

DREI-S-Piercing Punches

**DIN 9861
ISO 8020
DIN 9844
DIN 9840
DIN 9846**

for punching/cutting



PIERCING PUNCHES



DREI-S-WERK

PRECISION STANDARD PARTS

PIERCING PUNCHES



Piercing punches are used for punching/cutting holes in sheet made from metal and other materials.

DREI-S PIERCING PUNCHES are precision parts. They are the components in the press tool which are subjected to the highest stress. Their advantages and full capacity can only be fully manifested if all other components in the press tool are also precision made.

DREI-S were one of the first manufacturers in Europe to produce these articles and they are the initiator of various DIN or ISO standards. **DREI-S PIERCING PUNCHES** are well known for their highest quality and great life expectancy in all appropriate industrial sectors. They are produced according to various standards and customers' drawings:

Piercing punches according to **DIN 9861**, part 1 and 2 are manufactured with 60° countersunk head: Type DA (parallel) and CA (with stepped shaft) are standard designs, in which the 60° countersunk head is hot formed. As the flow-lines of the material are continuous, these parts can withstand great stress on the return stroke. These standard parts will permit swelling immediately under the head of max. 0.02 - 0.04 mm.

Types D and C are plunge cut ground in one piece, whereby the tolerance h6 is maintained over the whole length of the shaft and the head. A perfect fit of the punch head in the tool fixture is only guaranteed if these precision parts are positioned in precise mounting boreholes.

To facilitate higher cutting and withdrawal force, we recommend punches of type CA or C, as these have larger punch profiles for the resulting forces. For piercing printed circuit boards, piercing punches are manufactured in accordance with DIN 9861 with highly precision ground surface (Rz 0.4 - 0.6 µ) especially.

DREI-S have been offering piercing punches with bottle neck and trombone neck heads over many years. The largely expanded radius will reduce the danger of breakdown under the head even further.

Piercing punches according to **ISO 8020** are produced with cylindrical head in types A/B/E and F. They are basically plunge cut ground.

Piercing punches type A and B with cylindrical head (according to DIN 9844) are also plunge cut ground. In contrast to ISO 8020, a wider diameter range is available.

Piercing punches DIN 9840, Part 1 and 2 are specially made for cutting sheet metal perforations. The 40° countersunk head, used for this purpose, facilitates close positioning of the punches due to less space requirement in the tool fixture. Less danger of fracture under the head.

Square/rectangular and profile punches in accordance with DIN 9846 are available with or without head, with transverse hole or tapped blind hole. Over and above they can be produced according to customers' drawings.

For the different applications we use the following materials:

WS with average wear resistance

- HWS with high wear resistance
- HSS with extremely high wear resistance or for difficult to work materials
- ASP 2023 with excellent wear resistance
- HSS-E (cobalt alloy) also with extremely high wear resistance

For tools subjected to very high demands in the electro-technical and electronics industry, especially powder metallurgy manufactured steel, HSS steel ASP 2030/ASP 2060/CPM 10V/CPMREX M4 has gained acceptance, as well as piercing punches for the large series made from carbide alloy. We will also manufacture in Nirosta (stainless steel) on request.

By using a surface coating, the life expectancy can be greatly extended. DREI-S was one of the first to use TIN coatings and has saved the tool maker a great deal of money by extending the life expectancy of the piercing punches considerably. Today, we mainly offer the following coatings:

TIN (PVD) colour: gold-yellow (2200 - 2400 HV 0.05)

TICN (PVD) Colour: blue-grey (approx. 3000 HV 0.05)

Tenifer-bath nitrated, colour: grey-black (approx. 1000 HV 0.3 = 70 HRC).

For some processing applications certain end polishes are necessary. We offer e.g. hollow edged, 60° point (or gradation as specified) square point, centre point, angled polished end, semi-circle and other options.

Furthermore, the countersunk head of the piercing punches are also available from us as dome-capped fillister head or with parallel sides.



The premature failure of only a single piercing punch in production will increase costs, which will make up a large part of the price. When purchasing piercing punches, always look for the highest quality. Buy DREI-S precision piercing punches.

Other precision standard parts from our programme range:

Ejector Pins

- Ejector pins DIN 1530 Part 1, Type A - with cylindrical head
- Ejector pins DIN 1530 Part 2, Type C - with cylindrical head and stepped shaft
- Ejector pins DIN 1530 Part 3, Type D - with 60° conical head
- Ejector pins DIN 1530 Part 4, Type F - with cylindrical head and flat step
- Ejector sleeves DIN 16756 with cylindrical head
- Special ejector pins, similar to DIN 1530 Part 1, type EZ with off-set cylindrical head for securing against twisting Ejector pins - special type and finishes
- Core pins (Pinolen) similar to DIN 1530 Part 1
- Copper core pins Ampcoloy 940

Test Pins

- Single test pins
- Test pin sets
- Storage boxes with boreholes for test pins
- Test pins holder
- Plastic handles
- Test certificates

Precision dowel pins

- Precision dowel pins DIN 6325 (tolerance m6 and m5)
- Precision dowel pins DIN 7979 (tapped hole)
- Precision dowel pins DIN 7

Special parts

- Pull-through punches
- Locating pins DIN 9864
- Drill blanks
- Perforating pins
- Winding mandrels
- Parts for drawings
- Labour

Cold forming

- Top header/ejector pins
- Ejector pins without head
- Pressure stamp (punches)
- Hexagon pins
- To customers's drawing
- Hexagon pins
- Extrusion punches
- Phillips type punches
- Special punches

PIERCING PUNCHES

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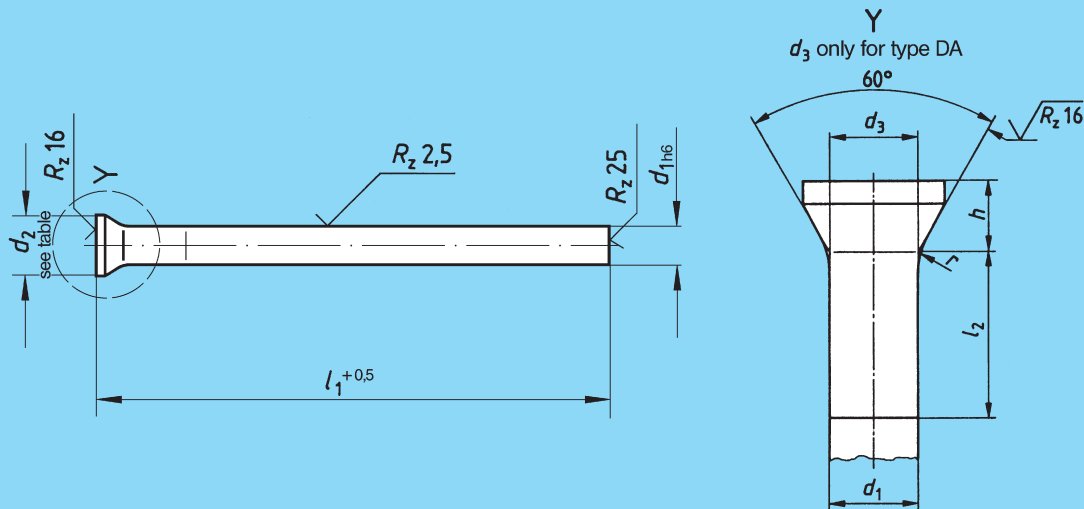


Round Piercing Punches

DIN 9861 Part 1 Type DA

Standard finish

- with continuous 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 with smooth surface).

Size/head size

See table pages 7-9 and 14-15, all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

h6	0,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 18,00 Ø	≥ 18,00 - 20,00 Ø
	- 0,006	- 0,008	- 0,009	- 0,011	- 0,013

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

All other tolerances: see illustration and table respectively for non-specified tolerances 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:	HRC	60 - 64	60 - 64	62 - 66
Head:	HRC	40 - 50	45 - 55	45 - 55

Finish

Hardened, annealed, shaft precision ground, 60° countersunk head hot formed, with permissible swelling d_3 immediately below the head.

Please note

For extremely high demands we would recommend piercing punches made from powdered high speed steel (pages 10/13) or with bottle 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.

Standard dimensions

Piercing punches type DA-WS

Shaft-Ø d ₁ h6	Total length l ₁ +0,5			Shaft-Ø d ₁ h6	Total length l ₁ +0,5			Shaft-Ø d ₁ h6	Total length l ₁ +0,5		
	71	80	100		71	80	100		71	80	100
0,5				3,6				10,0			
0,55				3,7				10,5			
0,6				3,8				11,0			
0,65				3,9				11,5			
0,7				4,0				12,0			
0,75				4,1				12,5			
0,8				4,2				13,0			
0,85				4,3				13,5			
0,9				4,4				14,0			
0,95				4,5				14,5			
1,0				4,6				15,0			
1,1				4,7				15,5			
1,2				4,8				16,0			
1,3				4,9							
1,4				5,0							
1,5				5,1							
1,6				5,2							
1,7				5,3							
1,8				5,4							
1,9				5,5							
2,0				5,6							
2,1				5,7							
2,2				5,8							
2,3				5,9							
2,4				6,0							
2,5				6,1							
2,6				6,2							
2,7				6,3							
2,8				6,4							
2,9				6,5							
3,0				7,0							
3,1				7,5							
3,2				8,0							
3,3				8,5							
3,4				9,0							
3,5				9,5							

The filled-in spaces indicate standard dimensions. Special dimensions on request.
For head sizes see table pages 14 and 15.

Standard dimensions

Piercing punches type DA-HWS

Shaft-Ø d ₁ h6	Total length l ₁ + ^{0,5}			Shaft-Ø d ₁ h6	Total length l ₁ + ^{0,5}			Shaft-Ø d ₁ h6	Total length l ₁ + ^{0,5}		
	71	80	100		71	80	100		71	80	100
0,5				2,9				7,6			
0,55				2,95				7,7			
0,6				3,0				7,8			
0,65				3,1				7,9			
0,7				3,2				8,0			
0,75				3,3				8,1			
0,8				3,4				8,2			
0,85				3,5				8,3			
0,9				3,6				8,4			
0,95				3,7				8,5			
1,0				3,8				8,6			
1,05				3,9				8,7			
1,1				4,0				8,8			
1,15				4,1				8,9			
1,2				4,2				9,0			
1,25				4,3				9,1			
1,3				4,4				9,2			
1,35				4,5				9,3			
1,4				4,6				9,4			
1,45				4,7				9,5			
1,5				4,8				9,6			
1,55				4,9				9,7			
1,6				5,0				9,8			
1,65				5,1				9,9			
1,7				5,2				10,0			
1,75				5,3				10,5			
1,8				5,4				11,0			
1,85				5,5				11,5			
1,9				5,6				12,0			
1,95				5,7				12,5			
2,0				5,8				13,0			
2,05				5,9				13,5			
2,1				6,0				14,0			
2,15				6,1				14,5			
2,2				6,2				15,0			
2,25				6,3				15,5			
2,3				6,4				16,0			
2,35				6,5				16,5			
2,4				6,6				17,0			
2,45				6,7				17,5			
2,5				6,8				18,0			
2,55				6,9				18,5			
2,6				7,0				19,0			
2,65				7,1				19,5			
2,7				7,2				20,0			
2,75				7,3							
2,8				7,4							
2,85				7,5							

The filled-in spaces indicate standard dimensions. Special dimensions on request.
For head sizes see table pages 14 and 15.

Standard dimensions

Piercing punches type DA-HSS

Shaft-Ø d ₁ h6	Total length l ₁ + ^{0,5}			Shaft-Ø d ₁ h6	Total length l ₁ + ^{0,5}		
	71	80	100		71	80	100
0,5				3,6			
0,55				3,7			
0,6				3,8			
0,65				3,9			
0,7				4,0			
0,75				4,1			
0,8				4,2			
0,85				4,3			
0,9				4,4			
0,95				4,5			
1,0				4,6			
1,1				4,7			
1,2				4,8			
1,3				4,9			
1,4				5,0			
1,5				5,1			
1,6				5,2			
1,7				5,3			
1,8				5,4			
1,9				5,5			
2,0				5,6			
2,1				5,7			
2,2				5,8			
2,3				5,9			
2,4				6,0			
2,5				6,1			
2,6				6,2			
2,7				6,3			
2,8				6,4			
2,9				6,5			
3,0				7,0			
3,1				7,5			
3,2				8,0			
3,3				8,5			
3,4				9,0			
3,5				9,5			
				10,0			

The filled-in spaces indicate standard dimensions. Special dimensions on request.
For head sizes see table pages 14 and 15.

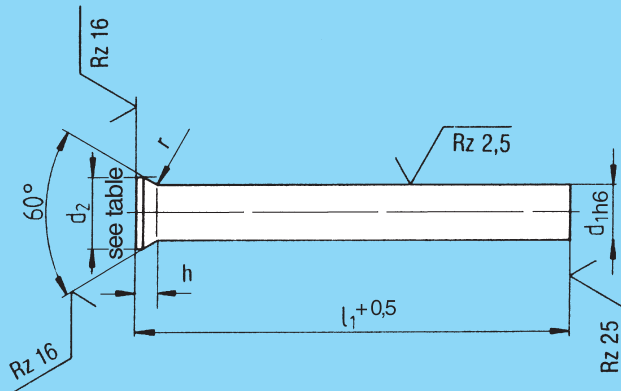
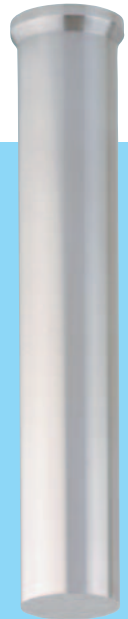


Round Piercing Punches

DIN 9861 Part 1 Type D

Precision finish

- with continuous shaft
- with 60° conical head
- plunge cut ground



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 pages 11-13 and 14-15, all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

h6	0,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 18,00 Ø	≥ 18,00 - 20,00 Ø
	- 0,006	- 0,008	- 0,009	- 0,011	- 0,013

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

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

Material

HWS: High alloy cold working steel (approx. 12 % Chrome)
HSS: High speed steel
ASP 2023: Powder metallurgy manufactured high speed steel

Material properties

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.
ASP 2023: A noticeable increase in the life expectancy, e.g. when piercing stainless materials

Hardness

		HWS	HSS	ASP 2023
Shaft:	HRC	60 - 64	62 - 66	62 - 66
Head:	HRC	45 - 55	45 - 55	45 - 55

Finish

Hardened, annealed, 60° countersunk head hot formed, subsequently the shaft is plunge cut ground over the whole length including the 60° countersunk, head surface ground.

Please note

For extremely high demands we would recommend piercing punches with bottle 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.

Standard dimensions

Piercing punches type D-HWS

Shaft-Ø d ₁ h6	Total length l ₁ +0,5			Shaft-Ø d ₁ h6	Total length l ₁ +0,5			Shaft-Ø d ₁ h6	Total length l ₁ +0,5		
	71	80	100		71	80	100		71	80	100
0,5				2,9				7,6			
0,55				2,95				7,7			
0,6				3,0				7,8			
0,65				3,1				7,9			
0,7				3,2				8,0			
0,75				3,3				8,1			
0,8				3,4				8,2			
0,85				3,5				8,3			
0,9				3,6				8,4			
0,95				3,7				8,5			
1,0				3,8				8,6			
1,05				3,9				8,7			
1,1				4,0				8,8			
1,15				4,1				8,9			
1,2				4,2				9,0			
1,25				4,3				9,1			
1,3				4,4				9,2			
1,35				4,5				9,3			
1,4				4,6				9,4			
1,45				4,7				9,5			
1,5				4,8				9,6			
1,55				4,9				9,7			
1,6				5,0				9,8			
1,65				5,1				9,9			
1,7				5,2				10,0			
1,75				5,3				10,5			
1,8				5,4				11,0			
1,85				5,5				11,5			
1,9				5,6				12,0			
1,95				5,7				12,5			
2,0				5,8				13,0			
2,05				5,9				13,5			
2,1				6,0				14,0			
2,15				6,1				14,5			
2,2				6,2				15,0			
2,25				6,3				15,5			
2,3				6,4				16,0			
2,35				6,5				16,5			
2,4				6,6				17,0			
2,45				6,7				17,5			
2,5				6,8				18,0			
2,55				6,9				18,5			
2,6				7,0				19,0			
2,65				7,1				19,5			
2,7				7,2				20,0			
2,75				7,3							
2,8				7,4							
2,85				7,5							

The filled-in spaces indicate standard dimensions. Special dimensions on request.
For head sizes see table on pages 14 and 15.

Standard dimensions

Piercing punches type D-HSS

Shaft-Ø d ₁ h ₆	Total length l ₁ + ^{0,5}				Shaft-Ø d ₁ h ₆	Total length l ₁ + ^{0,5}				Shaft-Ø d ₁ h ₆	Total length l ₁ + ^{0,5}			
	71	80	100	130		71	80	100	130		71	80	100	130
0,5					2,9					7,6				
0,55					2,95					7,7				
0,6					3,0					7,8				
0,65					3,1					7,9				
0,7					3,2					8,0				
0,75					3,3					8,1				
0,8					3,4					8,2				
0,85					3,5					8,3				
0,9					3,6					8,4				
0,95					3,7					8,5				
1,0					3,8					8,6				
1,05					3,9					8,7				
1,1					4,0					8,8				
1,15					4,1					8,9				
1,2					4,2					9,0				
1,25					4,3					9,1				
1,3					4,4					9,2				
1,35					4,5					9,3				
1,4					4,6					9,4				
1,45					4,7					9,5				
1,5					4,8					9,6				
1,55					4,9					9,7				
1,6					5,0					9,8				
1,65					5,1					9,9				
1,7					5,2					10,0				
1,75					5,3					10,5				
1,8					5,4					11,0				
1,85					5,5					11,5				
1,9					5,6					12,0				
1,95					5,7					12,5				
2,0					5,8					13,0				
2,05					5,9					13,5				
2,1					6,0					14,0				
2,15					6,1					14,5				
2,2					6,2					15,0				
2,25					6,3					15,5				
2,3					6,4					16,0				
2,35					6,5					16,5				
2,4					6,6					17,0				
2,45					6,7					17,5				
2,5					6,8					18,0				
2,55					6,9					18,5				
2,6					7,0					19,0				
2,65					7,1					19,5				
2,7					7,2					20,0				
2,75					7,3									
2,8					7,4									
2,85					7,5									

The filled-in spaces indicate standard dimensions. Special dimensions on request.
For head sizes see table on pages 14 and 15.

Standard dimensions

Piercing punches type D-ASP 2023

Shaft-Ø d ₁ h6	Total length l ₁ +0,5			Shaft-Ø d ₁ h6	Total length l ₁ +0,5			Shaft-Ø d ₁ h6	Total length l ₁ +0,5		
	71	80	100		71	80	100		71	80	100
0,8				4,4				14,0			
0,9				4,5				14,5			
1,0				4,6				15,0			
1,1				4,7				15,5			
1,2				4,8				16,0			
1,3				4,9							
1,4				5,0							
1,5				5,1							
1,6				5,2							
1,7				5,3							
1,8				5,4							
1,9				5,5							
2,0				5,6							
2,1				5,7							
2,2				5,8							
2,3				5,9							
2,4				6,0							
2,5				6,1							
2,6				6,2							
2,7				6,3							
2,8				6,4							
2,9				6,5							
3,0				7,0							
3,1				7,5							
3,2				8,0							
3,3				8,5							
3,4				9,0							
3,5				9,5							
3,6				10,0							
3,7				10,5							
3,8				11,0							
3,9				11,5							
4,0				12,0							
4,1				12,5							
4,2				13,0							
4,3				13,5							

The filled-in spaces indicate standard dimensions. Special dimensions on request.
For head sizes see table on pages 14 and 15.

Table of dimensions

Piercing punches DIN 9861 Part 1 Type DA and D

Shaft-Ø d ₁ h6	Head			Head height h ^{+0,2}	Swelling *		Shaft-Ø d ₁ h6	Head			Head height h ^{+0,2}	Swelling *	
	Ø d ₂	Tol.	r		d ₃	Length l ₂ max.		Ø d ₂	Tol.	r		d ₃	Length l ₂ max.
0,5	0,9	± 0,05	0,2 + 0,2	0,55	d ₁ + 0,02	5	2,25	3,5	± 0,1	0,4 + 0,3	1,58	d ₁ +0,03	5
0,55	1,0			1,54									
0,6	1,1			1,50									
0,65	1,2			1,45									
0,7	1,3			1,41									
0,75	1,3			1,37									
0,8	1,4			1,76									
0,85	1,4			1,71									
0,9	1,6			1,67									
0,95	1,6			1,63									
1,0	1,8			1,58									
1,05	1,8			1,54									
1,1	1,8			1,50									
1,15	2,0			1,45									
1,2	2,0			1,41									
1,25	2,0			1,80									
1,3	2,2			1,71									
1,35	2,2			1,63									
1,4	2,2	1,54											
1,45	2,2	1,45											
1,5	2,2	1,80											
1,55	2,5	1,71											
1,6	2,5	1,63											
1,65	2,5	1,54											
1,7	2,5	1,45											
1,75	2,8	1,80											
1,8	2,8	1,71											
1,85	2,8	1,63											
1,9	2,8	1,54											
1,95	3,0	1,45											
2,0	3,0	1,80											
2,05	3,2	1,71											
2,1	3,2	1,63											
2,15	3,2	1,54											
2,2	3,2	1,45											

* Swelling only with type DA

For type and finish and standard dimensions see pages 6 - 13.

Table of dimensions

Piercing punches DIN 9861 Part 1 Type DA and D

Shaft-Ø d ₁ h ₆	Head			Head height h ^{+0,2}	Swelling *		Shaft-Ø d ₁ h ₆	Head			Head height h ^{+0,2}	Swelling *	
	Ø d ₂	Tol.	r		d ₃	Länge l ₂ max.		Ø d ₂	Tol.	r		d ₃	Länge l ₂ max.
5,0	6,5	± 0,1	0,6 + 0,4	1,80	d ₁ + 0,03	6	8,5	11,0	± 0,2	1,0 + 0,5	3,17	d ₁ + 0,04	8
5,1				1,71			8,6				3,08		
5,2				1,63			8,7				2,99		
5,3				1,54			8,8				2,91		
5,4				1,45			8,9				2,82		
5,5				1,80			9,0				2,73		
5,6	7,0	± 0,1	0,6 + 0,4	1,71	d ₁ + 0,03	6	9,1	11,0	± 0,2	1,0 + 0,5	2,65	d ₁ + 0,04	8
5,7				1,63			9,2				2,56		
5,8				1,54			9,3				2,47		
5,9				1,45			9,4				3,25		
6,0				2,23			9,5				3,17		
6,1				2,15			9,6				3,08		
6,2	8,0	± 0,1	0,6 + 0,4	2,06	d ₁ + 0,03	6	9,7	12,0	± 0,2	1,0 + 0,5	2,99	d ₁ + 0,04	8
6,3				1,97			9,8				2,91		
6,4				1,89			9,9				2,82		
6,5				3,17			10,0				2,73		
6,6				3,08			10,5				3,17		
6,7				2,99			11,0				2,73		
6,8	9,0	± 0,2	1,0 + 0,5	2,91	d ₁ + 0,04	8	11,5	13,0	± 0,2	1,0 + 0,5	3,17	d ₁ + 0,04	10
6,9				2,82			12,0				2,73		
7,0				2,73			12,5				3,17		
7,1				2,65			13,0				2,73		
7,2				2,56			13,5				3,67		
7,3				2,47			14,0				3,23		
7,4	10,0	± 0,2	1,0 + 0,5	2,39	d ₁ + 0,04	8	14,5	14,0	± 0,2	1,0 + 0,5	3,67	d ₁ + 0,04	12
7,5				3,17			15,0				3,23		
7,6				3,08			15,5				3,67		
7,7				2,99			16,0				3,23		
7,8				2,91			16,5				3,67		
7,9				2,82			17,0				3,23		
8,0	10,0	± 0,2	1,0 + 0,5	2,73	d ₁ + 0,04	8	17,5	17,0	± 0,2	1,5 + 0,5	3,67	d ₁ + 0,04	15
8,1				2,65			18,0				3,23		
8,2				2,56			18,5				3,67		
8,3				2,47			19,0				3,23		
8,4				2,39			19,5				3,67		
							20,0				3,23		

* Swelling only with type DA

For type and finish and standard dimensions see pages 6 - 13.

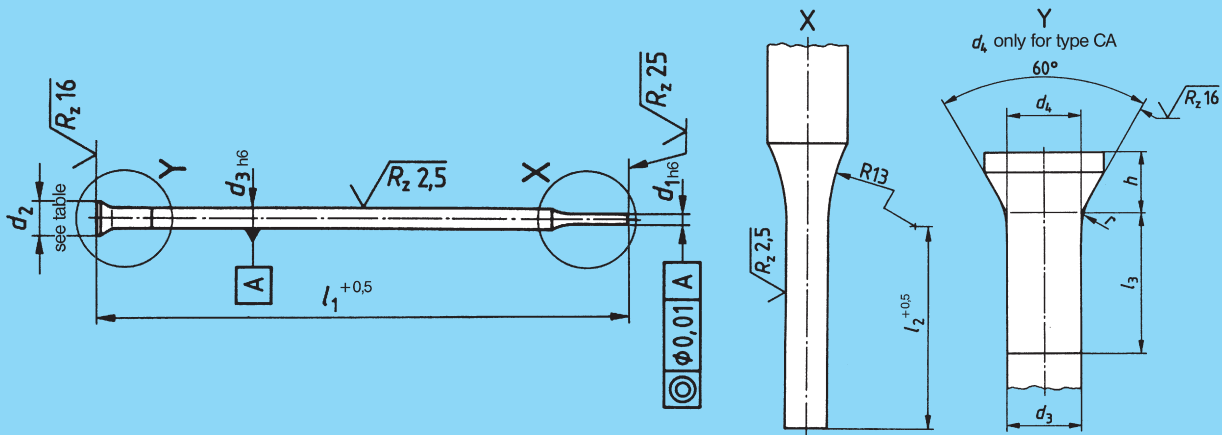
Round Piercing Punches

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 Ø	≥ 3,00 - 6,00 Ø
	- 0,006	- 0,008

h6	1,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø
	- 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 d_1 h6	Gradation d_1	Length of step $l_2^{+0,5}$	Shaft-Ø d_3 h6	Total length $l_1^{+0,5}$		Head			Head height $h^{+0,2}$	Swelling		
				71	80	Ø d_2	Tol.	r		d_4	Length l_3 max.	
0,5 - 1,4	0,10	7	1,5			2,2	± 0,05	0,4 + 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 + 0,4	1,80			
2,5 - 3,5	0,50	10	4,0			5,5	± 0,1	0,6 + 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 + 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.



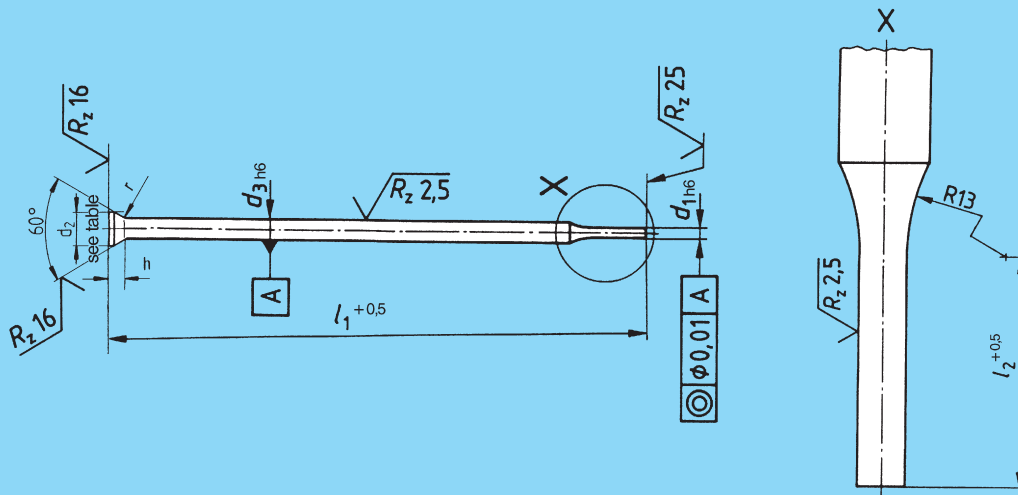
Round Piercing Punches

DIN 9861 Part 2

Type C

Precision finish

- with stepped shaft
- with 60° conical head
- plunge cut ground



Range of application

For press tools used for piercing/cutting sheet, steel, non ferrous metals, plastics, paper, 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 Ø	≥ 3,00 - 6,00 Ø
	- 0,006	- 0,008

h6	1,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø
	- 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 tolerances in accordance with ISO 2768-m

Material

HWS: High alloy cold working steel (approx. 12 % Chrome).

HSS: High speed steel

Material properties

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

		HWS	HSS
Shaft/step:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

Finish

Hardened, annealed, 60° countersunk head hot formed, subsequently the shaft is plunge cut ground over the whole length including 60° countersunk and step, head surface ground.

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 C

Step-Ø d_1 h_6	Gradation d_1	Length of step $l_2^{+0,5}$	Shaft-Ø d_3 h_6	Total length $l_1^{+0,5}$		Head			Head height $h^{+0,2}$
				71	80	Ø d_2	Tol.	r	
0,5 - 1,4	0,10	7	1,5			2,2	± 0,05	0,4 + 0,3	1,11
0,5 - 1,9			2,0			3,0	± 0,1		1,37
1,6 - 2,9			3,0			4,5		0,6 + 0,4	1,80
2,5 - 3,5	0,50	10	4,0			5,5	± 0,2		
3,5 - 4,5			5,0			6,5			
4,5 - 5,5			6,0			8,0			

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 C are available ex-stock only to limited extent.

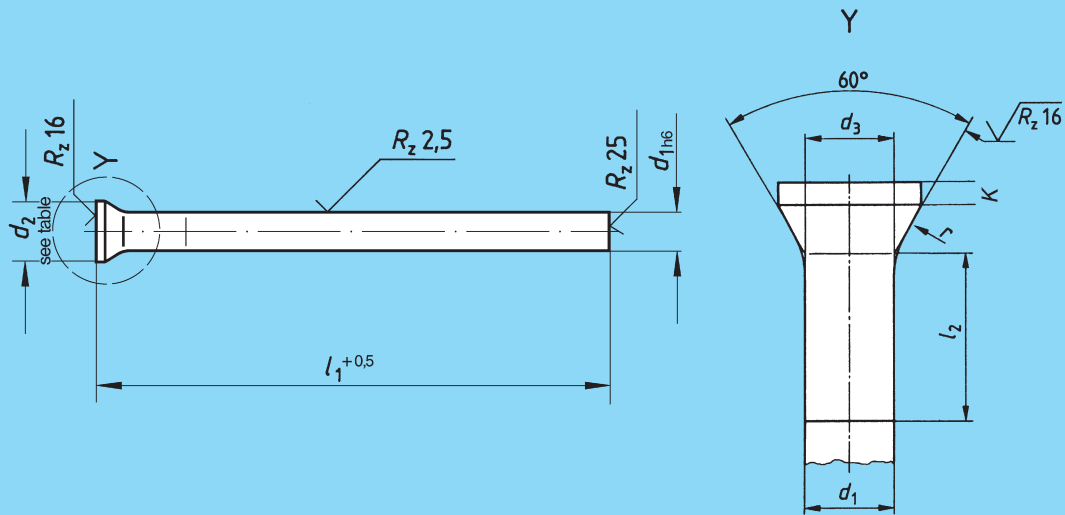


Special Round Piercing Punches – with 60° bottle neck head

Similar to **DIN 9861 Part 1 standard finish**

Form DA

– with continuous shaft



Range of application

For press tools used for higher demands

Size/Head size

See table - all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

h6	0,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 16,00 Ø
	- 0,006	- 0,008	- 0,009	- 0,011

Length: total $l_1 + 0,5$

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

Material

HWS: High alloy cold working steel (approx. 12 % Chrome).

HSS: High speed steel

Material properties

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

		HWS	HSS
Shaft:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

Finish

Hardened, annealed, shaft precision ground, 60° bottle neck head hot formed with permissible swelling d_3 immediately below the head.

Please note

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

The necessary counterbores are also available from us.

Table of dimensions

Piercing punches Type DA with 60° bottle neck head

Shaft-Ø $d_{1\ h6}$	Total length $l_1^{+0,5}$ 71	Head		Head edge $K^{+0,2}$	Swelling		Shaft-Ø $d_{1\ h6}$	Total length $l_1^{+0,5}$ 71	Head		Head edge $K^{+0,2}$	Swelling	
		$\varnothing d_2^{-0,1}$	$r^{-0,2}$		d_3	Length l_2 max.			$\varnothing d_2^{-0,1}$	$r^{-0,2}$		d_3	Length l_2 max.
0,8		1,4	2,5	0,6	d_1 $+0,02$	5	4,5	6,0	4,0	3,0	6,0	d_1 $+0,03$	5
0,9		1,6											
1,0		1,8											
1,1		2,0											
1,2		2,2											
1,3		2,2											
1,4		2,2	3,0	1,0	d_1 $+0,03$	5	5,1	6,5	4,0	3,0	6,0	d_1 $+0,03$	6
1,5		2,5											
1,6		2,5											
1,7		2,8											
1,8		2,8											
1,9		3,0											
2,0		3,0											
2,1		3,2											
2,2		3,2											
2,3		3,5											
2,4		3,5											
2,5		4,0	1,5	3,0	d_1 $+0,03$	5	6,1	8,0	4,0	3,0	6,0	d_1 $+0,03$	6
2,6		4,0											
2,7		4,0											
2,8		4,0											
2,9		4,0											
3,0		4,5											
3,1		4,5											
3,2		4,5											
3,3		4,5											
3,4		4,5											
3,5		5,0	4,0	3,0	d_1 $+0,03$	5	6,2	9,0	6,0	4,0	d_1 $+0,04$	10	
3,6		5,0											
3,7		5,0											
3,8		5,0											
3,9		5,0											
4,0		5,5											
4,1		5,5											
4,2		5,5											
4,3		5,5											
4,4		5,5											
							12,0	6,0	4,0	6,0	d_1 $+0,04$	12	
							13,0						
							14,0						
							15,0						
							16,0	6,0	4,0	6,0	d_1 $+0,04$	12	
							17,0						
							18,0						
							19,0						

The filled-in spaces indicate standard dimensions. Special dimensions on request. These piercing punches are also available in type CA (with stepped shaft).

Piercing punches with bottle neck head are not a stock item.

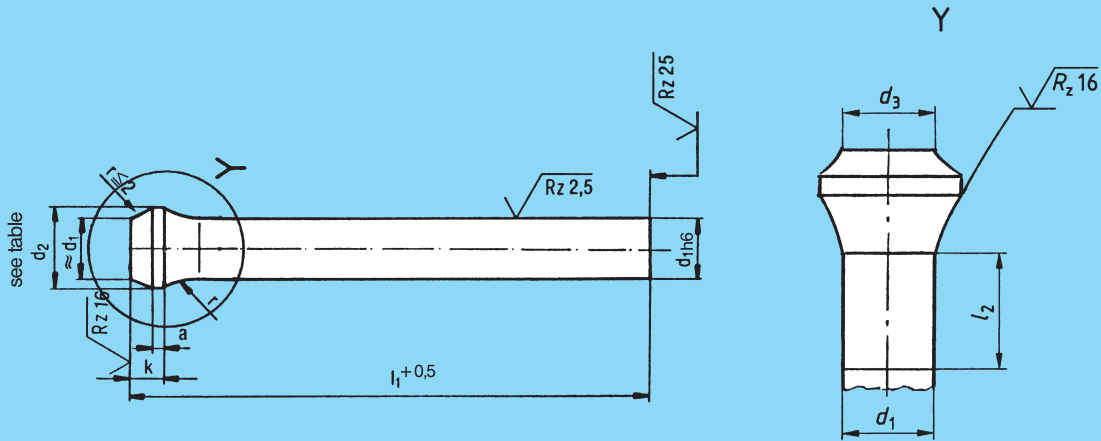


Special Round Piercing Punches – with trombone neck head

Similar to **DIN 9861 Part 1 Standard finish**

Type DA

– with continuous shaft



Range of application

For press tools used for extremely high demands

Size/head size

See table - all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

h6	0,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 16,00 Ø
	- 0,006	- 0,008	- 0,009	- 0,011

Length: total $l_1 + 0,5$

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

Material

HWS: High alloy cold working steel (approx. 12 % Chrome)

HSS: High speed steel

Material properties

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

		HWS	HSS
Shaft:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

Finish

Hardened, annealed, shaft precision ground, trombone neck head hot formed with permissible swelling d_3 immediately below the head.

Please note

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

The necessary counterbores are also available from us.

As required, the head pivot can be omitted. Please indicate when ordering.

Table of dimensions

Piercing punches Type DA with trombone neck head

Shaft-Ø d ₁ h ₆	Total length l ₁ ^{+0,5} 71	Head		Head edge a ±0,1	Head pivot K +0,2	Swelling		Shaft-Ø d ₁ h ₆	Total length l ₁ ^{+0,5} 71	Head		Head edge a ±0,1	Head pivot K +0,2	Swelling																															
		Ø d ₂ -0,1 ²	r -0,2			d ₃	Length l ₂ max.			Ø d ₂ -0,1 ²	r -0,2			d ₃	Length l ₂ max.																														
2,0		3,0	3,5	1,0	3,0	d ₁ +0,03	5	5,5		8,0	10,0	1,5	4,0	d ₁ +0,03	6																														
2,1		3,2	5,0					5,6								5,7		5,8																											
2,2								5,9								6,0																													
2,3		3,5						6,1								6,2		6,3		9,0	12,0	d ₁ +0,04	8																						
2,4								6,4								6,5		7,0						7,5																					
2,5		4,0						6,5	6,5								8,0		8,5		13			15,0	4,0	10																			
2,6									6,6		9,0				9,5		10,0																												
2,7			4,5						6,7		10,5				11,0		14,0	15,0	4,0	12																									
2,8									6,8		11,5				12,0						12,5																								
2,9		5,0	8,0						1,5	4,0	d ₁ +0,03			5	13		15,0				15,0	4,0	10																						
3,0				14,0		16,0						17,0			18,0																														
3,1		5,5		8,0	1,5	4,0	d ₁ +0,03					5	15,0			19,0	15,0										4,0	12																	
3,2													16,0																17,0		18,0		19,0												
3,3		6,0											8,0		1,5	4,0		d ₁ +0,03											5	20,0		20,0	15,0	4,0	12										
3,4																														17,0						18,0		19,0		20,0					
3,5		6,5						8,0																1,5	4,0	d ₁ +0,03				5							15,0	4,0	12						
3,6																															18,0									19,0		20,0			
3,7		7,0																	8,0	1,5											4,0	d ₁ +0,03				5							15,0	4,0	12
3,8																																								19,0					
3,9		7,5	8,0						1,5	4,0	d ₁ +0,03			5																										15,0	4,0	12			
4,0																					20,0																								
4,1		8,0		8,0	1,5	4,0	d ₁ +0,03					5											15,0				4,0	12																	
4,2																	21,0																												
4,3		8,5											8,0		1,5	4,0	d ₁ +0,03	5															15,0	4,0	12										
4,4																					22,0																								
4,5		9,0						8,0													1,5	4,0		d ₁ +0,03	5												15,0	4,0	12						
4,6																										23,0																			
4,7		9,5																	8,0	1,5						4,0			d ₁ +0,03	5													15,0	4,0	12
4,8																															24,0														
4,9		10,0	8,0						1,5	4,0	d ₁ +0,03			5																										15,0	4,0	12			
5,0																															25,0														
5,1		10,5		8,0	1,5	4,0	d ₁ +0,03					5																			15,0	4,0				12									
5,2																							26,0																						
5,3		11,0											8,0		1,5	4,0	d ₁ +0,03	5															15,0	4,0	12										
5,4																							27,0																						

The filled-in spaces indicate standard dimensions. Special dimensions on request.
 These piercing punches are also available in type CA (with stepped shaft).

Piercing punches with bottle neck head are not a stock item.



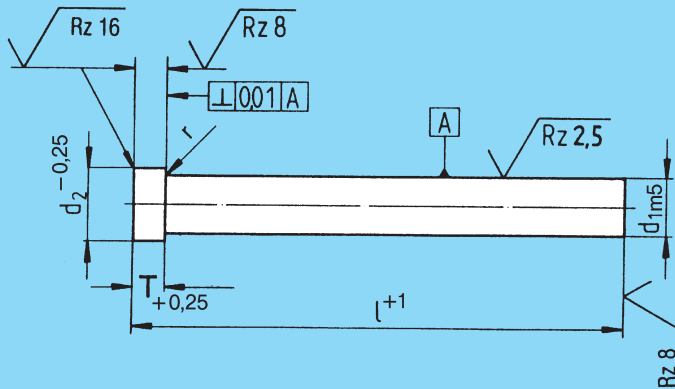
Round Piercing Punches

ISO 8020

Type A

Precision finish

- with continuous shaft
- with cylindrical Head
- plunge cut ground



Range of application

For press tools used mainly for piercing/cutting perforations into sheet steel.

Size/head size

See table - all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

	3 Ø	4 + 5 + 6 Ø	8 + 10 Ø	13 + 16 Ø	20 + 25 Ø	32 Ø
m5	+ 0,006	+ 0,009	+ 0,012	+ 0,015	+ 0,017	+ 0,020
	+ 0,002	+ 0,004	+ 0,006	+ 0,007	+ 0,008	+ 0,009

Length: total $l+1$

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

Material

HWS: High alloy cold working steel (approx. 12 % Chrome)

HSS: High speed steel

Material properties

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

		HWS	HSS
Shaft:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

Finish

Hardened, annealed, cylinder head hot formed, subsequently the shaft is plunge cut ground over the whole length including the underneath part of the head. Head surface ground.

Please note

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

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

Table of dimensions

Piercing Punches Type A

Shaft-Ø d_1 m5	Total length l ⁺¹					Head		Head height T + 0,25
	63	71	80	90	100	Ø d ₂ ^{-0,25}	r ^{±0,1}	
3						5	0,25	3
4						6		
5						8		
6						9		
8						11		
10						13		
13						16	0,4	5
16						19		
20						24		
25						29		
32						36		

The filled-in Spaces indicate standard dimensions.



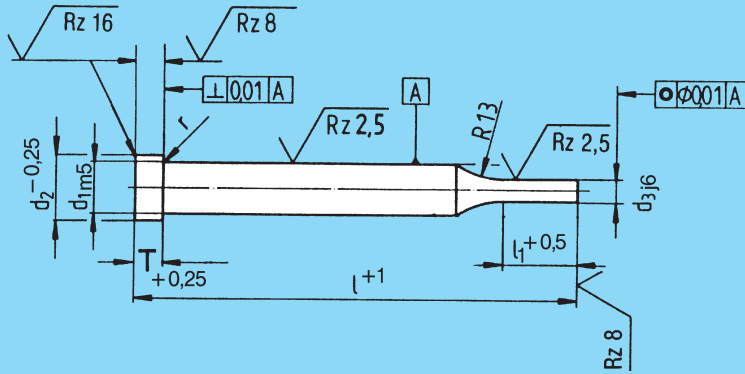
Round Piercing Punches

ISO 8020

Type B

Precision finish

- with round stepped shaft
- with cylindrical head
- plunge cut ground



Range of application

Size/head size

Fit/tolerancen

For press tools used mainly for piercing/cutting perforations into sheet steel.

See table - all dimensions are in mm

Nominal diameter d_3 (step)

	0,8 - 3 Ø	≤ 3 - 6 Ø	≤ 6 - 10 Ø	≤ 10 - 18 Ø	≤ 18 + 30 Ø	≤ 30 - 31,9 Ø
j6	+ 0,004	+ 0,006	+ 0,007	+ 0,008	+ 0,009	+ 0,011
	- 0,002	- 0,002	- 0,002	- 0,003	- 0,004	- 0,005

Nominal diameter d_1 (shaft)

	3 Ø	4 + 5 + 6 Ø	8 + 10 Ø	13 + 16 Ø	20 + 25 Ø	32 Ø
m5	+ 0,006	+ 0,009	+ 0,012	+ 0,015	+ 0,017	+ 0,020
	+ 0,002	+ 0,004	+ 0,006	+ 0,007	+ 0,008	+ 0,009

Length: total l^{+1}
step $l_1^{+0,5}$

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

Material

HWS: High alloy cold working steel (approx. 12 % Chrome).

HSS: High speed steel

Material properties

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

		<u>HWS</u>	<u>HSS</u>
Shaft/step:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

Finish

Hardened, annealed, cylindrical head hot formed, subsequently the shaft is plunge cut ground over the whole length including the underneath part of the head. Head surface ground.

Please note

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)

Table of dimensions

Piercing punches type B

Step-Ø d_3 j_6	Gradation d_3	Length of step $l_1 + 0,5$	Shaft-Ø d_1 m_5	Total length l^{+1}					Head		Head height $T + 0,25$
				63	71	80	90	100	$\varnothing d_2^{-0,25}$	$r \pm 0,1$	
0,8 - 2,9	0,10	10	3						5	0,25	3
1,0 - 3,9			4						6		
1,0 - 4,9			5						8		
1,6 - 5,9			6						9		
2,5 - 7,9		13	8						11	0,4	5
4,0 - 9,9		17	10						13		
5,0 - 12,9			13						16		
8,0 - 15,9			16						19		
12,0 - 19,9			20						24		
16,5 - 24,9			25						29		
20,0 - 31,9	32						36				

The filled-in spaces indicate standard dimensions.

Piercing punches of type B are not a stock item.



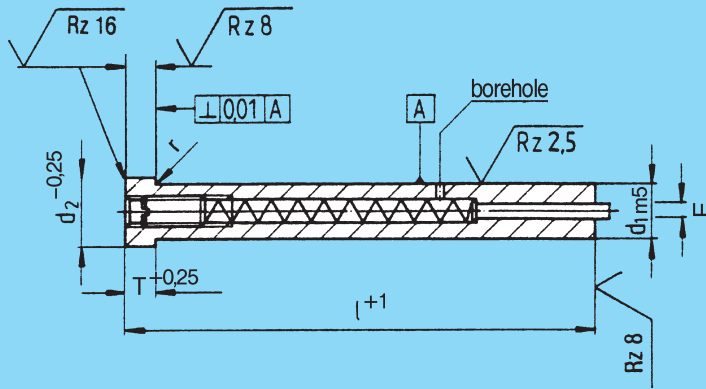
Round Piercing Punches

ISO 8020

Type E

Precision finish

- with continuous shaft
- with cylindrical Head
- with springmounted draw-off pin
- plunge cut ground



Range of application

For press tools mainly used for piercing/cutting perforations into sheet steel. Especially suitable for the rapid ejection of punch blanks

Size/Head size

See table - all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

	5 + 6 Ø	8 + 10 Ø	13 + 16 Ø	20 + 25 Ø	32 Ø
m5	+ 0,009	+ 0,012	+ 0,015	+ 0,017	+ 0,020
	+ 0,004	+ 0,006	+ 0,007	+ 0,008	+ 0,009

Length: Total l^{+1}

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

Material

HSS: High Speed Steel

Material properties

HSS: For working high strength or difficult to work materials. Very abrasion proof, high tensile strength and high heat resistance.

Hardness

		HSS
Shaft:	HRC	62 - 66
Head:	HRC	45 - 55

Finish

Hardened, annealed, cylindrical head hot formed, subsequently the shaft is plunge cut ground over the whole length including the underneath part of the head. Head surface ground.

Please note

These piercing punches come complete with special threaded compression spring, setscrew and ejector. The spring tension of the draw-off pin is adjustable at the setscrew on the head.

Table of measurements

Piercing Punches Type E

Shaft-Ø d_1 m5	Total length l ⁺¹					Head		Head height T + 0,25	Ejector E
	63	71	80	90	100	Ø d ₂ ^{-0,25}	r ± 0,1		
5						8	0,25	5	1,0
6						9			
8						11			
10						13			
13						16	0,4		1,4
16						19			
20						24			
25						29			
32						36		2,1	

The filled-in spaces indicate standard dimensions.



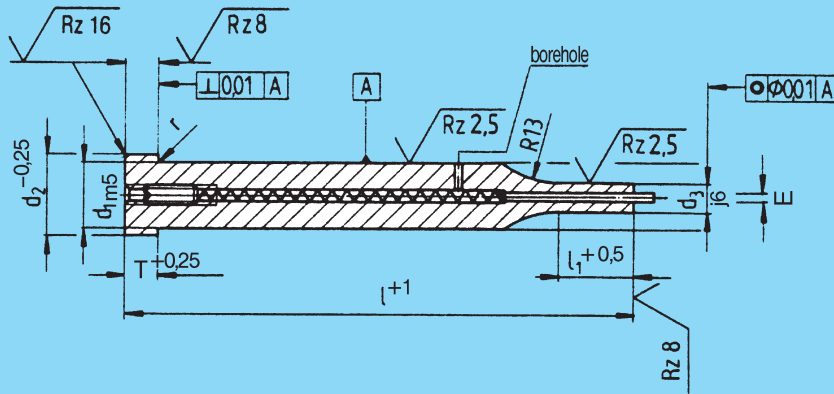
Round Piercing Punches

ISO 8020

Type F

Precision finish

- with round stepped shaft
- with cylindrical head
- with springmounted draw-off pin
- plunge cut ground



Range of application

For press tools used mainly for piercing/cutting perforations into sheet steel. Especially suitable for the rapid ejection of punch blanks.

Size/head size

See table - all dimensions are in mm.

Fit/tolerances

Nominal diameter d_3 (step)

	1,6 - 3 Ø	≤ 3 - 6 Ø	≤ 6 - 10 Ø	≤ 10 - 18 Ø	≤ 18 + 30 Ø	≤ 30 - 31,9 Ø
j6	+ 0,004	+ 0,006	+ 0,007	+ 0,008	+ 0,009	+ 0,011
	- 0,002	- 0,002	- 0,002	- 0,003	- 0,004	- 0,005

Nominal diameter d_1 (shaft)

	5 + 6 Ø	8 + 10 Ø	13 + 16 Ø	20 + 25 Ø	32 Ø
m5	+ 0,009	+ 0,012	+ 0,015	+ 0,017	+ 0,020
	+ 0,004	+ 0,006	+ 0,007	+ 0,008	+ 0,009

Length: Total $l+1$
step $l_1+0,5$

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

Material

HSS: High Speed Steel

Material properties

HSS: For working high strength or difficult to work materials. Very abrasion proof, high tensile strength and high heat resistance.

Hardness

		HSS
Shaft/step:	HRC	62 - 66
Head:	HRC	45 - 55

Finish

Hardened, annealed, cylindrical head hot formed, subsequently the shaft is plunge cut ground over the whole length including the underneath part of the head. Head surface ground.

Please note

These piercing punches come complete with special threaded compression spring, setscrew and ejector. The spring tension of the draw-off pin is adjustable by using the setscrew on the head.

Table of measurements

Piercing punches type F

Step-Ø d_3 j_6	Gradation d_3	Length of step $l_1^{+0,5}$	Shaft-Ø d_1 m_5	Total length l^{+1}					Head		Head height $T^{+0,25}$	Ejector E	
				63	71	80	90	100	$\varnothing d_2^{-0,25}$	$r^{\pm 0,1}$			
1,6 - 4,9	0,10	10	5						8	0,25	5	1,0	
2,5 - 5,9			6						9				
3,0 - 7,9		13						11					
4,0 - 9,9		17		10						13		0,4	1,4
5,0 - 12,9				13						16			2,1
8,0 - 15,9				16						19			
12,0 - 19,9				20						24			
16,5 - 24,9				25						29			
20,0 - 31,9				32						36			

The filled-in spaces indicate standard dimensions.

Piercing punches of type F are not a stock item.

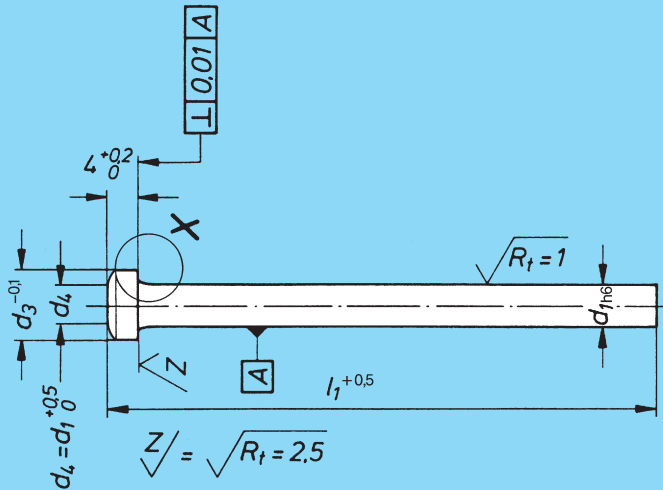
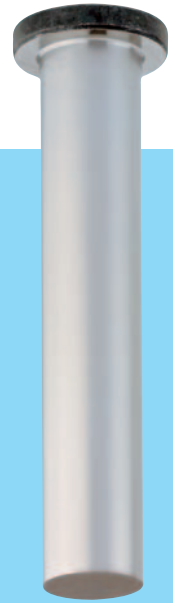


Round Piercing Punches

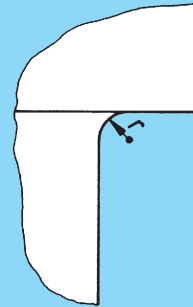
Previously **DIN 9844**
Type A

Precision finish

- with continuous shaft
- with cylindrical Head
- plunge cut ground



Detail X
Standard design
with radius



Range of application

For press tools used mainly for piercing/cutting perforations into sheet steel.

Size/head size

See table - all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

h6	2,00 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 16,00 Ø
	- 0,006	- 0,008	- 0,009	- 0,011

Length: Total l^{+1}

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

Material

HSS: High Speed Steel

Material properties

HSS: For working high strength or difficult to work materials. Very abrasion proof, high tensile strength and high heat resistance.

Hardness

		HSS
Shaft:	HRC	62 - 66
Head:	HRC	45 - 55

Finish

Hardened, annealed, cylindrical head hot formed, subsequently the shaft is plunge cut ground over the whole length including the underneath part of the head. Head surface ground.

Please note

These piercing punches are designed for moving punch holding devices in the die. They are designed, contrary to piercing punches with conical head, for level coating areas at the punch holding plate. By allowing adequate tolerance clearance between piercing punch, punch holding plate and pressure plate, the bending stresses, which will occur due to misalignment in rigid installations, can therefore be avoided. main measurements are based on standard figures and take into account a supporting flange at the head of the piercing punch, which will permit stripping of piercing particles or stripes without plasticised deforming of the punch holding plate.

Table of measurements

Piercing punches type A

Shaft-Ø d_1 h6	Gradation d_1	Total length $l_1^{+0,5}$			Head		Head height + 0,2
		71	90	112	$\varnothing d_3^{-0,1}$	$r^{+0,1}$	
2,0 - 2,2	0,10				3,6	0,2	4
2,3 - 2,5					4,0		
2,6 - 2,8					4,5	0,3	
2,9 - 3,2					5,0		
3,3 - 3,5					6,0		
3,6 - 4,0					7,0		
4,1 - 4,5					8,0	0,5	
4,6 - 5,0					8,5		
5,1 - 5,4					9,0		
5,5 - 5,9					9,5		
6,0 - 6,4				10,0			
6,5 - 7,0	0,50				10,8	0,7	
7,5 - 8,0					12,0		
8,5 - 9,0					13,0		
9,5 - 10,0					14,5		
10,5 - 11,0					16,0	1,0	
11,5 - 12,5					18,0		
13,0 - 14,5					20,0		
15,0 - 16,0					22,0		

The filled-in spaces indicate standard dimensions.

Piercing punches of type A are a limited stock item.

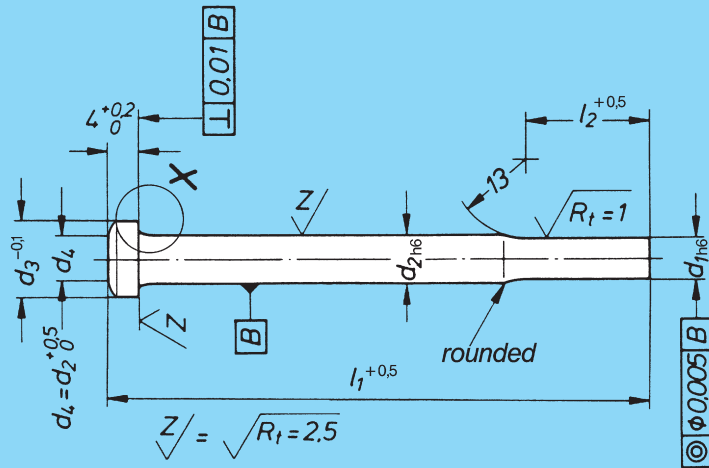


Round Piercing Punches

Previously **DIN 9844**
Type B

Precision finish

- with round stepped shaft
- with cylindrical Head
- plunge cut ground



Detail X
Standard design
with radius



Range of application

Size/head size

Fit/tolerances

For press tools used mainly for piercing/cutting perforations into sheet steel.

See table - all dimensions are in mm

Nominal diameter d_1 (step)

h6	0,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 15,90 Ø
	- 0,006	- 0,008	- 0,009	- 0,011

Nominal diameter d_2 (shaft)

h6	2 + 2,5 Ø	3,2 + 4 + 5 Ø	6,3 + 8 + 10 Ø	≥ 12,5 + 16 Ø
	- 0,006	- 0,008	- 0,009	- 0,011

Length: Total $l_1^{+0.5}$
Shaft $l_2^{+0.5}$

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

Material

Material properties

Hardness

Finish

Please note

HSS: High Speed Steel

HSS: For working high strength or difficult to work materials. Very abrasion proof, high tensile strength and high heat resistance.

		HSS
Shaft/step:	HRC	62 - 66
Head:	HRC	45 - 55

Hardened, annealed, cylindrical head hot formed, subsequently the shaft is plunge cut ground over the whole length including the underneath part of the head. Head surface ground.

These piercing punches are designed for moving punch holding devices in the die. They are designed, contrary to piercing punches with conical head, for level coating areas at the punch holding plate. By allowing adequate tolerance clearance between piercing punch, punch holding plate and pressure plate, the bending stresses, which will occur due to misalignment in rigid installations, can therefore be avoided. The main measurements are based on standard figures and take into account a supporting flange at the head of the piercing punch, which will permit stripping of piercing particles or stripes without plasticised deforming of the punch holding plate.

Table of measurements

Piercing Punches Type B

Step-Ø d_1 h6	Gradation d_1	Length of step $l_2^{+0,5}$	Shaft-Ø d_2 h6	Total length $l_1^{+0,5}$			Head		Head height $+0,2$
				71	90	112	Ø $d_3^{-0,1}$	$r^{+0,1}$	
0,5 - 1,9	0,05	7	2,0				3,6	0,2	4
1,95 - 2,4			2,5				4,0		
2,5 - 3,1	0,10		3,2				5,	0,3	
3,2 - 3,9			4,0				7,0		
4,0 - 4,9			5,0				8,5	0,5	
5,0 - 6,2			6,3				10,0		
6,3 - 7,9			16	8,0				12,0	
8,0 - 9,9	10,0					14,5			
10,0 - 12,4	12,5					18,0	1,0		
12,5 - 15,9	16,0					22,0			

The filled-in spaces indicate standard dimensions.

Piercing punches of type A are a limited stock item.



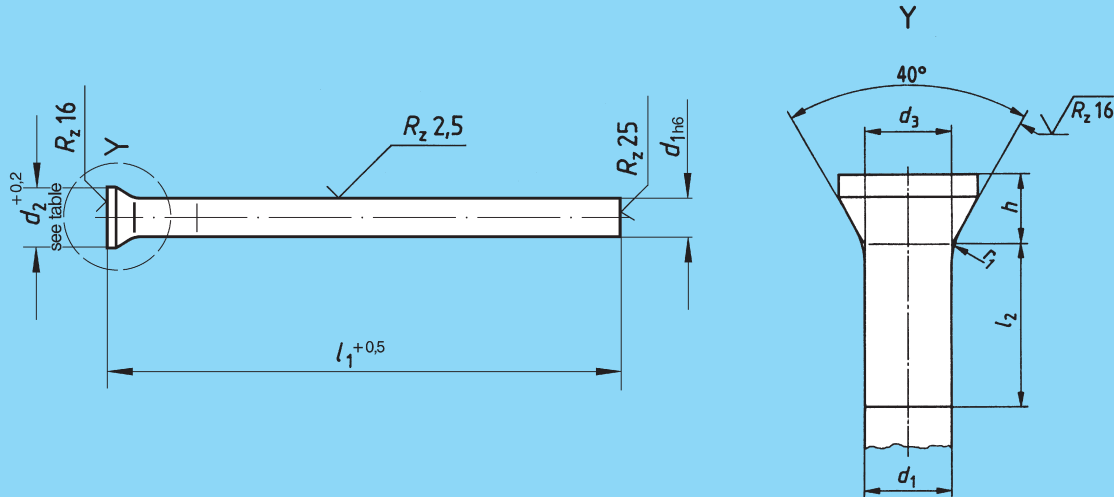
Round Piercing punches

DIN 9840 Part 1

Type DA

Standard finish

- with continuous shaft
- 40° conical head



Range of application

For press tools used mainly for making perforated sheet metals.

Size/head size

See table - all measurements are in mm

Fit/tolerances

Nominal diameter d_1 (shaft)

h6	0,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 16,00 Ø
	- 0,006	- 0,008	- 0,009	- 0,011

Length: Total $l_1^{+0,5}$

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

Material

HWS: High alloy cold working steel (approx. 12 % Chrome)

HSS: High Speed Steel

Material properties

HWS: For working materials of higher strength. 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

		HWS	HSS
Shaft:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

Finish

Hardened, annealed, shaft precision ground, 40° countersunk head hot formed, with permissible swelling d_3 immediately below the head.

Please note

For extremely high demands we would recommend a piercing punch made from powder high speed steel.

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

Table of measurements

Piercing Punches Type DA

Shaft-Ø d ₁ h ₆	Total length l ₁ + ^{0,5}					Head			Head height	Swelling	
	25	36	50	63	71	Ø d ₂	Tol.	r ₁	h+ ^{0,2}	d ₃	Length l ₂ max.
0,5						0,85	+ 0,2	0,5	0,65	d1 + 0,02	5
0,63						1,0			0,7		
0,8						1,35			1,0		
1,0						1,7		1,0	1,3	d1 + 0,03	
1,25						1,9			1,5		
1,6						2,4					
2,0						2,9		2,0	1,8		
2,5						3,5			2,1		
3,15						4,25			2,5		
4,0						5,1					
5,0						6,3		3,0	3,0	d1 + 0,04	
6,3						7,6			3,8		
8,0						9,5					
10,0						12,0					
12,5						14,5					
14,0						16,0					
16,0						18,0					

The filled-in spaces indicate standard dimensions.. Special dimensions on request.

Piercing punches with 40° conical head are not a stock item.



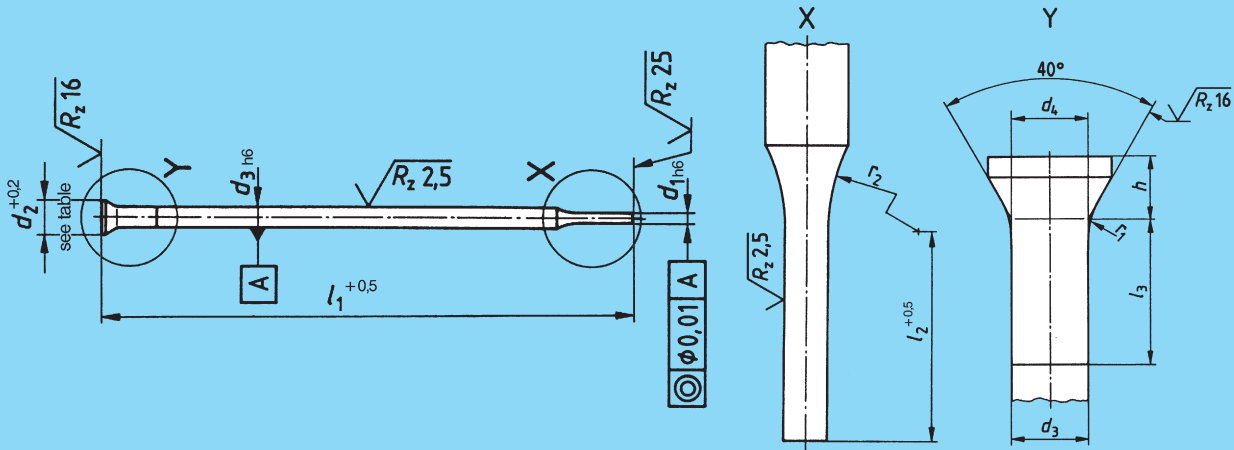
Round Piercing Punches

DIN 9840 Part 2

Type CA

Standard finish

- with round stepped shaft
- with 40° conical head



Range of application

For press tools mainly used for making perforated sheet metals.

Size/head size

See table - all dimensions are in mm

Fit/tolerances

Nominal diameter d_1 (step)

h6	0,50 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø
	- 0,006	- 0,008	- 0,009

Nominal diameter d_3 (shaft)

h6	1,25 - 3,00 Ø	≥ 3,00 - 6,00 Ø	≥ 6,00 - 10,00 Ø	≥ 10,00 - 12,50 Ø
	- 0,006	- 0,008	- 0,009	- 0,011

Length: Total $l_1^{+0,5}$
Step $l_2^{+0,5}$

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

Material

HWS: High alloy cold working steel (approx. 12 % Chrome)
HSS: High Speed Steel

Material properties

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

		HWS	HSS
Shaft/step:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

Finish

Hardened, annealed, shaft and step precision ground, 40° countersunk head hot formed, with permissible swelling d_4 immediately below the head.

Please note

For extremely high demands we would recommend a piercing punch made from powder high speed steel.
HSS Piercing punches can be covered with a special surface coating on request (Pages 42/43)

Table of measurements

Piercing Punches Type CA

Step-Ø d ₁ h ₆	Shaft-Ø d ₃ h ₆	Total length l ₁ ^{+0,5}					Step radius r ₂	Head			Head height h ^{+0,2}	Swelling		
		25	36	50	63	71		Ø d ₂	Tol.	r ₁		d ₄	Length l ₃ max.	
		Length of step l ₂ ^{+0,5}												
0,50	1,25	2,5					2	1,9		1,0	1,5	d3 + 0,03	5	
0,63		3,2												
0,80		4,0	4,0	4,0										
1,0	2,0	5,0	5,0	5,0			2,9			1,8				
1,25		5,0	5,0	5,0										
1,6	2,5		6,3	6,3			3,5	+ 0,2	2,0	2,1				
2,0	3,15		6,3	8,0	8,0		4,25							
2,5			6,3	8,0	8,0		5,1							
3,15	4,0		10,0	10,0	10,0		6,3				2,5			
4,0	5,0		12,5	16,0	16,0	20,0	7,6							
5,0	6,3		12,5	16,0	16,0	20,0	9,5				3,0			3,0
6,3	8,0			16,0	16,0	20,0	12,0							
8,0	10,0			16,0	16,0	20,0	14,5					3,8		
10,0	12,5			16,0	20,0	20,0								

The filled-in spaces under l₂ indicate standard dimensions. Special dimensions on request.
The stepped piercing punches are also available with highly precision ground step (R_Z = 0,4 - 0,6 μ).

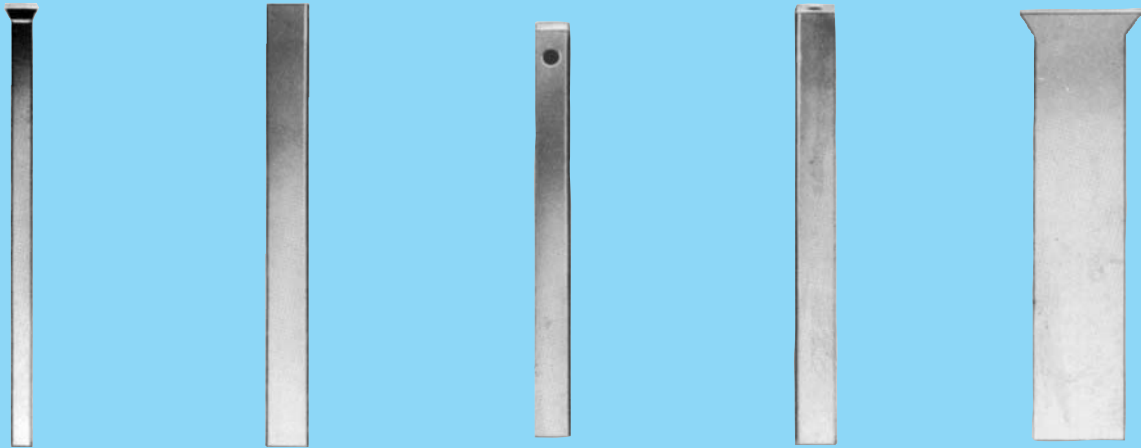
Piercing punches with 40° conical head are not a stock item.



Piercing Punches

Similar to DIN 9846

- square or rectangular
- with or without head



Range of application

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

Dimensions

To customers' request.

Head size

In accordance with DIN 9861 or to customers' request

Fit/tolerances

Nominal diameter shaft: -0.01 or to customer specifications

Nominal diameter step: -0.01 or to customer specifications

Length: Total $l_1^{+0,5}$
Step $l_2^{+0,5}$ or to customer specifications

All other tolerances: To customers request or non-specified tolerances in accordance with ISO 2768-m

Material

HWS: High alloy cold working steel (approx. 12 % Chrome)

HSS: High Speed Steel

Material properties

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

		HWS	HSS
Shaft/step:	HRC	60 - 64	62 - 66
Head:	HRC	45 - 55	45 - 55

With type D (flat head) the head is not annealed

Finish

Hardened, annealed and ground.

With type DA the countersunk head is hot formed

Please note

For extremely high demands we would recommend piercing punches made from powder high speed steel.

HSS Piercing punches can be covered 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.

Type and design

Type A

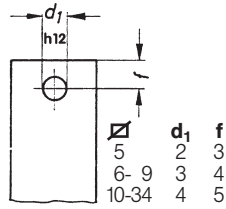
without head

On request with one end annealed to 45-55 HRC
made from HWS or HSS materials



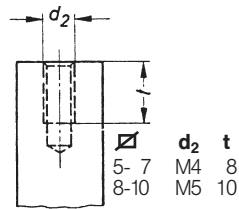
Type B for punches from 5 mm

without head, with transverse hole at the end of the shaft, on request with the end at the transverse hole annealed to 45-55 HRC.
Made from HWS or HSS materials



Type C for punches from 5 mm

without head, with threaded blind hole
made from HWS or HSS materials



Type DA

with hot formed 60° square countersunk head
Head size according to DIN 9861
made from HWS or HSS materials



Type D

with ground 60° precision countersunk head
The countersunk head is not annealed.
Made from HWS or HSS materials



Type E

with round shaft in accordance with DIN 9861, type DA (with 60° countersunk head) and square or rectangular step.
Made from HWS or HSS materials



Type F

with round shaft in accordance with DIN 9861, type B (without head) and square or rectangular step.
Made from HWS or HSS materials



Type G

with round, hot formed 60° countersunk head.
Made from HWS or HSS materials



Form/profile punch

Please ask for specific information.
Below is a small selection of different types.



Information

The use of increasingly modern machines and installations, the constant aim for higher performance and the need to be more economical, puts higher demands on the punch manufacturer to produce better and more efficient tools and materials. DREI-S can offer the following solutions for a longer life expectancy:

Piercing Punches for perforated metals

When working perforated metals, considerable withdrawal forces will occur. We therefore recommend the use of punches with 40° countersunk head (see pages 36 - 39). Punches with bottle neck or trombone neck head (pages 20 - 23) are also very beneficial. A greater life expectancy is of course achieved by using a surface coating (page 42).

Piercing punches for printed circuit boards

For this application we would recommend punches with high precision ground surface (Rz 0.4 - 0.6 μ). These are piercing punches with a specially smooth surface, which have the advantage of not drawing up the existing dust particles during punching. Up to this point this has led to unavoidable, premature wear of the punches. By refining the punch surface, the life expectancy has been extended. The result: Enormous savings in the cost of tools, and production can be increased due to reduced interruption time on the machines. A surface coating has even further advantages (see page 42).

Special materials

Apart from the already listed standard materials WS - HWS and HSS, we also produce punches from the following materials for extremely high throughput:

1. Powder metallurgy manufactured high speed steel
 - a) ASP 2023
 - b) ASP 2030
 - c) ASP 2060
 - d) CPM 10 V
 - e) CPM Rex M4
2. HSS-E cobalt alloy
3. Tungsten carbide
4. Stainless steel

Surface coatings

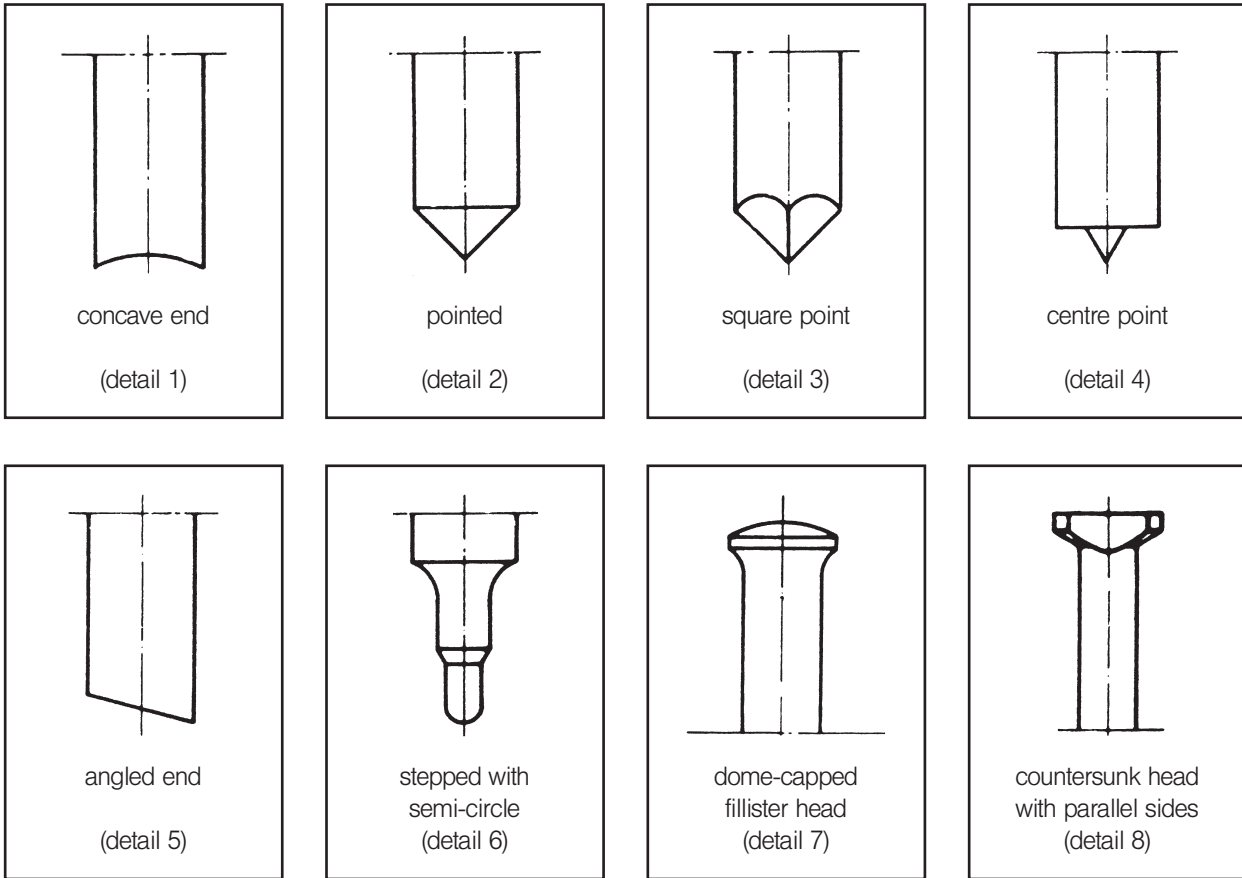
By using the following coatings, all punches made from HSS or powder metallurgy manufactured HSS have a greater life expectancy:

1. TIN (PVD procedure) Colour: gold-yellow
The hardness of the coating of 2 200 - 2 400 HV 0.05 when a coating strength of 2 - 4 μ is achieved. The relatively low coating temperature permits coating of tools with the closest tolerances.
2. TICN (PVD procedure) Colour: blue-grey
The TICN coating combines the extreme hardness of a carbide layer (approx. 3 000 HV 0.05) with the advantageous chemical properties and the favourable gliding behaviour of the nitrate layer. The coating strength is 2 - 4 μ .
3. Nitrated (Tenifer procedure) Colour: grey-black
By using this treatment, an increase in the surface hardness to approx. 1 000 HV 0.3 (approx. 70 HRC) has been achieved.

Others

Processed ends

For special applications we can offer different dimensions and types of ground ends and special countersunk heads. Below is small sample from our range:



Piercing punches without head

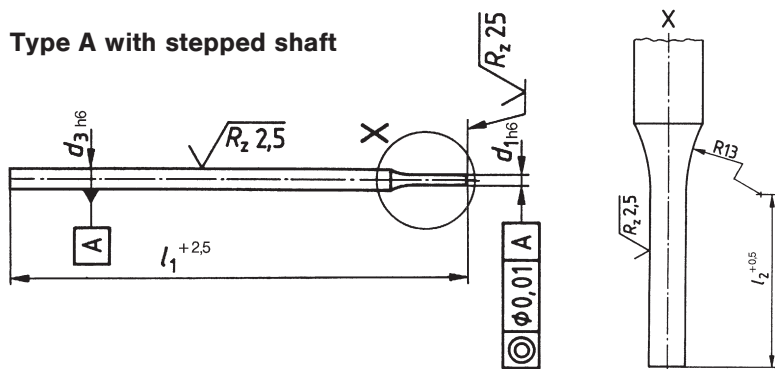
We will only manufacture these punches on specific instruction as a specially made item.

For technical details see pages 6 and 16.

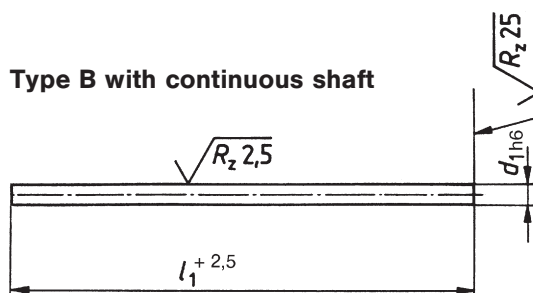
We have set the added length to + 2.5 mm. This will give enough length for the required countersunk head to be "hammered".

It should be remembered that the ends need to be annealed.

Type A with stepped shaft



Type B with continuous shaft





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