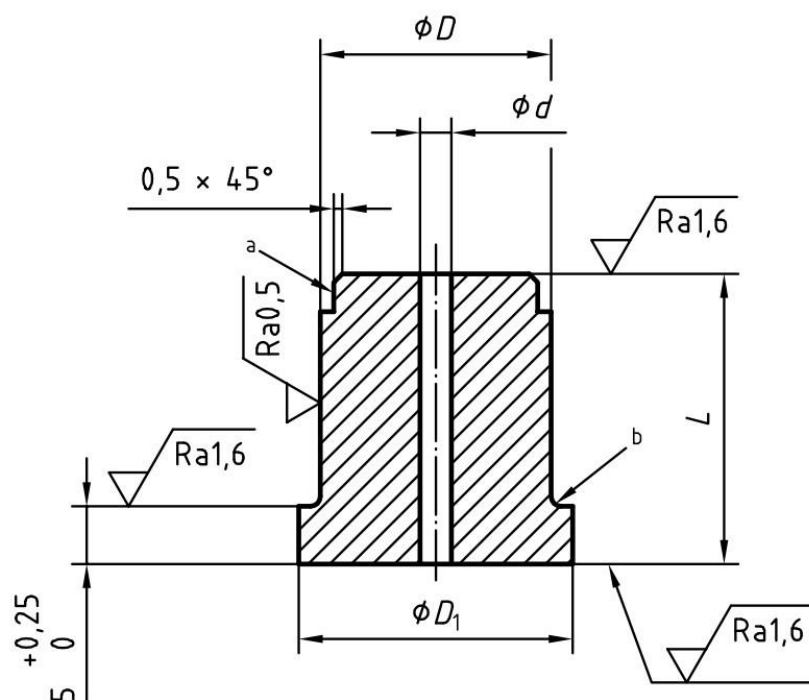
^a Optional lead.

^b Chamfer left to the manufacturer's discretion.

图5 E型 不带头凹模坯件 Figure 5 — Type E — Headless matrix blank

表面粗糙度值单位为微米

Surface roughness values in micrometres



^a 可选导向端

^b 圆角由制造者自行决定。

^a Optional lead.

^b Execution left to the manufacturer's discretion.

图6 F型 带头凹模坯件 Figure 6 — Type F — Headed matrix blank

表3 尺寸 Dimensions

尺寸单位为毫米

Dimensions in millimeters

| E 型 n5 ^a | D | F 型 m5 ^a | d | D ₁ 0 -0.25 | L +0.5 0 | | |
|------------------------|---|------------------------|-----|------------------------------|----------------|----|----|
| | | | | | 20 | 25 | 32 |
| 8 | | | 1 | 11 | × | × | |
| 10 | | | 1 | 13 | × | × | × |
| 13 | | | 1.2 | 16 | × | × | × |
| 16 | | | 1.2 | 19 | × | × | × |
| 20 | | | 1.5 | 23 | × | × | × |
| 25 | | | 1.5 | 28 | × | × | × |
| 32 | | | 1.5 | 35 | × | × | × |
| 40 | | | 1.5 | 43 | | × | × |
| 50 | | | 1.5 | 53 | | | × |

^a 有特殊要求可取 h5。

^a h5 on special request.

5 材料和硬度 **Materials and hardness**

材料由制造者自行确定, 下列硬度仅作示例参考:

- a) 含 Cr5%~12%的冷作合金钢: (60 ± 2)HRC
- b) 高速钢: (62 ± 2)HRC

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

- a) alloyed cold work steel with 5 % to 12 % Cr: (60 ± 2) HRC;
- b) high-speed steel: (62 ± 2) HRC.

6 标记 **Designation**

符合本文件的凹模应有下列标记:

- a) “凹模”;
- b) 本国际标准的代码, 即 ISO 8977;
- c) 凹模类型(A、B、C、D、E、F、AS、AR、AO、BS、BR 或 B0);
- d) 外径 D ;
- e) 直径 D 的公差;
- f) 刃口直径 d (如有要求);
- g) 总长度 L ;
- h) 工作部分的深度 l ;
- i) 材料 (含 Cr5%~12%的冷作合金钢或高速钢)。

示例:

外径 $D = 10\text{mm}$ (公差为 h5)、刃口 $d = 4\text{mm}$ 、总长度 $L = 20\text{mm}$ 、工作部分深度 $l = 4\text{mm}$ 的高速钢 A 型无头凹模的标记如下:

凹模 ISO 8977 - A 10 h5 × 4 × 20 × 4 - 高速钢

Matrixes in accordance with this International Standard shall be designated by:

- a) “Matrix”;
- b) reference to this International Standard, i.e. ISO 8977;
- c) the type of matrix (A, B, C, D, E, F, AS, AR, AO, BS, BR or B0);
- d) its external diameter, D ;
- e) its tolerance on diameter D ;
- f) its point diameter, d (if required);
- g) its overall length, L ;
- h) the depth of the working part, l ;
- i) its material (alloyed cold work steel with 5 % to 12 % Cr or high speed steel).

EXAMPLE A headless matrix, type A, of external diameter $D = 10\text{ mm}$ with an h5 tolerance, point diameter

ISO 8977:2003 译文（中英）

$d = 4$ mm, total length $L = 20$ mm and having a depth of working part $l = 4$ mm in high speed steel is designated as follows:

Matrix ISO 8977 - A 10 h5 $\times 4 \times 20 \times 4$ - high speed steel

附 录 A Annex A
(资料性) informative
凹模示例 Example of matrixes

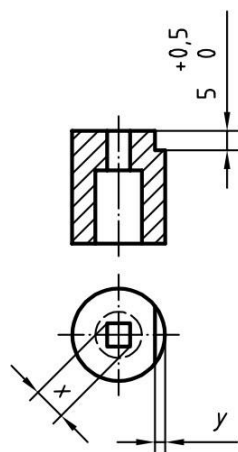
A.1 总则 General

符合本文件的凹模也用于冲切圆形以外的其它形状。A.2中的示例包括切割正方形、长方形和长圆形的凹模，A.2中凹模的尺寸适用于ISO 8020中的各类凸模。切圆形以外其它形状的凹模（凸模）应设计成组装时只能按一个方向安装，这一点通过安装带有锁紧装置的凹模即可达到。对于凹模，这个装置总是安装在形状（轮廓）的最长边上，这样符合ISO 8020中凸模的要求。

Matrixes in accordance with this International Standard are also used with cutting shapes other than round ones. Examples for matrixes with square, rectangular or oblong shapes are shown in clause A.2. The dimensions of matrixes in clause A.2 are adapted to the types of punches in accordance with ISO 8020. Matrixes (punches) with other than round shapes are designed so that on assembly, they can only be mounted in one direction. This can be achieved by fitting the matrixes with a locking device. For matrixes, this device is always fitted on the longest side of the shape (profile) and thus complies with the requirements for punches in accordance with ISO 8020.

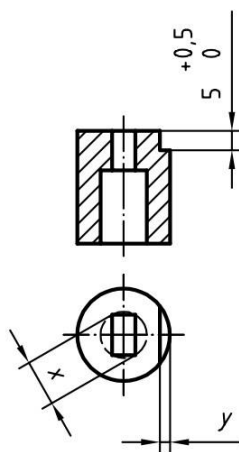
A.2 冲切特殊形状的凹模示例 Examples for matrixes with individual cutting shapes

见图A.1~A.6（尺寸单位为毫米）和表A.1。See Figures A.1 to A.6 (dimensions in millimetres) and Table A.1.



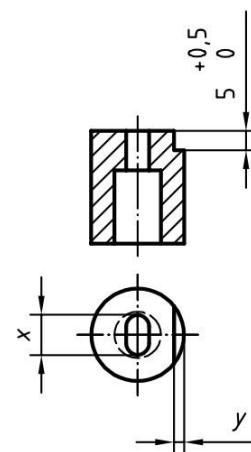
**Figure A.1 — Type AS —
Headless matrix with square
cutting shape**

图 A.1 AS 型 冲切正方形
的无头凹模



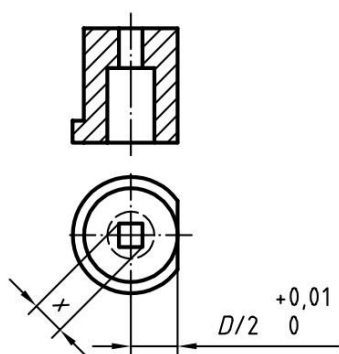
**Figure A.2 — Type AR —
Headless matrix with
rectangular cutting shape**

图 A.2 AR 型 冲切长方形
的无头凹模



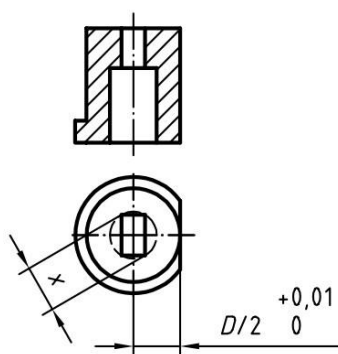
**Figure A.3 — Type AO —
Headless matrix with oblong
cutting shape**

图 A.3 AO 型 冲切长圆形
的无头凹模



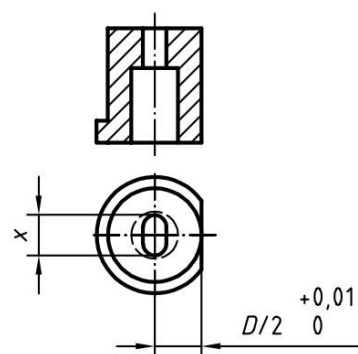
**Figure A.4 — Type BS —
Headed matrix with square
cutting shape**

图 A.4 BS 型 冲切正方形
的带头凹模



**Figure A.5 — Type BR —
Headed matrix with rectangular
cutting shape**

图 A.5 BR 型 冲切长方形
的带头凹模



**Figure A.6 — Type BO —
Headed matrix with oblong
cutting shape**

图 A.6 BO 型 冲切长圆形
的带头凹模

表A.1 尺寸 **Dimensions**

尺寸单位为毫米

Dimensions in millimeters

| D | x max. | y $\begin{smallmatrix} 0 \\ -0.01 \end{smallmatrix}$ |
|-----|-------------|---|
| 8 | 3.5 | 1 |
| 10 | 5 | |
| 13 | 7 | |
| 16 | 9 | 1.5 |
| 20 | 11 | |
| 25 | 16 | |
| 32 | 20 | 2.5 |
| 40 | 27 | |
| 50 | 36 | |