

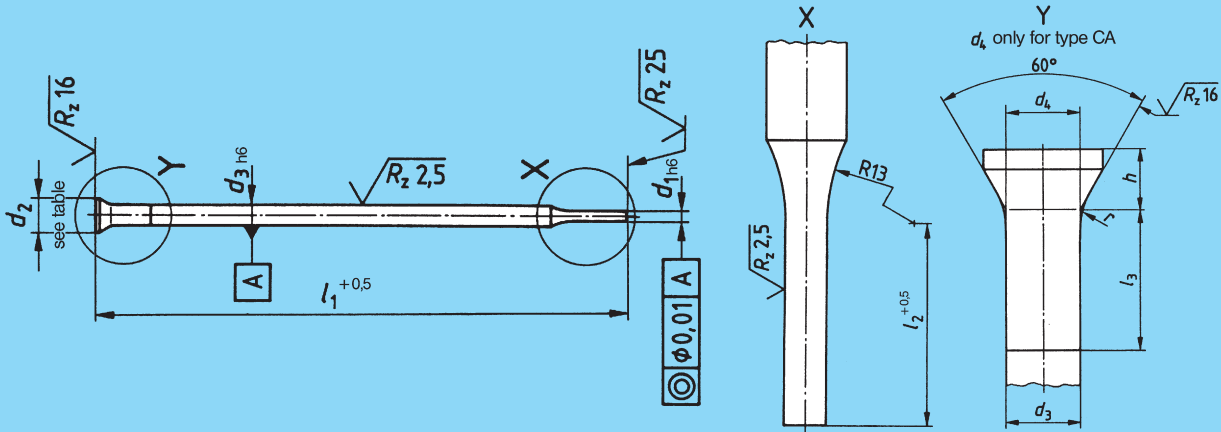
# Round Piercing Punches

## DIN 9861 Part 2

### Type CA

## Standard finish

- with stepped shaft
- with 60° conical head



#### Range of application

For press tools used for piercing/cutting sheet, steel, non-ferrous metals, plastics, paper, for basic printed circuit board material.

#### Size/head size

See table - all dimensions are in mm

#### Fit/tolerances

Nominal diameter  $d_1$  (step)

Nominal diameter  $d_3$  (shaft)

|    |                           |                                |
|----|---------------------------|--------------------------------|
| h6 | 0,50 - 3,00 $\varnothing$ | $\geq 3,00 - 6,00 \varnothing$ |
|    | - 0,006                   | - 0,008                        |

|    |                           |                                |
|----|---------------------------|--------------------------------|
| h6 | 1,50 - 3,00 $\varnothing$ | $\geq 3,00 - 6,00 \varnothing$ |
|    | - 0,006                   | - 0,008                        |

Length: total  $l_1^{+0,5}$   
step  $l_2^{+0,5}$

All other tolerances: see illustration and table respectively for non-specified tolerance in accordance with ISO 2768-m

#### Material

WS: Alloyed cold working steel  
HWS: High alloy cold working steel (approx. 12% Chrome)  
HSS: High speed steel

#### Material properties

WS: For working medium strength materials  
HWS: For working higher strength materials  
High wear resistance - long life.  
HSS: For working high strength or difficult to work materials. Very abrasion proof high tensile strength and high heat resistance.

#### Hardness

|             |     | WS      | HWS     | HSS     |
|-------------|-----|---------|---------|---------|
| Shaft/step: | HRC | 60 - 64 | 60 - 64 | 62 - 66 |
| Head:       | HRC | 40 - 50 | 45 - 55 | 45 - 55 |

#### Finish

Hardened, annealed, shaft and step precision ground, 60° countersunk head hot formed, with permissible swelling  $d_4$  immediately below the head.

#### Please note

For extremely high demands we would recommend piercing punches made from powder high speed steel (pages 10/13) or with a bottle neck or trombone neck (pages 20/21 and 22/23).

HSS piercing punches can be treated with a special surface coating on request (pages 42/43).

Piercing punches made from tungsten carbide are also available (pages 42/43)

Other materials on request.

# Table of dimensions

## Piercing punches type CA

| Step-Ø<br>$d_1$<br>h6 | Gradation<br>$d_1$ | Length of step<br>$l_2^{+0,5}$ | Shaft-Ø<br>$d_3$<br>h6 | Total length $l_1^{+0,5}$ |    | Head    |        |              | Head height<br>$h^{+0,2}$ | Swelling      |                      |   |
|-----------------------|--------------------|--------------------------------|------------------------|---------------------------|----|---------|--------|--------------|---------------------------|---------------|----------------------|---|
|                       |                    |                                |                        | 71                        | 80 | Ø $d_2$ | Tol.   | r            |                           | $d_4$         | Length $l_3$<br>max. |   |
| 0,5 - 1,4             | 0,10               | 7                              | 1,5                    |                           |    | 2,2     | ± 0,05 | 0,4<br>+ 0,3 | 1,11                      | $d_3^{+0,03}$ | 5                    |   |
| 0,5 - 1,9             |                    |                                | 2,0                    |                           |    | 3,0     | ± 0,1  |              | 1,37                      |               |                      |   |
| 1,6 - 2,9             |                    |                                | 3,0                    |                           |    | 4,5     |        | 0,6<br>+ 0,4 | 1,80                      |               |                      |   |
| 2,5 - 3,5             | 0,50               | 10                             | 4,0                    |                           |    | 5,5     | ± 0,1  | 0,6<br>+ 0,4 | 1,80                      |               | $d_3^{+0,03}$        | 6 |
| 3,5 - 4,5             |                    |                                | 5,0                    |                           |    | 6,5     |        |              |                           |               |                      |   |
| 4,5 - 5,5             |                    |                                | 6,0                    |                           |    | 8,0     | ± 0,2  | 1,0<br>+ 0,5 | 2,23                      |               |                      |   |

The filled-in spaces indicate standard dimensions. Special dimensions on request.  
The stepped piercing punches are also available with high precision ground step (Rz 0.4 - 0.6 µ).

**Piercing punches type CA are available ex-stock only to limited extent.**