

INTERNATIONAL STANDARD

ISO 8977

Second edition
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Tools for pressing — Matrixes

Outillage de presse — Matrices



Reference number
ISO 8977:2003(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 8977 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 8, *Tools for pressing and moulding*.

This second edition cancels and replaces the first edition (ISO 8977:1987), clause 3 of which has been technically revised.

Annex A of this International Standard is for information only.

Tools for pressing — Matrixes

1 Scope

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 Normative reference

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.

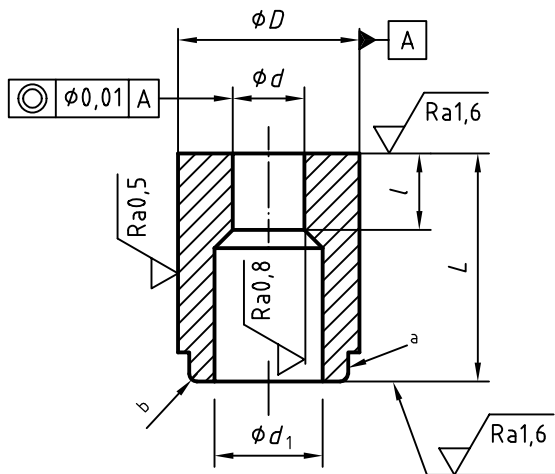
ISO 8020:2002, *Tools for pressing — Punches with cylindrical head and straight or reduced shank*

3 Dimensions

3.1 Matrixes with round cutting shapes

See Figures 1 and 2 and Table 1.

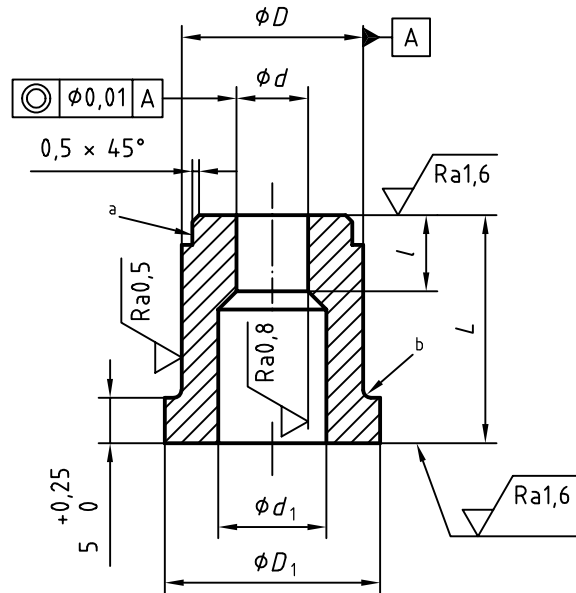
Surface roughness values in micrometres



- a Optional lead
- b Chamfer left to the manufacturer's discretion

Figure 1 — Type A — Headless matrix with round cutting shape

Surface roughness values in micrometres



- a Optional lead
- b Execution left to the manufacturer's discretion

Figure 2 — Type B — Headed matrix with round cutting shape

Table 1 — Dimensions

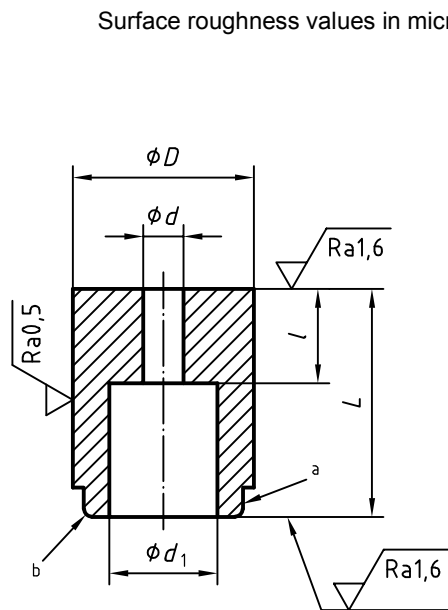
Dimensions in millimetres

| Type A n5 ^a | Type B m5 ^a | d $^{+0,02}$ $_0$ | D_1 $_0$ $^{-0,25}$ | L | | | l | | d_1 max. |
|---------------------------|---------------------------|---------------------------|-----------------------------|-----|----|----|------|------|---------------|
| | | | | 20 | 25 | 32 | min. | max. | |
| 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 h5 on special request.

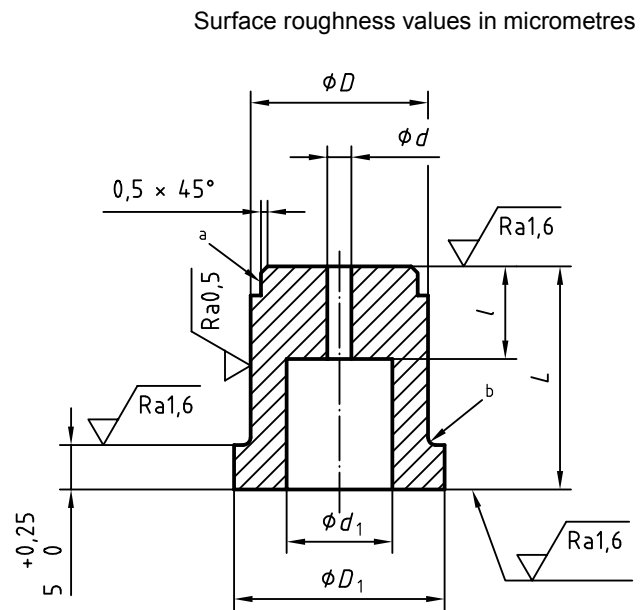
3.2 Blank matrixes for shaped cutting shapes

See Figures 3 and 4 and Table 2.



- a Optional lead
- b Chamfer left to the manufacturer's discretion

Figure 3 — Type C — Blank headless matrix with shaped cutting shape



- a Optional lead
- b Execution left to the manufacturer's discretion

Figure 4 — Type D — Blank headed matrix with shaped cutting shape

Table 2 — Dimensions

Dimensions in millimetres

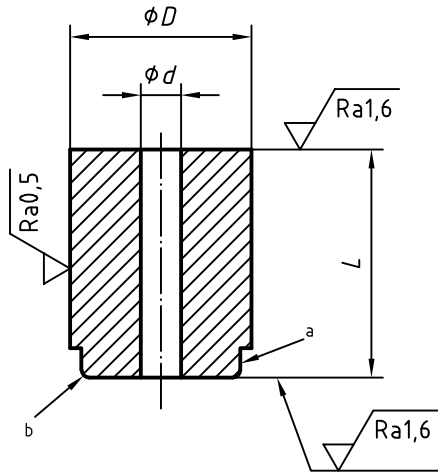
| Type C n5 ^a | Type D m5 ^a | d | D_1 0 -0,25 | L | | | l | | d_1^b max. |
|---------------------------|---------------------------|-----|---------------------|-----|----|----|------|------|-----------------|
| | | | | 20 | 25 | 32 | min. | max. | |
| 8 | | 1 | 11 | × | × | | 4 | | 4 |
| 10 | | 1 | 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 h5 on special request.
- b Shape of the bore is left to the manufacturer's discretion.

3.3 Matrix blanks

See Figures 5 and 6 and Table 3.

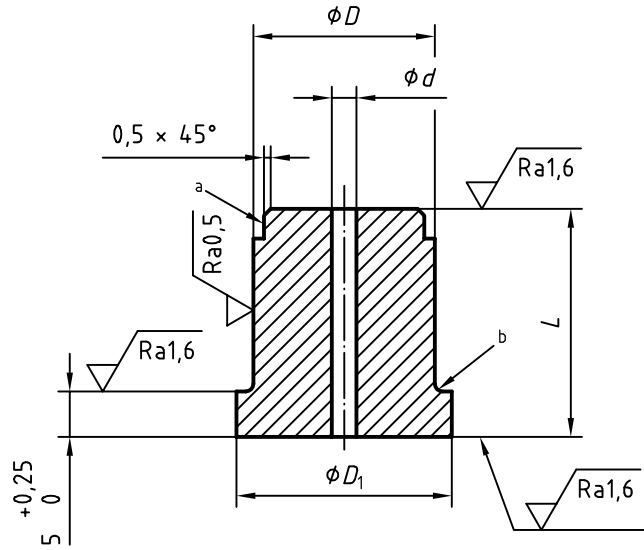
Surface roughness values in micrometres



- a Optional lead
- b Chamfer left to the manufacturer's discretion

Figure 5 — Type E — Headless matrix blank

Surface roughness values in micrometres



- a Optional lead
- b Execution left to the manufacturer's discretion

Figure 6 — Type F — Headed matrix blank

Table 3 — Dimensions

Dimensions in millimetres

| Type E n5 ^a | Type F m5 ^a | <i>d</i> | <i>D</i> ₁ 0 -0,25 | <i>L</i> | | |
|---------------------------|---------------------------|----------|-------------------------------------|----------|-----------------|----|
| | | | | 20 | 25 +0,5 0 | 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 h5 on special request.

4 Material and hardness

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.

5 Designation

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 BO);
- 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 $D = 10$ mm with an h5 tolerance, point diameter $d = 4$ 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 × 4 × 20 × 4 - high speed steel

Annex A (informative)

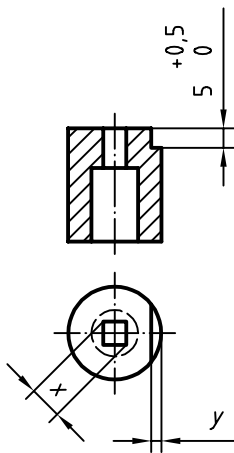
Example of matrixes

A.1 General

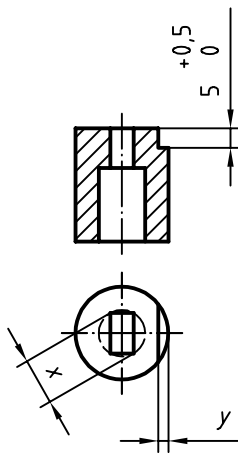
Matrixes in accordance with this International Standard are also used with cutting shapes other than round ones. Examples for matrixes with square, rectangular or oblong shapes are shown in clause A.2. The dimensions of matrixes in clause A.2 are adapted to the types of punches in accordance with ISO 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 Examples for matrixes with individual cutting shapes

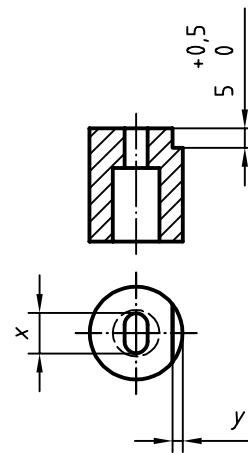
See Figures A.1 to A.6 (dimensions in millimetres) and Table A.1.



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



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



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

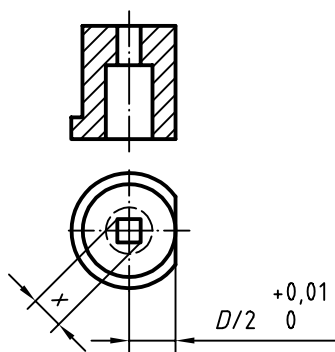


Figure A.4 — Type BS —
Headed matrix with square
cutting shape

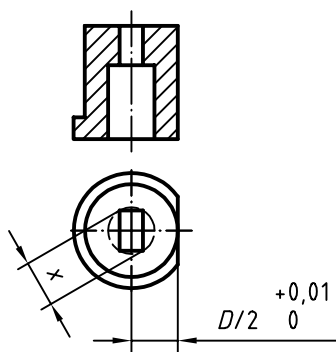


Figure A.5 — Type BR —
Headed matrix with rectangular
cutting shape

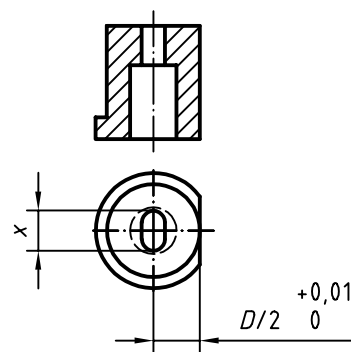


Figure A.6 — Type BO —
Headed matrix with oblong
cutting shape

Table A.1 — Dimensions

Dimensions in millimetres

| <i>D</i> | <i>x</i> max. | <i>y</i> 0 -0,01 |
|----------|------------------|------------------------|
| 8 | 3,5 | 1 |
| 10 | 5 | |
| 13 | 7 | 1,5 |
| 16 | 9 | |
| 20 | 11 | |
| 25 | 16 | 2,5 |
| 32 | 20 | |
| 40 | 27 | |
| 50 | 36 | |

ICS 25.120.10

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