



Eberhard

PRÄZISIONSTEILE · PRECISION PARTS

ENGLISH VERSION 

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 **MADE IN GERMANY**

PRESS TOOLS
MOULD COMPONENTS
FIXTURES
FORMING TOOLS

TABLE OF CONTENTS

THE COMPANY

4 – 5	Precision and reliability based on tradition
6 – 7	Gebrüder EBERHARD 90 years of precision
8 – 9	Your contact person
10 – 11	EBERHARD standard parts Highest quality and best availability

73	Die bush with through-going starting hole of material HSS, ISO 8977, type F with collar
74 – 75	Forming die with collar of material HSS, similar ISO 8977
76	Punch guide bush DIN 9845, type C
77	Punch guide bush ISO 8978

PRESS TOOLS

14 – 16	Cutting punch with countersunk head, DIN 9861 part 1, type DA
18 – 24	Cutting punch with countersunk head, DIN 9861 part 1, type D (similar ISO 6752)
25	Solid carbide punch with countersunk head, DIN 9861 part 1, type D (similar ISO 6752)
26	Cutting punch with countersunk head, DIN 9861 part 2, type CA
27 – 28	Cutting punch with countersunk head, DIN 9861 part 2, type C (similar ISO 9181)
30 – 31	Cutting punch with countersunk head, DIN 9861 part 2, type C (similar ISO 9181) with round or square stepped cutting shaft
32	Cutting punch without head, DIN 9861, type B
34 – 35	Forming punch with forged head, type CA
36	Cutting punch with 30°-head, type D
37	Cutting punch with bottle neck, similar DIN 5118, type E
38 – 39	Cutting punch with bottle neck, similar DIN 5118, type DA
40 – 42	Cutting punch with bottle neck, similar DIN 5118, type D
43	Countersink tool with three side-trimmer, for bottle neck punches
44 – 47	Cutting punch with cylindrical head, DIN ISO 8020, type A
48	Solid carbide punch with cylindrical head, DIN ISO 8020, type A
49 – 51	Cutting punch with cylindrical head, DIN ISO 8020, type B
52 – 53	Cutting punch with cylindrical head, DIN ISO 8020, type C
54 – 55	Cutting punch with cylindrical head, DIN ISO 8020, type E
56	Cutting punch with cylindrical head, DIN ISO 8020, type F
58	Cutting punch with cylindrical head, DIN ISO 8020, type G
60 – 61	Cutting punch with cylindrical head, type EA
62	Cutting punch with cylindrical head, type EB
63	Cutting punch with cylindrical head, with stepped shaft, square, rectangular and oblong, type EC
64	Die bush of material HSS, DIN 9845, type A without collar
65	Die bush of material HSS, DIN 9845, type B with collar
66 – 67	Die bush of material HSS, ISO 8977, type A without collar
68 – 69	Die bush of material HSS, ISO 8977, type B with collar
70	Die bush with starting hole of material HSS, ISO 8977, type C without collar
71	Die bush with starting hole of material HSS, ISO 8977, type D with collar
72	Die bush with through-going starting hole of material HSS, ISO 8977, type E without collar

MOULD COMPONENTS

80 – 81	Ejector pin with countersunk head, DIN 1530 part 3, type D
82 – 83	Ejector pin with cylindrical head, DIN 1530 part 1, type A, nitrided & oxidized (similar DIN ISO 6751)
84 – 85	Ejector pin with cylindrical head, DIN 1530 part 1, type A, bright nitrided (similar DIN ISO 6751)
86 – 87	Ejector pin Core pin unnitrided, similar DIN 1530 part 1, type A (similar DIN ISO 6751)
88	Ejector pin Core pin high tempered, similar DIN 1530 part 1, type A (similar DIN ISO 6751)
89	Pin unnitrided approx. 54 HRC, similar DIN 1530 part 1, type A (similar DIN ISO 6751)
90	Copper core pin with cylindrical head, similar DIN 1530 part 1, type A (similar DIN ISO 6751)
92 – 93	Ejector pin with cylindrical head, DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)
94 – 95	Ejector pin with cylindrical head and DLC-coating, similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)
96	Ejector pin with one-sided anti-twist lock, similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)
98 – 99	Ejector pin with cylindrical head of material HSS, similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)
100 – 101	EJECTOR PIN with cylindrical head of material HSS and DLC-coating, similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)
102	Ejector pin stainless and acid-resistant, similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)
103	Ejector pin with cylindrical head, DIN 1530 part 2, type C, nitrided & oxidized (similar DIN ISO 8694)
104	Ejector pin with cylindrical head, DIN 1530 part 2, type C, bright nitrided (similar DIN ISO 8694)
105	Ejector pin with cylindrical head, DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)
106	Ejector pin with cylindrical head and DLC-coating, similar DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)
107	Ejector pin with cylindrical head of material HSS, similar DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)
108	Ejector pin with cylindrical head of material HSS and DLC-coating, similar DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)
109	Flat ejector with cylindrical head, DIN ISO 8693, nitrided & oxidized (DIN 1530 part 4, type FA)
110 – 111	Flat ejector with cylindrical head, DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
112	Flat ejector with 2 corner radii, similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
113	Flat ejector with 2 corner radii and DLC-coating, similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
114	Flat ejector with 4 corner radii, similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
115	Flat ejector with 4 corner radii and DLC-coating, similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
116	Flat ejector with extra long sheet, similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
117	Flat ejector with 2 corner radii and extra long sheet, similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
118	Flat ejector with 4 corner radii and extra long sheet, similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)
120 – 121	Ejector sleeves with cylindrical head, DIN ISO 8405, bright nitrided (similar DIN 16756)
122 – 123	Ejector sleeves with cylindrical head, DIN ISO 8405, hardened (similar DIN 16756)

FIXTURES

126	Dowel pins DIN 6325 (similar DIN EN ISO 8734, type A)
127	Dowel pins DIN 7979 (similar DIN EN ISO 8735, type A)
128 – 129	Drill bush without collar DIN 179 (similar ISO 4247)
130 – 131	Drill bush with collar DIN 172 (similar ISO 4247)

FORMING TOOLS

134 – 135	Preforming ejector pin similar DIN 9861 part 1, type D, through hardened
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CUSTOM-MADE COMPONENTS

138 – 141	EBERHARD precision parts – trusted in many industries
142	Technologies at EBERHARD

TECHNICAL NOTES

144 – 147	Tolerances for form and position General notes on tolerances for form and position
148	Conversion table for Vickers- and Rockwellhardness
150 – 151	Material table Selection of materials
152 – 153	Selection of our manufacturing processes

EBERHARD PRECISION PARTS



LOCATION NORDHEIM

We are a family-owned, medium-sized company proudly led by our third generation with more than 500 employees at five locations. With our main plant in Nordheim, as well as two additional sites in Ohrdruf and Bretzfeld, EBERHARD Precision Parts is the largest part of the overall business according to the number of employees.

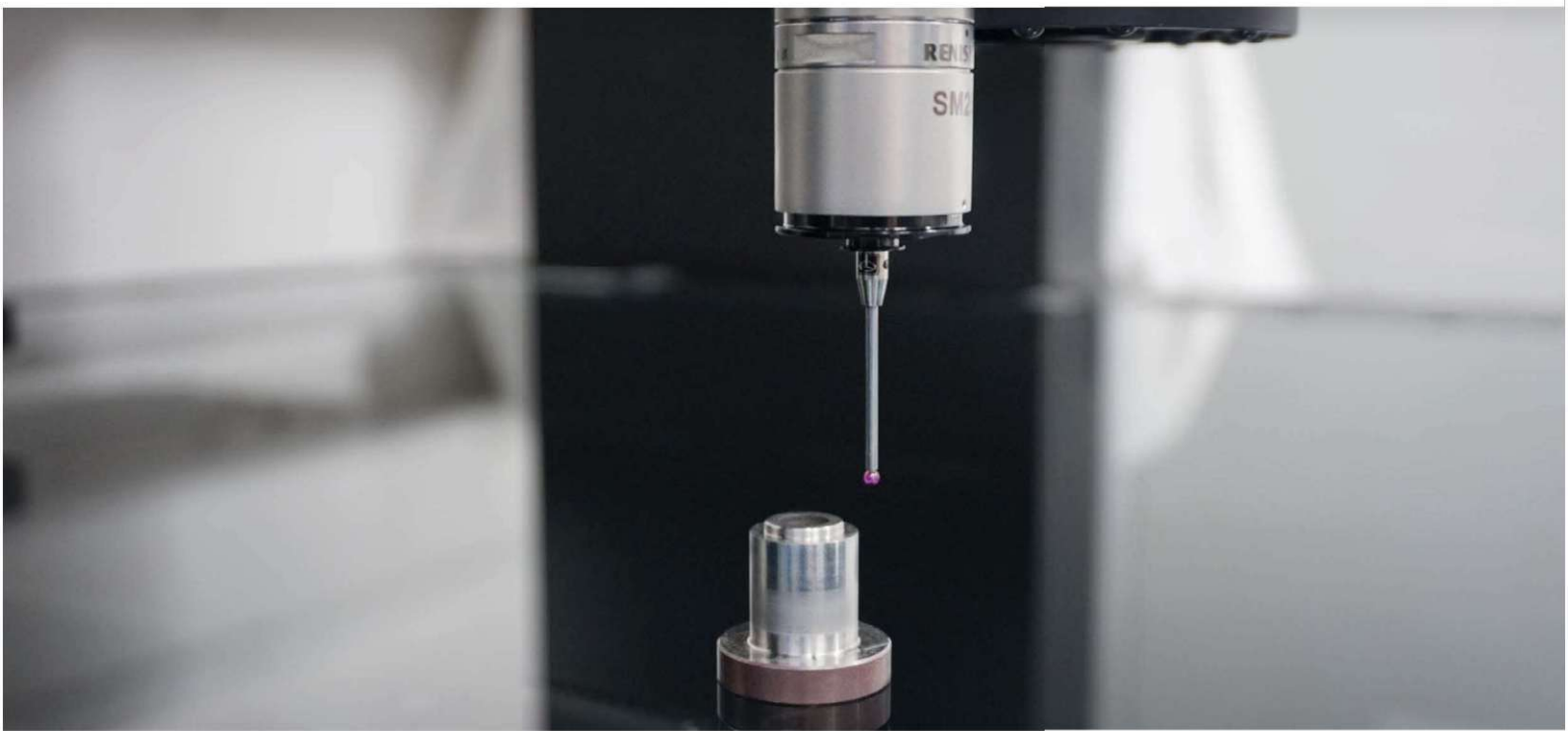
EBERHARD Precision Parts is a leading global manufacturer of high-precision standard and special components. We produce "MADE IN GERMANY" at our sites in Nordheim and Ohrdruf.

Extensive technical expertise, high vertical manufacturing range, production in the range of micron tolerances, on-time delivery as well as excellent service, are what we stand for. Using the latest technology and years of experience, we produce DIN and ISO-compliant standard components as well as individual special components of the highest quality.

Thousands of international customers across different industries rely on our products. You too can trust in the expertise, quality and logistics of EBERHARD Precision Parts.

Our friendly and caring corporate culture is infused in our responsibility for people and the environment since our very beginning. We stand for tradition, reliable cooperation and technical progress for our products as well as for our organisation. EBERHARD offers modern team organisation, flexible working hours, profit sharing and environmentally friendly production for our employees.

PRECISION AND RELIABILITY BASED ON TRADITION



EXPERTISE

Precision and reliability of EBERHARD products result from decades of experience in the production of high-precision parts for tool, mould and fixture components. Our production technology based on this extensive experience combined with the expertise of our qualified employees assure that you can trust in the genuine quality of EBERHARD Precision Parts.



LOGISTICS

From raw material disposition and production data acquisition to computer-controlled inventories, every component of our logistics system is designed for on-time production and fast delivery. We move 500 tons of raw materials in a year, schedule more than 30,000 production steps in the running processes and dispatch several hundred parcels a day. The efficiency of our logistics system is evident in the smooth operation of these processes.



SUSTAINABILITY

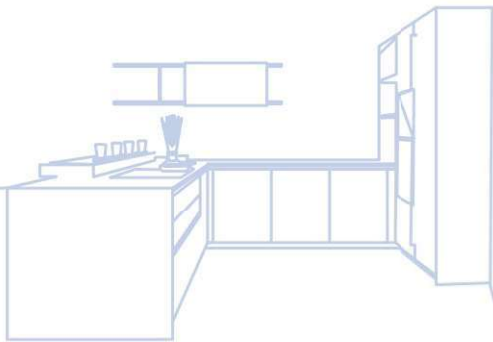
Environmentally friendly production and conserving resources mean preserving the future. We implement this practice for the benefit of our employees, our customers, our suppliers, our society and last but not least, for EBERHARD. We constantly review this credo for example with regular energy audits, our waste management concept as well as our membership in "Modell Hohenlohe", a regional association for companies working together for sustainability. Furthermore, we contribute to energy conservation with our own combined heat and power unit including heat recovery. We have an energy management system and are certified according to DIN EN ISO 50001:2018.



QUALITY

Structural analysis and batch control of raw material deliveries, program-controlled vacuum hardening plants, structural analysis after hardening, CNC-controlled production facilities and the latest measuring equipment are the basis for high-quality products. The expertise of our employees guarantees precise execution to achieve this basis. Our quality management system is ISO 9001 certified.

GEBRÜDER EBERHARD – 90 YEARS OF PRECISION



2024

Complete renovation and refurbishment of the showroom at EBERHARD Küchen in Heilbronn. With a new atmosphere and highly modern kitchen exhibits, the latest developments in the market are presented at Böckingen.



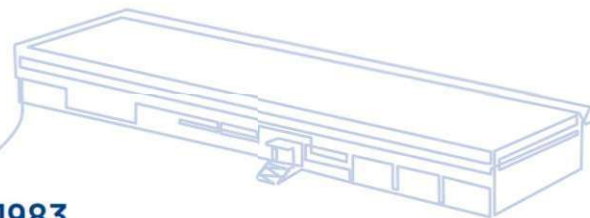
2019

Acquisition of a premise formerly occupied by Schade and Lamminger furniture store on Lämmlinstraße in Heilbronn-Böckingen. The building allows expansion of the storage and logistics capacities for the electrical wholesale.



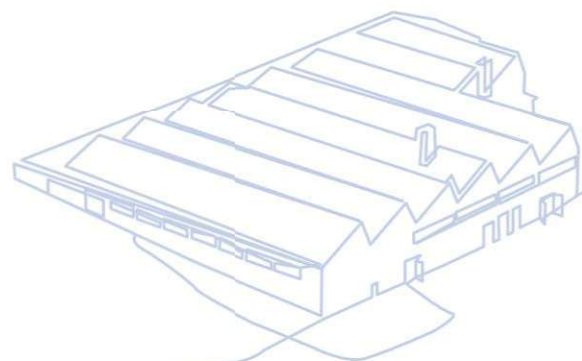
1973 | 1980

The second generation steps in the family business. Ulrich Eberhard primarily oversees EBERHARD Precision Parts, while his brother Roland Eberhard is responsible for EBERHARD Electrical Wholesale.



1983

EBERHARD Electrical Wholesale and Kitchen relocates to a newly built site in Heilbronn-Böckingen on Reinerstraße. The wholesaler develops into a full-range supplier, the installation and lighting technology sectors grow.

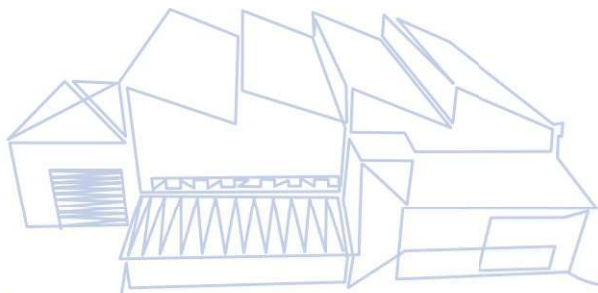


1969

The electrical wholesale business remains at Bahnhofstraße, Nordheim. Kitchen sales commence following contacts established during the wholesale trade with kitchen manufacturers.

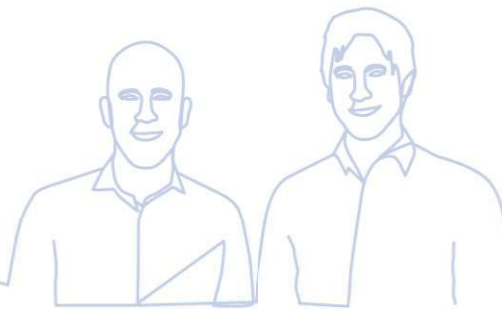
1963

The production of small appliances creates an opportunity to expand as a supplier of coil cores and magnesium housings for large industrial customers. This development later leads into the production of standard and special components for toolmaking. The production relocates to a new factory building, to its current address on Lerchenstraße.



2018

Acquisition of Belle Maschinenbau in Bretzfeld. The location now operates as our exclusive machine development and maintenance centre.



2017

The third generation steps in the family business. Cousins Fabian and Manuel Eberhard assume responsibility in all three business sectors.



1992

After the fall of the Berlin Wall, two more locations are built in the new federal states. EBERHARD Electrical Wholesale opens a location in Chemnitz, which moves to Gornau shortly afterwards.



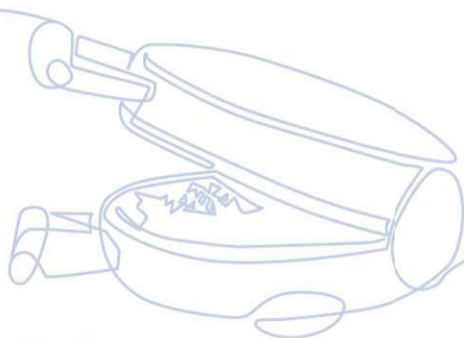
1992

EBERHARD Precision Parts acquires Polytechnic centre in Ohrdruf, Thuringia.



2009

Construction of an additional production hall including an administration wing at Lerchenstraße in Nordheim. The total available production and office space is now over 13,000 m².



1945

After the end of World War II, Willi and his wife Lore Eberhard focus on the production and trade of small electrical (domestic) appliances in Bahnhofstraße, Nordheim.



1933

The brothers Eugen and Willi Eberhard establish Gebrüder Eberhard, a company for electrical circuit breaker production in Nordheim, Germany.

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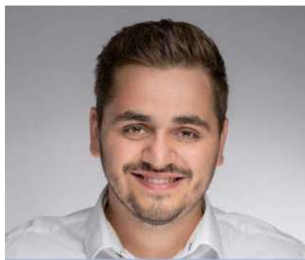
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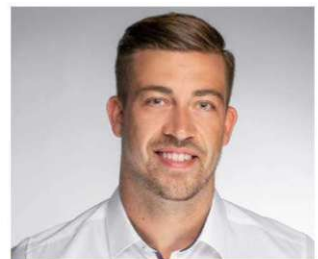
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EBERHARD STANDARD PARTS



PRESS TOOLS

Same-day-shipping from stock of DIN and ISO-compliant cutting punches and bushings, both in standard and in intermediate dimensions. Special orders (dimension and/or form) can be produced at short notice.

From page 11

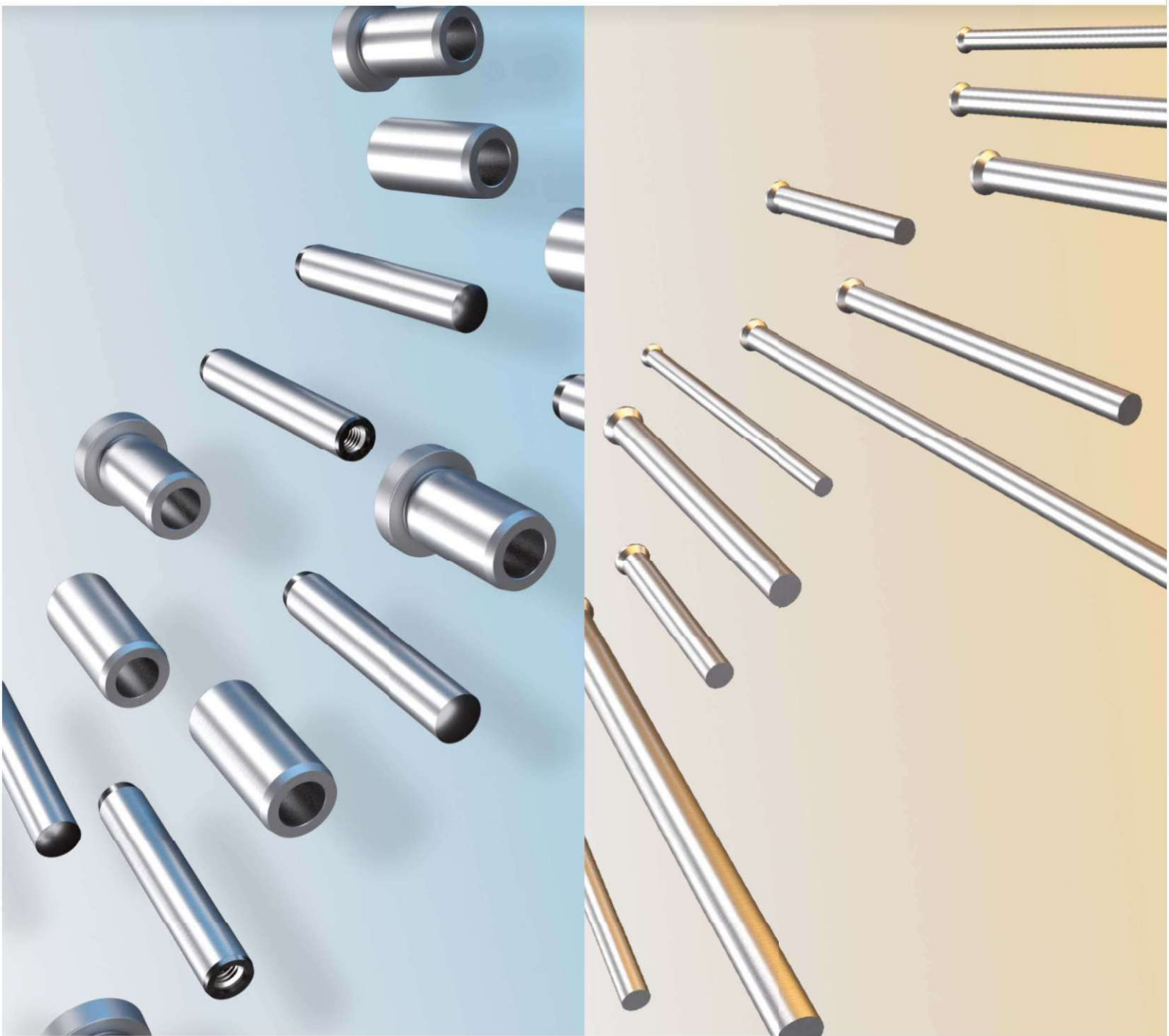


MOULD COMPONENTS

DIN and ISO-compliant standard components in all types such as ejectors, flat ejectors, round stepped ejectors, ejector sleeves and core pins.

From page 75

HIGHEST QUALITY AND BEST AVAILABILITY



FIXTURES

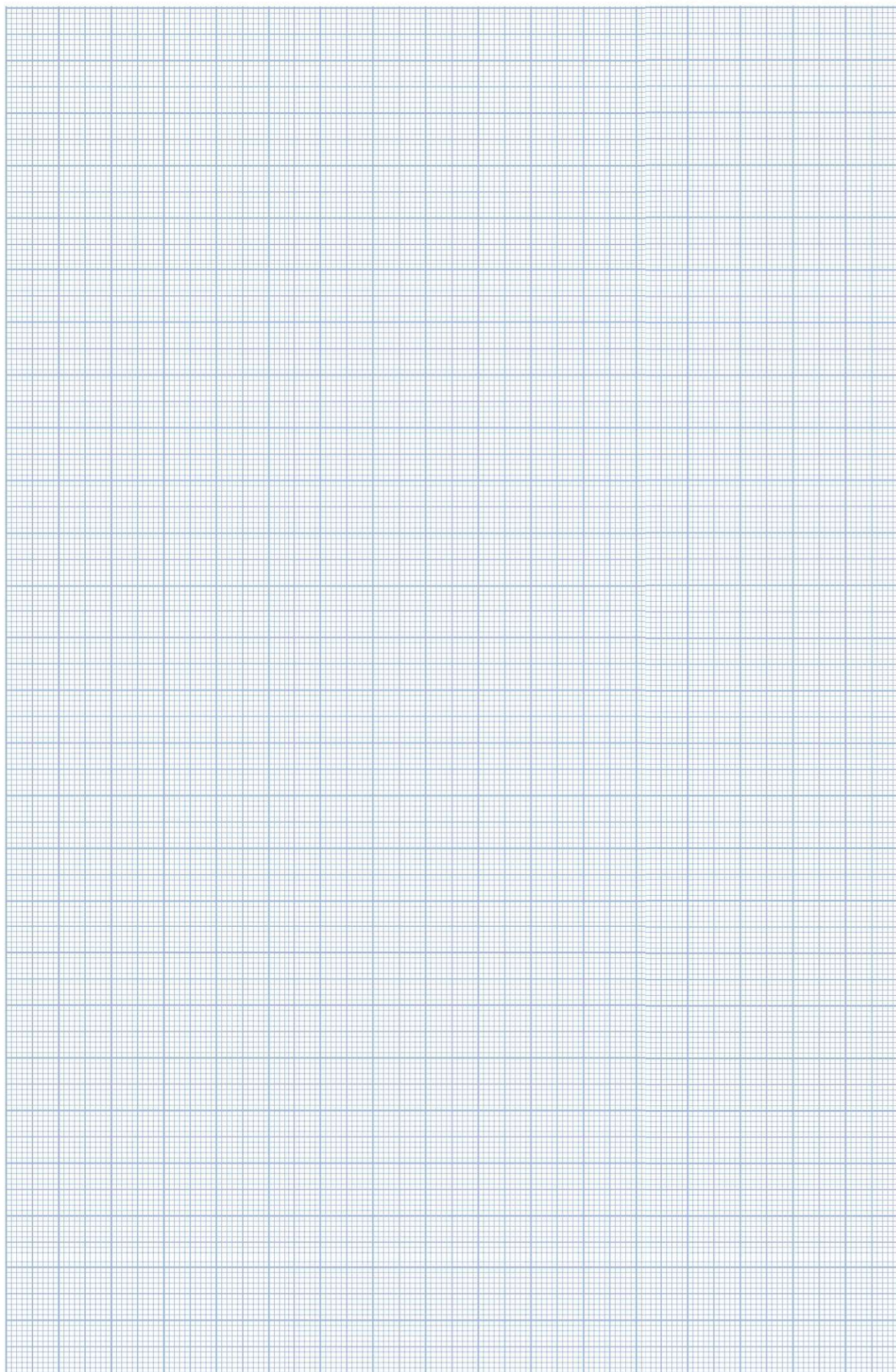
We offer cylindrical pins and drill bushes for the construction and production of jigs and fixtures as well as for general use in tool, fixture and mould construction.

[From page 121](#)

FORMING TOOLS

We stock through hardened preforming ejector pins, assuring you the best availability when you need it. Our portfolio also includes extrusion punches, guide sleeves and complete triple ejector device and hexagon socket punches.

[From page 129](#)



PRESS TOOLS

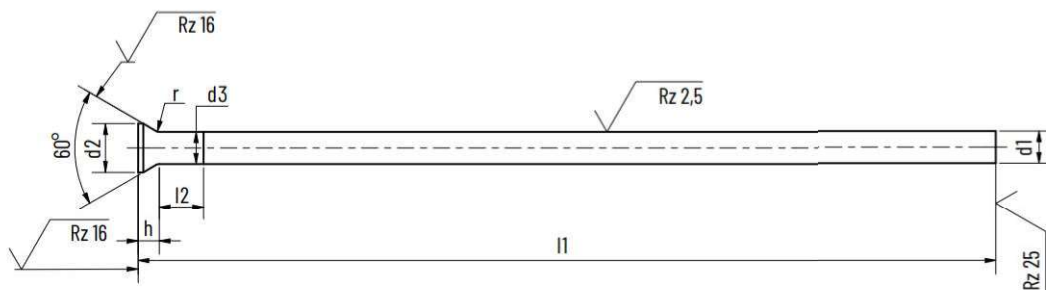
Our DIN and ISO-compliant precision parts such as cutting punches and die bushes, prove its quality and reliability throughout their lifetime. Manufacturers of the automotive industry as well as the electrical, fittings, perforating, filter and sheet metal forming industries rely on our expertise.

Maintaining standard in a competitive market, EBERHARD Precision Parts is your trusted partner for standard components of the highest quality. Increase your productivity with our precision tools. From material to coating, our team of experts is happy to help you. We offer same-day-shipping from stock of DIN and ISO-compliant cutting punches and die bushes, both in standard and intermediate dimensions. Special orders with custom dimensions and forms can be produced at short notice.



CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 1, type DA



Item no.
1161.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 45 ± 5

Material
WS

Other materials available on request, see material table.

d ₁ h ₆	d ₂	d ₃ max.	h +0,2 0	l ₂ max.	r	l ₁ +0,5 0	71	80	100
0,5	0,9 ± 0,05	0,52	0,55	5	0,2 ± 0,2		6,39	7,03	8,97
0,6	1,1 ± 0,05	0,62	0,63	5	0,2 ± 0,2		6,39		8,97
0,7	1,3 ± 0,05	0,72	0,72	5	0,2 ± 0,2		5,93		8,30
0,8	1,4 ± 0,05	0,82	0,92	5	0,2 ± 0,2		5,93		8,30
0,85	1,4 ± 0,05	0,87	0,88	5	0,2 ± 0,2			7,03	
0,9	1,6 ± 0,05	0,92	1,01	5	0,2 ± 0,2		5,93		8,30
1	1,8 ± 0,05	1,03	1,19	5	0,4 ± 0,3		4,68	5,13	6,54
1,1	1,8 ± 0,05	1,13	1,11	5	0,4 ± 0,3		4,68		6,54
1,2	2 ± 0,05	1,23	1,19	5	0,4 ± 0,3		4,68		6,54
1,3	2 ± 0,05	1,33	1,11	5	0,4 ± 0,3		4,68	5,13	6,54
1,4	2,2 ± 0,05	1,43	1,19	5	0,4 ± 0,3		4,68		6,54
1,45	2,2 ± 0,05	1,48	1,15	5	0,4 ± 0,3		6,33		
1,5	2,2 ± 0,05	1,53	1,11	5	0,4 ± 0,3		3,69	4,03	5,13
1,6	2,5 ± 0,05	1,63	1,28	5	0,4 ± 0,3		3,86		5,41
1,7	2,5 ± 0,05	1,73	1,19	5	0,4 ± 0,3		3,86	4,22	5,41
1,8	2,8 ± 0,05	1,83	1,37	5	0,4 ± 0,3		3,86		5,41
1,9	2,8 ± 0,05	1,93	1,28	5	0,4 ± 0,3		3,86		5,41
2	3 ± 0,1	2,03	1,37	5	0,4 ± 0,3		3,69	4,03	5,13
2,1	3,2 ± 0,1	2,13	1,45	5	0,4 ± 0,3		3,94	4,36	5,56
2,2	3,2 ± 0,1	2,23	1,37	5	0,4 ± 0,3		3,94	4,36	5,56
2,3	3,5 ± 0,1	2,33	1,54	5	0,4 ± 0,3		3,94	4,36	5,56
2,4	3,5 ± 0,1	2,43	1,45	5	0,4 ± 0,3		3,94	4,36	5,56
2,5	3,5 ± 0,1	2,53	1,37	5	0,4 ± 0,3		3,81	4,14	5,29
2,6	4 ± 0,1	2,63	1,71	5	0,4 ± 0,3		3,94		5,56
2,7	4 ± 0,1	2,73	1,63	5	0,4 ± 0,3		4,03		5,73
2,8	4 ± 0,1	2,83	1,54	5	0,4 ± 0,3		4,03	4,46	5,73
2,9	4 ± 0,1	2,93	1,45	5	0,4 ± 0,3		4,03		5,73
3	4,5 ± 0,1	3,03	1,8	5	0,4 ± 0,3		3,80	4,14	5,29

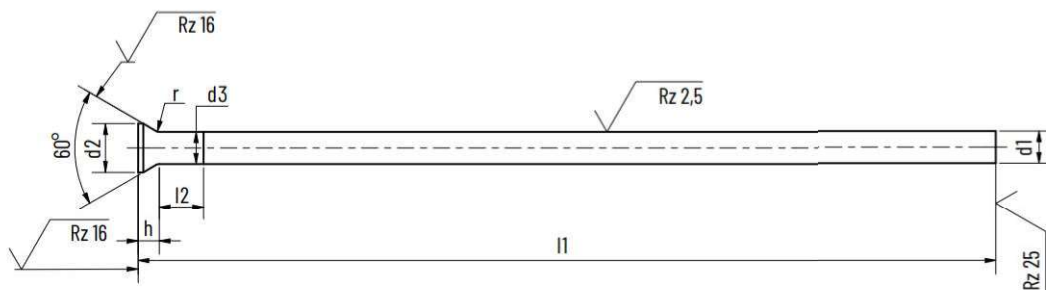
d ₁ h ₆	d ₂	d ₃ max.	h +0,2 0	l ₂ max.	r	l ₁ +0,5 0	71	80	100
3,1	4,5 ± 0,1	3,13	1,71	5	0,6 ± 0,4		4,03		5,73
3,2	4,5 ± 0,1	3,23	1,63	5	0,6 ± 0,4		4,03	4,46	5,73
3,3	4,5 ± 0,1	3,33	1,54	5	0,6 ± 0,4		4,03	4,46	5,73
3,4	4,5 ± 0,1	3,43	1,45	5	0,6 ± 0,4				5,89
3,5	5 ± 0,1	3,53	1,8	5	0,6 ± 0,4		3,85	4,21	5,37
3,6	5 ± 0,1	3,63	1,71	5	0,6 ± 0,4		4,36		5,89
3,7	5 ± 0,1	3,73	1,63	5	0,6 ± 0,4		4,22		5,89
3,8	5 ± 0,1	3,83	1,54	5	0,6 ± 0,4		4,22	4,68	5,89
3,9	5 ± 0,1	3,93	1,45	5	0,6 ± 0,4		4,22		5,89
4	5,5 ± 0,1	4,03	1,8	5	0,6 ± 0,4		3,85	4,21	5,37
4,1	5,5 ± 0,1	4,13	1,71	5	0,6 ± 0,4				6,18
4,2	5,5 ± 0,1	4,23	1,63	5	0,6 ± 0,4		4,35	4,77	6,11
4,3	5,5 ± 0,1	4,33	1,54	5	0,6 ± 0,4		4,40		6,18
4,4	5,5 ± 0,1	4,43	1,45	5	0,6 ± 0,4		4,40		6,18
4,5	6 ± 0,1	4,53	1,8	5	0,6 ± 0,4		4,32	4,75	6,10
4,6	6 ± 0,1	4,63	1,71	5	0,6 ± 0,4		4,40		6,18
4,7	6 ± 0,1	4,73	1,63	5	0,6 ± 0,4		4,80	5,29	6,74
4,8	6 ± 0,1	4,83	1,54	5	0,6 ± 0,4		4,80		6,74
4,9	6 ± 0,1	4,93	1,45	5	0,6 ± 0,4				6,74
5	6,5 ± 0,1	5,03	1,8	6	0,6 ± 0,4		4,03	4,46	5,67
5,1	6,5 ± 0,1	5,13	1,71	6	0,6 ± 0,4			5,41	6,87
5,5	7 ± 0,1	5,53	1,8	6	0,6 ± 0,4		4,73	5,19	6,60
5,6	7 ± 0,1	5,63	1,71	6	0,6 ± 0,4		5,29		7,40
6	8 ± 0,2	6,04	2,23	6	1 ± 0,5		4,49	4,96	6,28
6,1	8 ± 0,2	6,14	2,15	6	1 ± 0,5		5,37		7,52
6,4	8 ± 0,2	6,44	1,89	6	1 ± 0,5			5,89	
6,5	9 ± 0,2	6,54	3,17	6	1 ± 0,5		5,29		7,38
6,7	9 ± 0,2	6,74	2,99	6	1 ± 0,5		5,44		

d ₁ h ₆	d ₂	d ₃ max.	h +0,2 0	l ₂ max.	r	l ₁ +0,5 0	71	80	100
7	9 ±0,2	7,04	2,73	6	1+0,5		5,29	5,79	7,38
7,3	9 ±0,2	7,34	2,47	6	1+0,5		6,20	7,03	
7,4	9 ±0,2	7,44	2,39	6	1+0,5		6,20	7,03	
7,5	10 ±0,2	7,54	3,17	6	1+0,5		6,28		8,84
7,6	10 ±0,2	7,64	3,08	6	1+0,5		6,49		
7,7	10 ±0,2	7,74	2,99	6	1+0,5		6,49		
8	10 ±0,2	8,04	2,73	8	1+0,5		5,89	6,52	8,26
8,4	10 ±0,2	8,44	2,39	8	1+0,5		7,16		
8,5	11 ±0,2	8,54	3,17	8	1+0,5		7,53	8,26	10,55
8,8	11 ±0,2	8,84	2,91	8	1+0,5		7,78		
9	11 ±0,2	9,04	2,73	8	1+0,5			8,26	10,55
9,25	11 ±0,2	9,29	2,52	8	1+0,5			11,16	
9,3	11 ±0,2	9,34	2,47	8	1+0,5		8,53	9,36	
9,4	11 ±0,2	9,44	2,39	8	1+0,5		8,53		
9,7	12 ±0,2	9,74	2,99	8	1+0,5		8,53		
10	12 ±0,2	10,04	2,73	10	1+0,5		8,65	9,46	12,09
10,5	13 ±0,2	10,54	3,17	10	1+0,5		10,97		
10,6	13 ±0,2	10,64	3,08	10	1+0,5		11,26		
11	13 ±0,2	11,04	2,73	10	1+0,5		10,87	11,93	15,17
11,6	14 ±0,2	11,64	3,08	10	1+0,5		13,14		
11,8	14 ±0,2	11,84	2,91	10	1+0,5			14,45	
12	14 ±0,2	12,04	2,73	10	1+0,5		11,95	13,17	16,75
12,1	14 ±0,2	12,14	2,65	10	1+0,5		13,90		
12,3	14 ±0,2	12,34	2,47	10	1+0,5		13,90		
12,5	15 ±0,2	12,54	3,17	10	1+0,5		13,69		
14	16 ±0,2	14,04	3,23	12	1,5+0,5		15,93		22,25
16	18 ±0,2	16,04	3,23	12	1,5+0,5				28,13

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 1, type DA



Item no.
1163.

Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
HSS

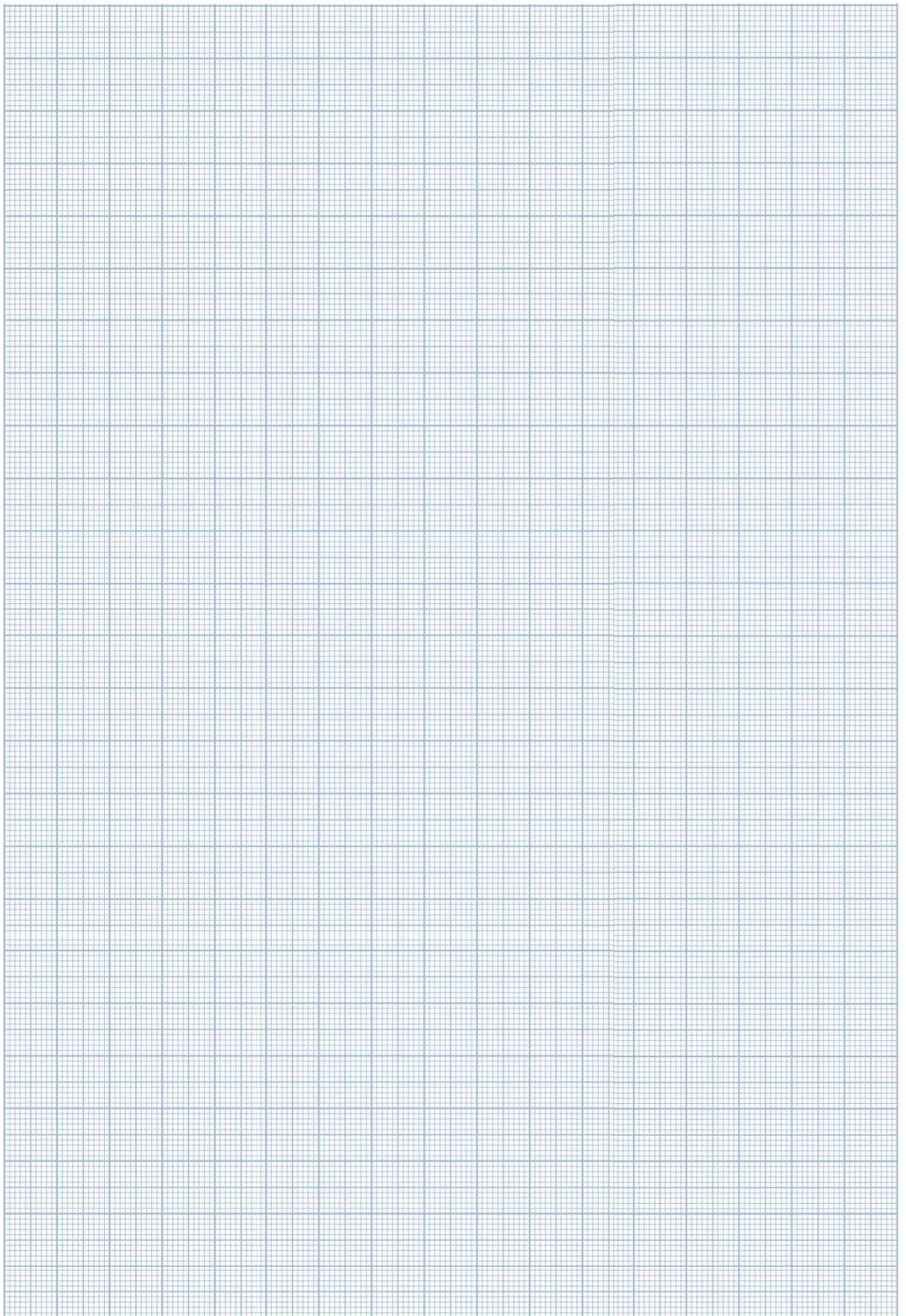
Other materials available on request, see material table.

d ₁ h ₆	d ₂	d ₃ max.	h +0,2 0	l ₂ max.	r	l ₁ +0,5 0	71	80	100
1,1	1.8 ± 0,05	1,13	1,11	5	0.4 + 0,3				9,11
1,2	2 ± 0,05	1,23	1,19	5	0.4 + 0,3		6,53		
1,4	2.2 ± 0,05	1,43	1,19	5	0.4 + 0,3		6,53		9,11
1,45	2.2 ± 0,05	1,48	1,15	5	0.4 + 0,3		8,80		
1,5	2.2 ± 0,05	1,53	1,11	5	0.4 + 0,3		5,87		8,25
1,6	2.5 ± 0,05	1,63	1,28	5	0.4 + 0,3		6,53		
1,7	2.5 ± 0,05	1,73	1,19	5	0.4 + 0,3		6,53		
1,8	2.8 ± 0,05	1,83	1,37	5	0.4 + 0,3		6,53		9,11
2	3 ± 0,1	2,03	1,37	5	0.4 + 0,3		5,95	6,56	8,37
2,1	3.2 ± 0,1	2,13	1,45	5	0.4 + 0,3		6,68		9,39
2,2	3.2 ± 0,1	2,23	1,37	5	0.4 + 0,3		6,68		9,39
2,3	3.5 ± 0,1	2,33	1,54	5	0.4 + 0,3		6,68		9,39
2,35	3.5 ± 0,1	2,38	1,5	5	0.4 + 0,3		9,07		
2,4	3.5 ± 0,1	2,43	1,45	5	0.4 + 0,3		6,68		9,39
2,5	3.5 ± 0,1	2,53	1,37	5	0.4 + 0,3		6,03	6,62	8,44
2,6	4 ± 0,1	2,63	1,71	5	0.4 + 0,3		6,68		9,39
2,65	4 ± 0,1	2,68	1,67	5	0.4 + 0,3				12,68
2,7	4 ± 0,1	2,73	1,63	5	0.4 + 0,3				9,82
2,8	4 ± 0,1	2,83	1,54	5	0.4 + 0,3		7,03		9,82
2,9	4 ± 0,1	2,93	1,45	5	0.4 + 0,3				9,82
2,95	4 ± 0,1	2,98	1,41	5	0.4 + 0,3		9,48		
3	4.5 ± 0,1	3,03	1,8	5	0.4 + 0,3		6,03	6,62	8,44
3,1	4.5 ± 0,1	3,13	1,71	5	0.6 + 0,4		7,03		9,82
3,15	4.5 ± 0,1	3,18	1,67	5	0.6 + 0,4		9,48		
3,2	4.5 ± 0,1	3,23	1,63	5	0.6 + 0,4		7,03		9,82
3,3	4.5 ± 0,1	3,33	1,54	5	0.6 + 0,4				9,82
3,45	4.5 ± 0,1	3,48	1,41	5	0.6 + 0,4				
3,5	5 ± 0,1	3,53	1,8	5	0.6 + 0,4		6,40	7,05	8,94

d ₁ h ₆	d ₂	d ₃ max.	h +0,2 0	l ₂ max.	r	l ₁ +0,5 0	71	80	100
3,55	5 ± 0,1	3,58	1,76	5	0.6 + 0,4		8,62		12,08
3,6	5 ± 0,1	3,63	1,71	5	0.6 + 0,4				10,15
3,65	5 ± 0,1	3,68	1,67	5	0.6 + 0,4		9,81		
3,7	5 ± 0,1	3,73	1,63	5	0.6 + 0,4				10,15
3,8	5 ± 0,1	3,83	1,54	5	0.6 + 0,4		7,25	7,95	10,15
3,85	5 ± 0,1	3,88	1,5	5	0.6 + 0,4		9,81		
3,9	5 ± 0,1	3,93	1,45	5	0.6 + 0,4		7,25		10,15
4	5.5 ± 0,1	4,03	1,8	5	0.6 + 0,4		6,40	7,05	8,94
4,25	5.5 ± 0,1	4,28	1,58	5	0.6 + 0,4		9,88		
4,3	5.5 ± 0,1	4,33	1,54	5	0.6 + 0,4		7,56		10,62
4,5	6 ± 0,1	4,53	1,8	5	0.6 + 0,4		6,90	7,56	9,67
4,6	6 ± 0,1	4,63	1,71	5	0.6 + 0,4				10,62
4,8	6 ± 0,1	4,83	1,54	5	0.6 + 0,4			9,14	
5	6.5 ± 0,1	5,03	1,8	6	0.6 + 0,4		6,67	7,36	9,36
5,2	6.5 ± 0,1	5,23	1,63	6	0.6 + 0,4				11,75
5,3	6.5 ± 0,1	5,33	1,54	6	0.6 + 0,4			9,82	12,50
5,5	7 ± 0,1	5,53	1,8	6	0.6 + 0,4		7,35		10,24
6	8 ± 0,2	6,04	2,23	6	1 + 0,5		7,05	7,73	9,86
6,5	9 ± 0,2	6,54	3,17	6	1 + 0,5		8,34	9,14	11,63
7	9 ± 0,2	7,04	2,73	6	1 + 0,5		8,34	9,14	11,63
8	10 ± 0,2	8,04	2,73	8	1 + 0,5		8,73	9,66	12,25
8,5	11 ± 0,2	8,54	3,17	8	1 + 0,5				15,26
9	11 ± 0,2	9,04	2,73	8	1 + 0,5		10,91		15,26
9,9	12 ± 0,2	9,94	2,82	8	1 + 0,5		12,97		
10	12 ± 0,2	10,04	2,73	10	1 + 0,5		12,18	13,40	17,03

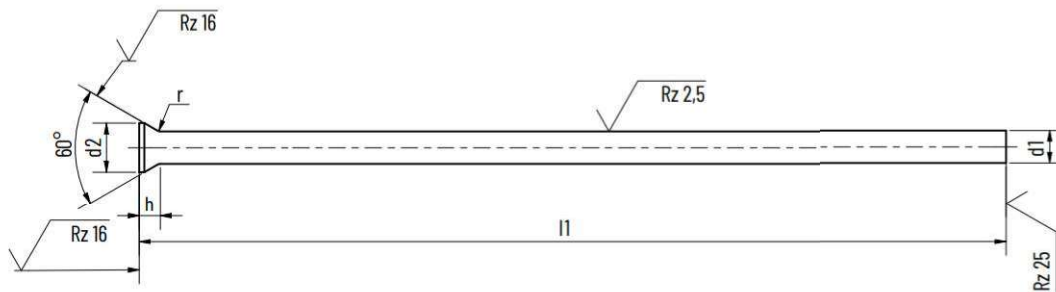
PRICES PER PIECE IN EURO





CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 1, type D (similar ISO 6752)



Item no.
1152.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 50 ± 5

Material
HWS

Other materials available on request, see material table.

d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100
0,5	0,9 ± 0,05	0,55	0,2 + 0,2		9,74		
0,6	1,1 ± 0,05	0,63	0,2 + 0,2		10,04	10,98	
0,65	1,2 ± 0,05	0,68	0,2 + 0,2				14,02
0,7	1,3 ± 0,05	0,72	0,2 + 0,2		9,24	10,15	
0,75	1,3 ± 0,05	0,68	0,2 + 0,2		10,04		
0,8	1,4 ± 0,05	0,92	0,2 + 0,2		9,24	10,15	12,89
0,85	1,4 ± 0,05	0,88	0,2 + 0,2		10,04		
0,9	1,6 ± 0,05	1,01	0,2 + 0,2		9,24	10,15	
1	1,8 ± 0,05	1,19	0,4 + 0,3		7,44	8,19	10,44
1,1	1,8 ± 0,05	1,11	0,4 + 0,3		7,69	8,46	
1,2	2 ± 0,05	1,19	0,4 + 0,3		7,69	8,46	10,71
1,3	2 ± 0,05	1,11	0,4 + 0,3		7,69	8,46	10,71
1,4	2,2 ± 0,05	1,19	0,4 + 0,3		7,69	8,46	
1,5	2,2 ± 0,05	1,11	0,4 + 0,3		7,06	7,77	9,86
1,6	2,5 ± 0,05	1,28	0,4 + 0,3		7,69	8,46	10,71
1,7	2,5 ± 0,05	1,19	0,4 + 0,3		7,69	8,46	
1,8	2,8 ± 0,05	1,37	0,4 + 0,3		7,69	8,46	
1,9	2,8 ± 0,05	1,28	0,4 + 0,3		7,69	8,46	10,71
2	3 ± 0,1	1,37	0,4 + 0,3		7,06	7,77	9,86
2,1	3,2 ± 0,1	1,45	0,4 + 0,3		7,81	8,66	
2,2	3,2 ± 0,1	1,37	0,4 + 0,3		7,81	8,66	10,97
2,3	3,5 ± 0,1	1,54	0,4 + 0,3		7,81	8,66	
2,4	3,5 ± 0,1	1,45	0,4 + 0,3		7,81	8,66	10,97
2,5	3,5 ± 0,1	1,37	0,4 + 0,3		7,22	7,90	10,13
2,6	4 ± 0,1	1,71	0,4 + 0,3		7,81	8,66	10,97
2,7	4 ± 0,1	1,63	0,4 + 0,3		8,11	8,88	11,32
2,8	4 ± 0,1	1,54	0,4 + 0,3		8,11	8,88	11,32
2,9	4 ± 0,1	1,45	0,4 + 0,3		8,11	8,88	11,32

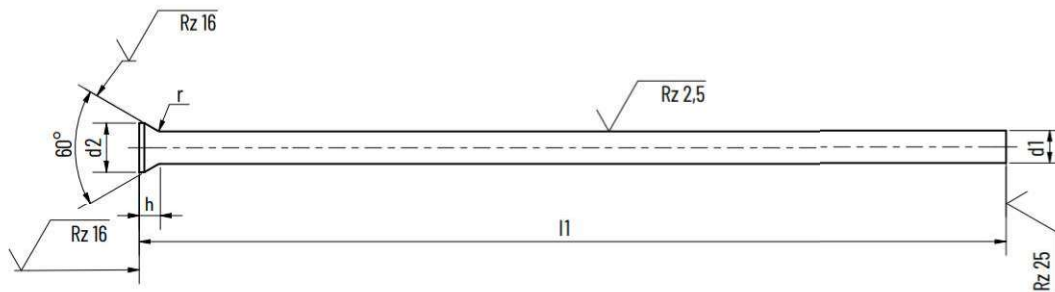
d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100
3	4,5 ± 0,1	1,8	0,6 + 0,4		7,22	7,90	10,13
3,1	4,5 ± 0,1	1,71	0,6 + 0,4		8,25	9,09	11,57
3,2	4,5 ± 0,1	1,63	0,6 + 0,4		8,25	9,09	11,57
3,3	4,5 ± 0,1	1,54	0,6 + 0,4		8,25	9,09	11,57
3,4	4,5 ± 0,1	1,45	0,6 + 0,4		8,56	9,43	12,00
3,5	5 ± 0,1	1,8	0,6 + 0,4		7,51	8,29	10,54
3,6	5 ± 0,1	1,71	0,6 + 0,4		8,56	9,43	12,00
3,7	5 ± 0,1	1,63	0,6 + 0,4		8,56	9,43	12,00
3,8	5 ± 0,1	1,54	0,6 + 0,4		8,56	9,43	12,00
3,9	5 ± 0,1	1,45	0,6 + 0,4		8,56	9,43	12,00
4	5,5 ± 0,1	1,8	0,6 + 0,4		7,51	8,29	10,54
4,1	5,5 ± 0,1	1,71	0,6 + 0,4		8,94	9,86	12,58
4,2	5,5 ± 0,1	1,63	0,6 + 0,4		8,94	9,86	12,58
4,3	5,5 ± 0,1	1,54	0,6 + 0,4		9,40	10,31	13,14
4,4	5,5 ± 0,1	1,45	0,6 + 0,4		9,40	10,31	13,14
4,5	6 ± 0,1	1,8	0,6 + 0,4		8,68	9,58	12,20
4,6	6 ± 0,1	1,71	0,6 + 0,4		9,40	10,31	13,14
4,7	6 ± 0,1	1,63	0,6 + 0,4		10,18	11,27	14,29
4,8	6 ± 0,1	1,54	0,6 + 0,4		10,18	11,27	14,29
4,9	6 ± 0,1	1,45	0,6 + 0,4		10,18	11,27	14,29
5	6,5 ± 0,1	1,8	0,6 + 0,4		8,31	9,15	11,66
5,1	6,5 ± 0,1	1,71	0,6 + 0,4		10,32	11,40	14,41
5,2	6,5 ± 0,1	1,63	0,6 + 0,4		10,32	11,40	14,41
5,3	6,5 ± 0,1	1,54	0,6 + 0,4		11,32	12,47	15,85
5,4	6,5 ± 0,1	1,45	0,6 + 0,4		11,32	12,47	15,85
5,5	7 ± 0,1	1,8	0,6 + 0,4		9,60	10,61	13,55
5,6	7 ± 0,1	1,71	0,6 + 0,4		11,32	12,47	15,85
5,7	7 ± 0,1	1,63	0,6 + 0,4		11,32	12,47	15,85

d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100
5,8	7 ±0,1	1,54	0,6 +0,4		11,32	12,47	15,85
5,9	7 ±0,1	1,45	0,6 +0,4		11,32	12,47	15,85
6	8 ±0,2	2,23	1 +0,5		9,10	10,04	12,77
6,1	8 ±0,2	2,15	1 +0,5		11,46	12,65	16,11
6,2	8 ±0,2	2,06	1 +0,5		11,46	12,65	16,11
6,3	8 ±0,2	1,97	1 +0,5		11,46	12,65	16,11
6,4	8 ±0,2	1,89	1 +0,5		11,46	12,65	16,11
6,5	9 ±0,2	3,17	1 +0,5		10,77	11,85	15,11
6,6	9 ±0,2	3,08	1 +0,5		11,46	12,65	16,11
6,7	9 ±0,2	2,99	1 +0,5		11,46	12,65	16,11
6,8	9 ±0,2	2,91	1 +0,5		11,46	12,65	16,11
6,9	9 ±0,2	2,82	1 +0,5		11,46	12,65	16,11
7	9 ±0,2	2,73	1 +0,5		10,77	12,28	15,64
7,1	9 ±0,2	2,65	1 +0,5		12,61	13,87	17,67
7,2	9 ±0,2	2,56	1 +0,5		12,61	13,87	17,67
7,3	9 ±0,2	2,47	1 +0,5		12,61	13,87	17,67
7,4	9 ±0,2	2,39	1 +0,5		12,61	13,87	17,67
7,5	10 ±0,2	3,17	1 +0,5		12,23	13,48	17,17
7,6	10 ±0,2	3,08	1 +0,5		12,61	13,87	17,67
7,7	10 ±0,2	2,99	1 +0,5		12,61	13,87	17,67
7,8	10 ±0,2	2,91	1 +0,5		12,61	13,87	17,67
7,9	10 ±0,2	2,82	1 +0,5		12,61	13,87	17,67
8	10 ±0,2	2,73	1 +0,5		11,52	12,71	16,13
8,1	10 ±0,2	2,65	1 +0,5		14,02	15,49	19,67
8,2	10 ±0,2	2,56	1 +0,5		14,02	15,49	19,67
8,3	10 ±0,2	2,47	1 +0,5		14,02	15,49	19,67
8,4	10 ±0,2	2,39	1 +0,5		14,02	15,49	19,67
8,5	11 ±0,2	3,17	1 +0,5		13,61	15,02	19,10
8,6	11 ±0,2	3,08	1 +0,5		14,02	15,49	19,67
8,7	11 ±0,2	2,99	1 +0,5		14,02	15,49	19,67
8,8	11 ±0,2	2,91	1 +0,5		14,02	15,49	19,67
8,9	11 ±0,2	2,82	1 +0,5		14,02	15,49	19,67
9	11 ±0,2	2,73	1 +0,5		13,61	15,02	19,10
9,1	11 ±0,2	2,65	1 +0,5		15,85	17,47	22,23
9,2	11 ±0,2	2,56	1 +0,5		15,85	17,47	22,23
9,3	11 ±0,2	2,47	1 +0,5		15,85	17,47	22,23
9,4	11 ±0,2	2,39	1 +0,5		15,85	17,47	22,23
9,5	12 ±0,2	3,17	1 +0,5		15,36	16,95	21,57
9,6	12 ±0,2	3,08	1 +0,5		15,85	17,47	22,23
9,7	12 ±0,2	2,99	1 +0,5		15,85	17,47	22,23
9,8	12 ±0,2	2,91	1 +0,5		15,85	17,47	22,23
9,9	12 ±0,2	2,82	1 +0,5		15,85	17,47	22,23
10	12 ±0,2	2,73	1 +0,5		14,56	16,06	20,41
10,1	12 ±0,2	2,65	1 +0,5				24,51
10,2	12 ±0,2	2,56	1 +0,5				24,51
10,3	12 ±0,2	2,47	1 +0,5				24,51
10,4	12 ±0,2	2,39	1 +0,5				24,51
10,5	13 ±0,2	3,17	1 +0,5		16,96	18,68	23,78
11	13 ±0,2	2,73	1 +0,5		16,83	18,47	23,56
11,5	14 ±0,2	3,17	1 +0,5		17,41	19,06	
11,8	14 ±0,2	2,91	1 +0,5		18,83		
12	14 ±0,2	2,73	1 +0,5		18,04	19,86	25,31
12,2	14 ±0,2	2,56	1 +0,5		21,12		
12,3	14 ±0,2	2,47	1 +0,5		21,12		29,59
12,5	15 ±0,2	3,17	1 +0,5		20,47	22,54	
13	15 ±0,2	2,73	1 +0,5		20,47	22,54	28,69
13,5	16 ±0,2	3,67	1,5 +0,5		22,21	24,50	
14	16 ±0,2	3,23	1,5 +0,5		22,21	24,50	31,10
14,5	17 ±0,2	3,67	1,5 +0,5		22,90	25,25	
15	17 ±0,2	3,23	1,5 +0,5		22,90	25,25	32,11
15,5	18 ±0,2	3,67	1,5 +0,5		25,32	27,83	
16	18 ±0,2	3,23	1,5 +0,5		25,32	27,83	35,44
18,5	21 ±0,2	3,67	1,5 +0,5		44,01	48,90	
19,5	22 ±0,2	3,67	1,5 +0,5		51,33		

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 1, type D (similar ISO 6752)



Item no.
1153.

Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
HSS

Other materials available on request, see material table.

d ₁ h _e	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100	120	130
0,3	0.9±0,05	0,72	0.2±0,2		22,43				
0,35	0.9±0,05	0,68	0.2±0,2		22,43				
0,4	0.9±0,05	0,63	0.2±0,2		22,22				
0,45	0.9±0,05	0,59	0.2±0,2				31,11		
0,5	0.9±0,05	0,55	0.2±0,2		10,93	12,02	15,30		
0,55	1±0,05	0,59	0.2±0,2		11,58		16,23		
0,6	1.1±0,05	0,63	0.2±0,2		11,58	12,77	16,23		
0,65	1.2±0,05	0,68	0.2±0,2		11,58		16,23		
0,7	1.3±0,05	0,72	0.2±0,2		10,63	11,66	14,94		
0,75	1.3±0,05	0,68	0.2±0,2		11,58	12,77	16,23		
0,8	1.4±0,05	0,92	0.2±0,2		10,63	11,66	14,94		
0,85	1.4±0,05	0,88	0.2±0,2		11,58		16,23		
0,9	1.6±0,05	1,01	0.2±0,2		10,63	11,66	14,94		
0,95	1.6±0,05	0,96	0.2±0,2		11,58		16,23		
1	1.8±0,05	1,19	0.4±0,3		8,16	8,93	11,43		
1,05	1.8±0,05	1,15	0.4±0,3		11,06				
1,1	1.8±0,05	1,11	0.4±0,3		8,67	9,48	12,12		
1,15	1.8±0,05	1,06	0.4±0,3		11,06		15,51		
1,2	2±0,05	1,19	0.4±0,3		8,67	9,48	12,12		
1,25	2±0,05	1,15	0.4±0,3		11,06				
1,3	2±0,05	1,11	0.4±0,3		8,67	9,48	12,12		
1,35	2±0,05	1,06	0.4±0,3		11,06		15,51		
1,4	2.2±0,05	1,19	0.4±0,3		8,67	9,48	12,12		
1,45	2.2±0,05	1,15	0.4±0,3		11,06				
1,5	2.2±0,05	1,11	0.4±0,3		7,96	8,77	11,16		
1,55	2.2±0,05	1,06	0.4±0,3		11,06				
1,6	2.5±0,05	1,28	0.4±0,3		8,67	9,48	12,12		
1,65	2.5±0,05	1,24	0.4±0,3		11,06				

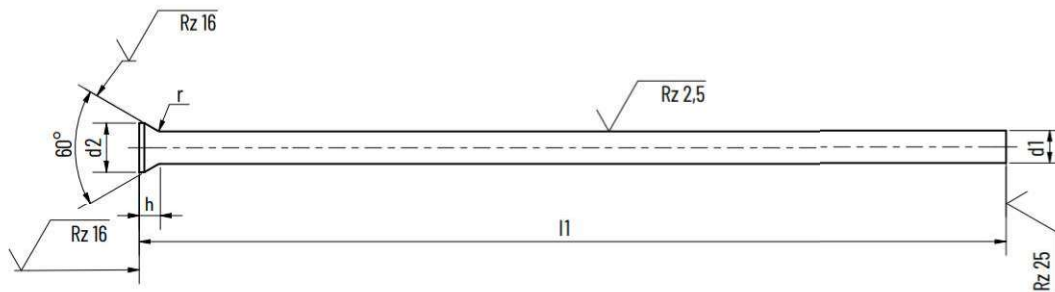
d ₁ h _e	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100	120	130
1,7	2.5±0,05	1,19	0.4±0,3		8,67	9,48	12,12		
1,75	2.5±0,05	1,15	0.4±0,3		11,06				
1,8	2.8±0,05	1,37	0.4±0,3		8,67	9,48	12,12		
1,85	2.8±0,05	1,32	0.4±0,3		11,06				
1,9	2.8±0,05	1,28	0.4±0,3		8,67	9,48	12,12		
1,95	2.8±0,05	1,24	0.4±0,3		11,06				
2	3±0,1	1,37	0.4±0,3		7,96	8,77	11,16	14,28	
2,05	3±0,1	1,32	0.4±0,3		11,35		15,91		
2,1	3.2±0,1	1,45	0.4±0,3		8,88	9,76	12,44		
2,15	3.2±0,1	1,41	0.4±0,3		11,35				
2,2	3.2±0,1	1,37	0.4±0,3		8,88	9,76	12,44		
2,25	3.2±0,1	1,32	0.4±0,3		11,35				
2,3	3.5±0,1	1,54	0.4±0,3		8,88	9,76	12,44		
2,35	3.5±0,1	1,5	0.4±0,3		11,35				
2,4	3.5±0,1	1,45	0.4±0,3		8,88	9,76	12,44		
2,45	3.5±0,1	1,41	0.4±0,3		11,35				
2,5	3.5±0,1	1,37	0.4±0,3		8,02	8,84	11,21	14,47	
2,55	3.5±0,1	1,32	0.4±0,3		11,35		15,91		
2,6	4±0,1	1,71	0.4±0,3		8,88	9,76	12,44		
2,65	4±0,1	1,67	0.4±0,3		11,35				
2,7	4±0,1	1,63	0.4±0,3		9,24	10,23	12,95		
2,75	4±0,1	1,58	0.4±0,3		11,35		15,91		
2,8	4±0,1	1,54	0.4±0,3		9,24	10,23	12,95		
2,85	4±0,1	1,5	0.4±0,3		11,35				
2,9	4±0,1	1,45	0.4±0,3		9,24	10,23	12,95		
2,95	4±0,1	1,41	0.4±0,3		11,35				
3	4.5±0,1	1,8	0.6±0,4		8,02	8,84	11,21	14,47	
3,05	4.5±0,1	1,76	0.6±0,4		12,69		17,76		

d ₁ h ₆	d ₂	h +0,2 0	r	I ₁ +0,5 0	71	80	100	120	130	d ₁ h ₆	d ₂	h +0,2 0	r	I ₁ +0,5 0	71	80	100	120	130
3,1	4,5 ±0,1	1,71	0,6 +0,4		9,39	10,34	13,18			7,8	10 ±0,2	2,91	1 +0,5		14,48	15,94	20,28		
3,15	4,5 ±0,1	1,67	0,6 +0,4		12,69					7,9	10 ±0,2	2,82	1 +0,5		14,48	15,94	20,28		
3,2	4,5 ±0,1	1,63	0,6 +0,4		9,39	10,34	13,18			8	10 ±0,2	2,73	1 +0,5		12,97	14,28	18,18	23,36	25,93
3,25	4,5 ±0,1	1,58	0,6 +0,4		12,69		17,76			8,1	10 ±0,2	2,65	1 +0,5		16,21	17,83	22,70		
3,3	4,5 ±0,1	1,54	0,6 +0,4		9,39	10,34	13,18			8,2	10 ±0,2	2,56	1 +0,5		16,21	17,83	22,70		
3,35	4,5 ±0,1	1,5	0,6 +0,4		12,69					8,3	10 ±0,2	2,47	1 +0,5		16,21	17,83	22,70		
3,4	4,5 ±0,1	1,45	0,6 +0,4		9,89	10,89	13,89			8,4	10 ±0,2	2,39	1 +0,5		16,21	17,83	22,70		
3,45	4,5 ±0,1	1,41	0,6 +0,4		12,69		17,76			8,5	11 ±0,2	3,17	1 +0,5		15,30	16,79	22,05	27,51	
3,5	5 ±0,1	1,8	0,6 +0,4		8,31	9,13	11,62	14,96		8,6	11 ±0,2	3,08	1 +0,5		16,21	17,83	22,70		
3,55	5 ±0,1	1,76	0,6 +0,4		12,69		17,76			8,7	11 ±0,2	2,99	1 +0,5		16,21	17,83	22,70		
3,6	5 ±0,1	1,71	0,6 +0,4		9,89	10,89	13,89	17,83		8,8	11 ±0,2	2,91	1 +0,5		16,21	17,83	22,70		
3,65	5 ±0,1	1,67	0,6 +0,4		13,38					8,9	11 ±0,2	2,82	1 +0,5		16,21	17,83	22,70		
3,7	5 ±0,1	1,63	0,6 +0,4		9,89	10,89	13,89			9	11 ±0,2	2,73	1 +0,5		15,30	16,79	21,40	27,49	
3,75	5 ±0,1	1,58	0,6 +0,4		13,38		18,75			9,05	11 ±0,2	2,69	1 +0,5		21,25				
3,8	5 ±0,1	1,54	0,6 +0,4		9,89	10,89	13,89			9,1	11 ±0,2	2,65	1 +0,5		19,58	21,56	27,43		
3,85	5 ±0,1	1,5	0,6 +0,4		13,38					9,2	11 ±0,2	2,56	1 +0,5		19,58	21,56	27,43		
3,9	5 ±0,1	1,45	0,6 +0,4		9,89	10,89	13,89			9,3	11 ±0,2	2,47	1 +0,5		19,58	21,56	27,43		
3,95	5 ±0,1	1,41	0,6 +0,4		13,38		18,75			9,4	11 ±0,2	2,39	1 +0,5		19,58	21,56	27,43		
4	5,5 ±0,1	1,8	0,6 +0,4		8,31	9,13	11,62	14,96		9,5	12 ±0,2	3,17	1 +0,5		18,49	20,32	25,88		
4,05	5,5 ±0,1	1,76	0,6 +0,4		13,91		19,45			9,6	12 ±0,2	3,08	1 +0,5		19,58	21,56	27,43		
4,1	5,5 ±0,1	1,71	0,6 +0,4		10,29	11,29	14,39			9,7	12 ±0,2	2,99	1 +0,5		19,58	21,56	27,43		
4,15	5,5 ±0,1	1,67	0,6 +0,4		13,91		19,45			9,8	12 ±0,2	2,91	1 +0,5		19,58	21,56	27,43		
4,2	5,5 ±0,1	1,63	0,6 +0,4		10,29	11,29	14,39			9,9	12 ±0,2	2,82	1 +0,5		19,58	21,56	27,43		
4,25	5,5 ±0,1	1,58	0,6 +0,4		13,91		19,45			10	12 ±0,2	2,73	1 +0,5		17,42	19,14	24,36	31,31	34,80
4,3	5,5 ±0,1	1,54	0,6 +0,4		10,77	11,87	15,11			10,1	12 ±0,2	2,65	1 +0,5		20,82	22,86	29,11		
4,35	5,5 ±0,1	1,5	0,6 +0,4		14,56					10,2	12 ±0,2	2,56	1 +0,5		20,82	22,86	29,11		
4,4	5,5 ±0,1	1,45	0,6 +0,4		10,77	11,87	15,11			10,3	12 ±0,2	2,47	1 +0,5		20,82	22,86	29,11		
4,45	5,5 ±0,1	1,41	0,6 +0,4		14,56		20,37			10,4	12 ±0,2	2,39	1 +0,5		20,82	22,86	29,11		
4,5	6 ±0,1	1,8	0,6 +0,4		9,58	10,63	13,57			10,5	13 ±0,2	3,17	1 +0,5		19,60	21,58	27,45	35,30	39,23
4,55	6 ±0,1	1,76	0,6 +0,4		14,56		20,37			10,6	13 ±0,2	3,08	1 +0,5		20,82	22,86	29,11		
4,6	6 ±0,1	1,71	0,6 +0,4		10,77	11,87	15,11			10,7	13 ±0,2	2,99	1 +0,5		20,82	22,86	29,11		
4,65	6 ±0,1	1,67	0,6 +0,4		14,56		20,37			10,8	13 ±0,2	2,91	1 +0,5		20,82	22,86	29,11		
4,7	6 ±0,1	1,63	0,6 +0,4		11,63	12,83	16,31			10,9	13 ±0,2	2,82	1 +0,5		20,82	22,86	29,11		
4,75	6 ±0,1	1,58	0,6 +0,4		15,71					11	13 ±0,2	2,73	1 +0,5		19,43	21,40	27,29	34,96	
4,8	6 ±0,1	1,54	0,6 +0,4		11,63	12,83	16,31			11,1	13 ±0,2	2,65	1 +0,5		24,18	26,59	33,82		
4,85	6 ±0,1	1,5	0,6 +0,4		15,71					11,2	13 ±0,2	2,56	1 +0,5		24,18	26,59	33,82		
4,9	6 ±0,1	1,45	0,6 +0,4		11,63	12,83	16,31			11,3	13 ±0,2	2,47	1 +0,5		24,18	26,59	33,82		
4,95	6 ±0,1	1,41	0,6 +0,4		15,71					11,4	13 ±0,2	2,39	1 +0,5		24,18	26,59	33,82		
5	6,5 ±0,1	1,8	0,6 +0,4		9,38	10,29	13,06	16,82	19,76	11,5	14 ±0,2	3,17	1 +0,5		22,79	25,05	31,90		
5,05	6,5 ±0,1	1,76	0,6 +0,4				22,06			11,6	14 ±0,2	3,08	1 +0,5		24,18	26,59	33,82		
5,1	6,5 ±0,1	1,71	0,6 +0,4		11,88	13,09	16,65			11,7	14 ±0,2	2,99	1 +0,5		24,18	26,59	33,82		
5,15	6,5 ±0,1	1,67	0,6 +0,4		16,05					11,8	14 ±0,2	2,91	1 +0,5		24,18	26,59	33,82		
5,2	6,5 ±0,1	1,63	0,6 +0,4		11,88	13,09	16,65			11,9	14 ±0,2	2,82	1 +0,5		24,18	26,59	33,82		
5,3	6,5 ±0,1	1,54	0,6 +0,4		12,42	13,63	17,41			12	14 ±0,2	2,73	1 +0,5		22,61	24,90	31,70	40,67	45,23
5,4	6,5 ±0,1	1,45	0,6 +0,4		12,42	13,63	17,41			12,1	14 ±0,2	2,65	1 +0,5		26,98	29,69	37,82		
5,5	7 ±0,1	1,8	0,6 +0,4		10,58	11,63	14,82	19,03		12,2	14 ±0,2	2,56	1 +0,5		26,98	29,69	37,82		
5,6	7 ±0,1	1,71	0,6 +0,4		12,42	13,63	17,41			12,3	14 ±0,2	2,47	1 +0,5		26,98	29,69	37,82		
5,7	7 ±0,1	1,63	0,6 +0,4		12,42	13,63	17,41			12,4	14 ±0,2	2,39	1 +0,5		26,98	29,69	37,82		
5,75	7 ±0,1	1,58	0,6 +0,4		16,76					12,5	15 ±0,2	3,17	1 +0,5		25,46	27,98	35,66	70,13	
5,8	7 ±0,1	1,54	0,6 +0,4		12,42	13,63	17,41			12,6	15 ±0,2	3,08	1 +0,5		26,98	29,69	37,82		
5,9	7 ±0,1	1,45	0,6 +0,4		12,42	13,63	17,41			12,7	15 ±0,2	2,99	1 +0,5		26,98	29,69	37,82		
6	8 ±0,2	2,23	1 +0,5		10,16	11,17	14,22	18,31	20,35	12,8	15 ±0,2	2,91	1 +0,5		26,98	29,69	37,82		
6,05	8 ±0,2	2,19	1 +0,5		16,92		23,70			12,9	15 ±0,2	2,82	1 +0,5		26,98	29,69	37,82		
6,1	8 ±0,2	2,15	1 +0,5		12,52	13,80	17,55			13	15 ±0,2	2,73	1 +0,5		25,46	27,98	35,66		
6,2	8 ±0,2	2,06	1 +0,5		12,52	13,80	17,55			13,5	16 ±0,2	3,67	1,5 +0,5		30,78	33,82	43,05		
6,3	8 ±0,2	1,97	1 +0,5		12,52	13,80	17,55			14	16 ±0,2	3,23	1,5 +0,5		30,78	33,82	43,05	77,52	
6,4	8 ±0,2	1,89	1 +0,5		12,52	13,80	17,55			14,5	17 ±0,2	3,67	1,5 +0,5		36,49	40,10	51,06		
6,5	9 ±0,2	3,17	1 +0,5		11,56	12,73	16,18	19,55	25,93	15	17 ±0,2	3,23	1,5 +0,5		36,49	40,10	51,06		
6,6	9 ±0,2	3,08	1 +0,5		12,26	13,55	17,15			15,5	18 ±0,2	3,67	1,5 +0,5		44,11	48,54	61,75		
6,7	9 ±0,2	2,99	1 +0,5		12,26	13,55	17,15			16	18 ±0,2	3,23	1,5 +0,5		44,11	48,54	61,75		
6,8	9 ±0,2	2,91	1 +0,5		12,26	13,55	17,15			16,5	19 ±0,2	3,67	1,5 +0,5		47,38	52,15	66,33		
6,9	9 ±0,2	2,82	1 +0,5		12,26	13,55	17,15			17	19 ±0,2	3,23	1,5 +0,5		47,38	52,15	66,33		
7	9 ±0,2	2,73	1 +0,5		11,56	12,73	16,18	20,84	25,93	17,5	20 ±0,2	3,67	1,5 +0,5		54,95	60,43	76,90		
7,1	9 ±0,2	2,65	1 +0,5		14,48	15,94	20,28			18	20 ±0,2	3,23	1,5 +0,5		54,95	60,43	76,90		
7,2	9 ±0,2	2,56	1 +0,5		14,48	15,94	20,28			18,5	21 ±0,2	3,67	1,5 +0,5		62,75	69,02	87,83		
7,25	9 ±0,2	2,52	1 +0,5		19,50					19	21 ±0,2	3,23	1,5 +0,5		62,75	69,02	87,83		
7,3	9 ±0,2	2,47	1 +0,5		14,48	15,94	20,28			19,5	22 ±0,2	3,67	1,5 +0,5		74,56	82,03	104,40		
7,4	9 ±0,2	2,39	1 +0,5		14,48	15,94	20,28			20	22 ±0,2	3,23	1,5 +0,5		74,56	82,03	104,40	134,20	
7,5	10 ±0,2	3,17	1 +0,5		13,65	15,04	19,12	24,55											
7,6	10 ±0,2	3,08	1 +0,5		14,48	15,94	20,28												
7,7	10 ±0,2	2,99	1 +0,5		14,48	15,94	20,28												

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 1, type D (similar ISO 6752)



Item no.
1154.

Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
PM23

Other materials available on request, see material table.

d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100
1	1.8 ± 0,05	1,19	0.4 + 0,3		10,70		14,98
1,1	1.8 ± 0,05	1,11	0.4 + 0,3		10,90		
1,2	2 ± 0,05	1,19	0.4 + 0,3		10,90		
1,3	2 ± 0,05	1,11	0.4 + 0,3		10,90		15,29
1,4	2.2 ± 0,05	1,19	0.4 + 0,3		10,90		
1,5	2.2 ± 0,05	1,11	0.4 + 0,3		10,52	11,58	15,29
1,6	2.5 ± 0,05	1,28	0.4 + 0,3		10,90	12,01	
1,7	2.5 ± 0,05	1,19	0.4 + 0,3		10,90	12,01	15,29
1,8	2.8 ± 0,05	1,37	0.4 + 0,3		10,90	12,01	15,29
1,9	2.8 ± 0,05	1,28	0.4 + 0,3		10,90		
2	3 ± 0,1	1,37	0.4 + 0,3		10,52	11,58	14,74
2,1	3.2 ± 0,1	1,45	0.4 + 0,3		11,31	12,48	15,86
2,2	3.2 ± 0,1	1,37	0.4 + 0,3		11,31		15,86
2,3	3.5 ± 0,1	1,54	0.4 + 0,3			12,48	
2,4	3.5 ± 0,1	1,45	0.4 + 0,3		11,31		15,86
2,5	3.5 ± 0,1	1,37	0.4 + 0,3		10,66	11,73	14,92
2,6	4 ± 0,1	1,71	0.4 + 0,3				15,86
2,7	4 ± 0,1	1,63	0.4 + 0,3		11,76	12,96	
2,8	4 ± 0,1	1,54	0.4 + 0,3		11,76	12,96	16,52
2,9	4 ± 0,1	1,45	0.4 + 0,3		11,76	12,96	16,52
3	4.5 ± 0,1	1,8	0.6 + 0,4		10,66	11,73	14,92
3,1	4.5 ± 0,1	1,71	0.6 + 0,4		12,06	13,25	16,87
3,2	4.5 ± 0,1	1,63	0.6 + 0,4		12,06	13,25	16,87
3,3	4.5 ± 0,1	1,54	0.6 + 0,4			13,25	16,87
3,4	4.5 ± 0,1	1,45	0.6 + 0,4		12,55		17,62
3,5	5 ± 0,1	1,8	0.6 + 0,4		10,99	12,12	15,44
3,6	5 ± 0,1	1,71	0.6 + 0,4		12,55		17,62
3,7	5 ± 0,1	1,63	0.6 + 0,4				17,62

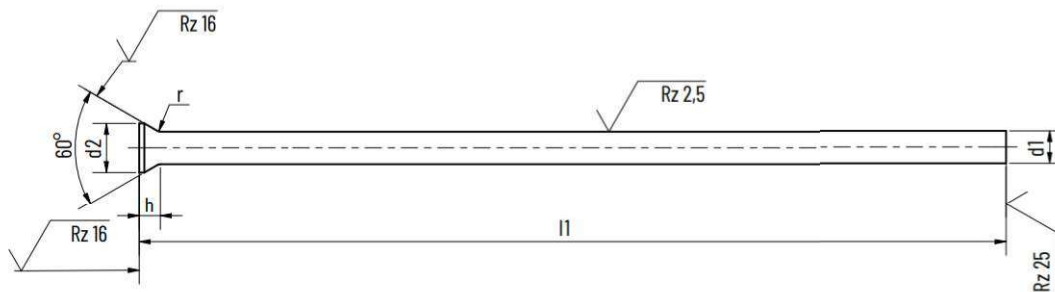
d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100
3,8	5 ± 0,1	1,54	0.6 + 0,4				17,62
3,9	5 ± 0,1	1,45	0.6 + 0,4		12,55		17,62
4	5.5 ± 0,1	1,8	0.6 + 0,4		10,99	12,12	15,44
4,1	5.5 ± 0,1	1,71	0.6 + 0,4		13,01	14,38	18,26
4,2	5.5 ± 0,1	1,63	0.6 + 0,4			14,38	18,26
4,3	5.5 ± 0,1	1,54	0.6 + 0,4		13,66		19,21
4,5	6 ± 0,1	1,8	0.6 + 0,4		12,92	14,17	18,08
4,6	6 ± 0,1	1,71	0.6 + 0,4		13,66	15,04	
4,7	6 ± 0,1	1,63	0.6 + 0,4				20,90
5	6.5 ± 0,1	1,8	0.6 + 0,4		12,39	13,63	17,34
5,1	6.5 ± 0,1	1,71	0.6 + 0,4		15,11	16,58	21,11
5,2	6.5 ± 0,1	1,63	0.6 + 0,4				21,11
5,3	6.5 ± 0,1	1,54	0.6 + 0,4				22,11
5,5	7 ± 0,1	1,8	0.6 + 0,4				19,54
5,6	7 ± 0,1	1,71	0.6 + 0,4				22,11
6	8 ± 0,2	2,23	1+0,5		13,56	14,92	18,95
6,1	8 ± 0,2	2,15	1+0,5				22,87
6,2	8 ± 0,2	2,06	1+0,5				22,87
6,4	8 ± 0,2	1,89	1+0,5				22,87
6,5	9 ± 0,2	3,17	1+0,5		16,53	18,18	27,04
6,6	9 ± 0,2	3,08	1+0,5			18,18	
6,8	9 ± 0,2	2,91	1+0,5				27,04
7	9 ± 0,2	2,73	1+0,5		16,53	18,18	27,04
7,1	9 ± 0,2	2,65	1+0,5				31,25
7,5	10 ± 0,2	3,17	1+0,5		19,28	21,22	27,04
8	10 ± 0,2	2,73	1+0,5		18,88	20,73	26,38
8,2	10 ± 0,2	2,56	1+0,5				31,25
8,3	10 ± 0,2	2,47	1+0,5				31,25

d_1 h_6	d_2	h $+0,2$ 0	r	l_1 $+0,5$ 0	71	80	100
8,5	$11 \pm 0,2$	3,17	$1 + 0,5$				31,25
9	$11 \pm 0,2$	2,73	$1 + 0,5$		22,31	24,56	31,25
9,2	$11 \pm 0,2$	2,56	$1 + 0,5$				37,46
9,5	$12 \pm 0,2$	3,17	$1 + 0,5$		26,73		
10	$12 \pm 0,2$	2,73	$1 + 0,5$		25,25	27,80	35,33
10,5	$13 \pm 0,2$	3,17	$1 + 0,5$		27,96		39,16
11	$13 \pm 0,2$	2,73	$1 + 0,5$		29,17		40,84
12	$14 \pm 0,2$	2,73	$1 + 0,5$		33,89	37,30	47,44
12,5	$15 \pm 0,2$	3,17	$1 + 0,5$				53,62
13	$15 \pm 0,2$	2,73	$1 + 0,5$			43,48	53,62
14	$16 \pm 0,2$	3,23	$1,5 + 0,5$				65,64
16	$18 \pm 0,2$	3,23	$1,5 + 0,5$		69,25		97,01

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 1, type D (similar ISO 6752)



Item no.
1156.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 50 ± 5

Material
PM10

Other materials available on request, see material table.

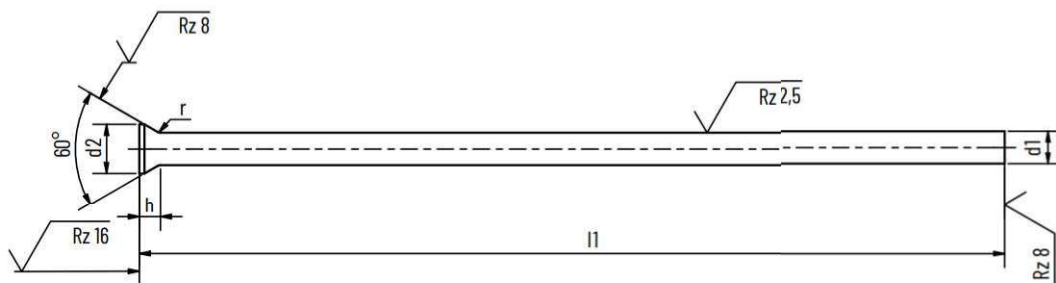
d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100
1,1	1.8 ± 0,05	1,11	0.4 + 0,3				29,44
1,2	2 + 0,05	1,19	0.4 + 0,3		21,02		
1,3	2 + 0,05	1,11	0.4 + 0,3		21,02		
1,5	2.2 ± 0,05	1,11	0.4 + 0,3		20,27		28,39
1,7	2.5 ± 0,05	1,19	0.4 + 0,3		21,02		
2	3 ± 0,1	1,37	0.4 + 0,3		20,27	22,34	28,39
2,1	3.2 ± 0,1	1,45	0.4 + 0,3		21,82		
2,2	3.2 ± 0,1	1,37	0.4 + 0,3				30,56
2,3	3.5 ± 0,1	1,54	0.4 + 0,3		21,82	24,03	
2,4	3.5 ± 0,1	1,45	0.4 + 0,3		21,82		
2,5	3.5 ± 0,1	1,37	0.4 + 0,3		20,57	22,58	
2,6	4 ± 0,1	1,71	0.4 + 0,3		21,82		
3	4.5 ± 0,1	1,8	0.6 + 0,4		20,57	22,58	28,76
3,1	4.5 ± 0,1	1,71	0.6 + 0,4		23,27		
3,2	4.5 ± 0,1	1,63	0.6 + 0,4		23,27		32,49
3,5	5 ± 0,1	1,8	0.6 + 0,4		21,24		29,81
3,6	5 ± 0,1	1,71	0.6 + 0,4		24,24		
4	5.5 ± 0,1	1,8	0.6 + 0,4		21,24	23,37	29,81
4,1	5.5 ± 0,1	1,71	0.6 + 0,4		25,10		
4,2	5.5 ± 0,1	1,63	0.6 + 0,4		25,10		
4,4	5.5 ± 0,1	1,45	0.6 + 0,4				36,95
4,5	6 ± 0,1	1,8	0.6 + 0,4		24,84		
5	6.5 ± 0,1	1,8	0.6 + 0,4		23,89		33,47
5,4	6.5 ± 0,1	1,45	0.6 + 0,4				42,69
5,5	7 ± 0,1	1,8	0.6 + 0,4				37,64
6	8 ± 0,2	2,23	1 + 0,5		26,14		36,58

d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	71	80	100
6,5	9 ± 0,2	3,17	1 + 0,5				44,55
7	9 ± 0,2	2,73	1 + 0,5		31,82		44,55
7,5	10 ± 0,2	3,17	1 + 0,5				52,11
8	10 ± 0,2	2,73	1 + 0,5		36,36	39,98	50,91
9,5	12 ± 0,2	3,17	1 + 0,5				72,14
10	12 ± 0,2	2,73	1 + 0,5				68,11
13	15 ± 0,2	2,73	1 + 0,5				103,30
13,5	16 ± 0,2	3,67	1.5 + 0,5				151,56
14	16 ± 0,2	3,23	1.5 + 0,5				126,53
14,5	17 ± 0,2	3,67	1.5 + 0,5				151,56
15	17 ± 0,2	3,23	1.5 + 0,5				151,56

PRICES PER PIECE IN EURO

SOLID CARBIDE PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 1, type D(similar ISO 6752)



Item no.
1150.Ø.length.V

Version
Grinded from solid carbide.

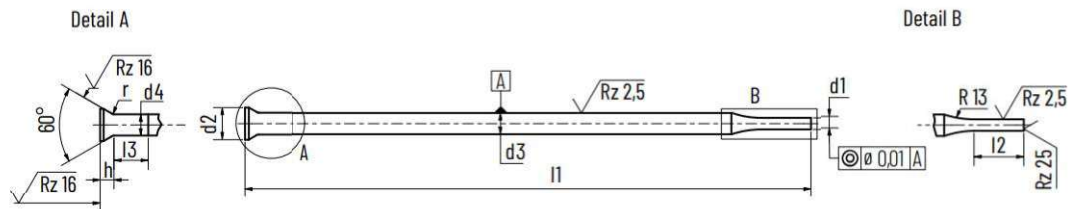
Material
Solid carbide

d ₁ h ₆	d ₂ ±0,05	h +0,2 0	r	l ₁ +0,5 0	71	d ₁ h ₆	d ₂ ±0,05	h +0,2 0	r	l ₁ +0,5 0	71
1	1,8	1,19	0,4 -0,3		44,02	4,2	5,5	1,63	0,6 +0,4		46,05
1,1	1,8	1,11	0,4 -0,3		44,02	4,3	5,5	1,54	0,6 +0,4		46,05
1,2	2	1,19	0,4 -0,3		44,02	4,5	6	1,8	0,6 +0,4		46,05
1,3	2	1,11	0,4 -0,3		44,02	4,6	6	1,71	0,6 +0,4		46,05
1,4	2,2	1,19	0,4 -0,3		44,02	4,7	6	1,63	0,6 +0,4		46,05
1,5	2,2	1,11	0,4 -0,3		39,24	4,9	6	1,45	0,6 +0,4		46,05
1,6	2,5	1,28	0,4 -0,3		39,24	5	6,5	1,8	0,6 +0,4		46,05
1,7	2,5	1,19	0,4 -0,3		39,24	5,5	7	1,8	0,6 +0,4		51,93
1,8	2,8	1,37	0,4 -0,3		39,24	6	8	2,23	1 +0,5		51,93
1,9	2,8	1,28	0,4 -0,3		39,24	6,5	9	3,17	1 +0,5		70,32
2	3	1,37	0,4 -0,3		39,24	7	9	2,73	1 +0,5		70,32
2,1	3,2	1,45	0,4 -0,3		39,24	7,5	10	3,17	1 +0,5		78,18
2,2	3,2	1,37	0,4 -0,3		39,24	8	10	2,73	1 +0,5		82,04
2,3	3,5	1,54	0,4 -0,3		39,24	9	11	2,73	1 +0,5		97,07
2,4	3,5	1,45	0,4 -0,3		39,24	10	12	2,73	1 +0,5		110,58
2,5	3,5	1,37	0,4 -0,3		39,24	15	17	3,23	1,5 +0,5		145,78
2,6	4	1,71	0,4 -0,3		39,24						
2,7	4	1,63	0,4 +0,3		39,24						
2,8	4	1,54	0,4 +0,3		39,24						
2,9	4	1,45	0,4 +0,3		39,24						
3	4,5	1,8	0,6 -0,4		39,24						
3,1	4,5	1,71	0,6 -0,4		41,68						
3,2	4,5	1,63	0,6 -0,4		41,68						
3,3	4,5	1,54	0,6 -0,4		41,68						
3,4	4,5	1,45	0,6 -0,4		41,68						
3,5	5	1,8	0,6 -0,4		41,68						
3,6	5	1,71	0,6 -0,4		41,68						
3,7	5	1,63	0,6 -0,4		41,68						
3,8	5	1,54	0,6 -0,4		41,68						
3,9	5	1,45	0,6 -0,4		41,68						
4	5,5	1,8	0,6 -0,4		41,68						
4,1	5,5	1,71	0,6 -0,4		46,05						

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 2, type CA



Item no.

114.

The 4th digit of the item no. indicates the material:
xxx1.= WS/xxx3.=HSS

Version

Modified from punch
DIN 9861 type DA.

Hardened, tempered, shaft fine
grinded. Head hot forged and
annealed.

With permissible thickening under
the head (d4) to DIN 9861 part 2.

Material

WS, HSS

Other materials available on
request, see material table.

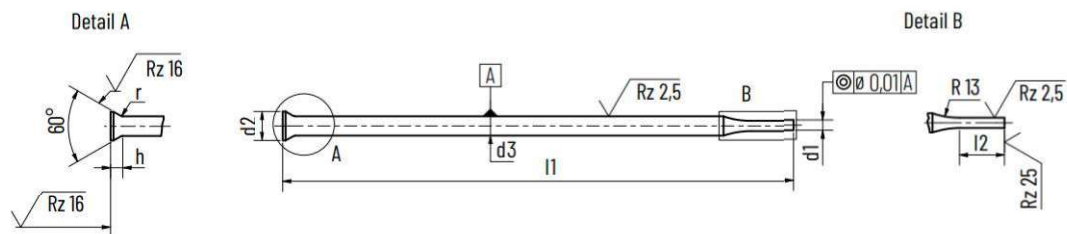
d ₁		Gradation		l ₁		d ₂		Tol.		d ₃		d ₄		l ₂		l ₃		h		r	
h6				+0,5 0						h6				+0,5 0		max.		+0,2 0			
larger	to																				
0,5	1,4	0,1	71	80	2,2	± 0,05		1,5	d ₃ +0,03		7	5		1,11	0,4	+0,3 0					
0,5	1,9	0,1	71	80	3,0	± 0,1		2	d ₃ +0,03		7	5		1,37	0,4	+0,3 0					
1,6	2,9	0,1	71	80	4,5	± 0,1		3	d ₃ +0,03		7	5		1,80	0,6	+0,4 0					
2,5	3,5	0,5	71	80	5,5	± 0,1		4	d ₃ +0,03		10	5		1,80	0,6	+0,4 0					
3,5	4,5	0,5	71	80	6,5	± 0,2		5	d ₃ +0,03		10	6		1,80	0,6	+0,4 0					
4,5	5,5	0,5	71	80	8,0	± 0,2		6	d ₃ +0,03		10	6		2,23	1,0	+0,5 0					

Cutting punches are not stocked, but can be manufactured at short notice. **PRICES UPON REQUEST**

CUTTING PUNCH

WITH COUNTERSUNK HEAD

DIN 9861 part 2, type C (similar ISO 9181)



Item no.
1132.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 50 ± 5

Material
HWS

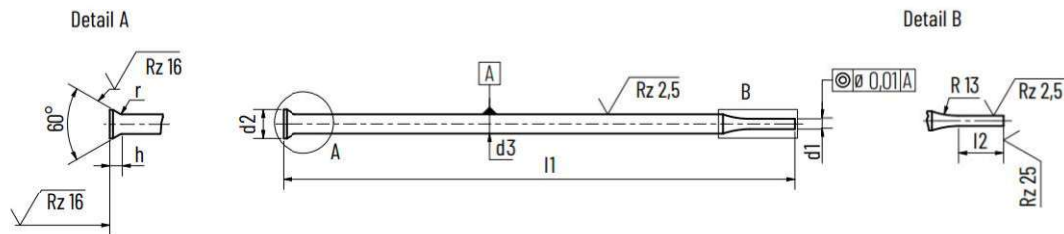
Other materials available on request, see material table.

d ₁ h ₆	d ₂ ± 0,1	d ₃ h6	l ₂ +0,5 0	h +0,2 0	r	l ₁ +0,5 0	71
0,5	3	2	7	1,37	0.4 +0,3		12,79
0,9	3	2	7	1,37	0.4 +0,3		12,79
1	3	2	7	1,37	0.4 +0,3		11,28
1,5	3	2	7	1,37	0.4 +0,3		11,28
1,8	4,5	3	7	1,8	0.6 +0,4		12,79

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 2, type C (similar ISO 9181)



Item no.
1133.

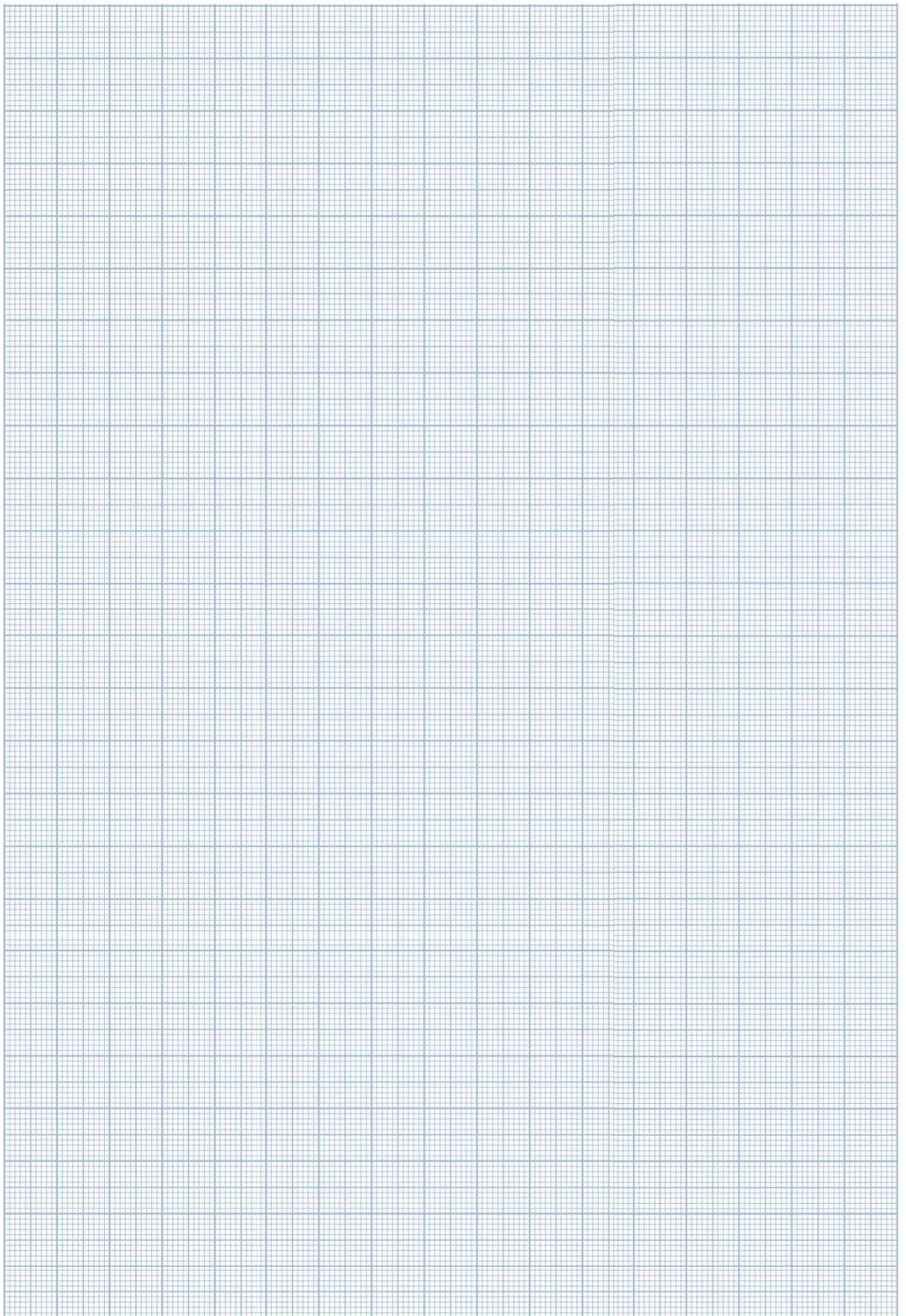
Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
HSS

Other materials available on request, see material table.

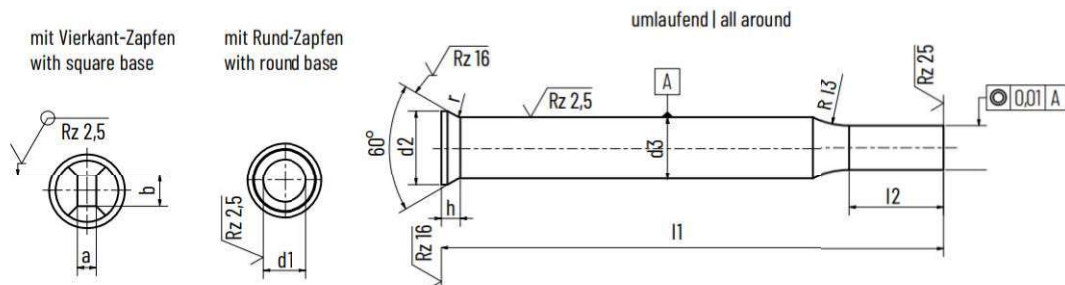
d_1 h_6	d_2 $\pm 0,1$	d_3 h_6	l_2 $+0,5$ 0	h $+0,2$ 0	r	l_1 $+0,5$ 0	71	80
0,5	3	2	7	1,37	0.4 +0,3		13,40	14,75
0,6	3	2	7	1,37	0.4 +0,3		13,40	14,75
0,7	3	2	7	1,37	0.4 +0,3		13,40	14,75
0,8	3	2	7	1,37	0.4 +0,3		13,40	14,75
0,9	3	2	7	1,37	0.4 +0,3		13,40	14,75
1	3	2	7	1,37	0.4 +0,3		12,54	13,81
1,1	3	2	7	1,37	0.4 +0,3		12,54	13,81
1,2	3	2	7	1,37	0.4 +0,3		12,54	13,81
1,3	3	2	7	1,37	0.4 +0,3		12,54	13,81
1,4	3	2	7	1,37	0.4 +0,3		12,54	13,81
1,5	3	2	7	1,37	0.4 +0,3		12,54	13,81
1,6	4,5	3	7	1,8	0.6 +0,4		13,40	14,75
1,7	4,5	3	7	1,8	0.6 +0,4		13,40	14,75
1,8	4,5	3	7	1,8	0.6 +0,4		13,40	14,75
1,9	4,5	3	7	1,8	0.6 +0,4		13,40	14,75
2	4,5	3	7	1,8	0.6 +0,4		13,40	14,75
2,1	4,5	3	7	1,8	0.6 +0,4		13,40	14,75
2,2	4,5	3	7	1,8	0.6 +0,4		13,40	14,75
2,3	4,5	3	7	1,8	0.6 +0,4		12,54	13,81
2,4	4,5	3	7	1,8	0.6 +0,4		12,54	13,81
2,5	4,5	3	7	1,8	0.6 +0,4		12,54	13,81
2,6	4,5	3	7	1,8	0.6 +0,4		12,54	13,81
2,7	4,5	3	7	1,8	0.6 +0,4		12,54	13,81
2,8	4,5	3	7	1,8	0.6 +0,4		12,54	13,81
2,9	4,5	3	7	1,8	0.6 +0,4		12,54	13,81

PRICES PER PIECE IN EURO



CUTTING PUNCH WITH COUNTERSUNK HEAD

DIN 9861 part 2, type C (similar ISO 9181)
with round or square stepped cutting shaft



Item

Custom made components

Version

Modified from punch
DIN 9861 type D.
Hardened, tempered and fine
grinded. Head hot forged and
annealed.
Max. deviation of the centre
corresponds to DIN 9861, type C

Material

HWS, HSS, PM 23, PM 10

Other materials available on
request, see material table.

d ₁ h6	a ± 0,01	b ± 0,01	d ₂	Tol.	d ₃ h6	h+0,2 0	r	l ₁ +0,5 0	l ₂ +0,5 0
			4,5	± 0,1	3,0	1,80	0,6	+ 0,4 0	
			5,5	± 0,1	4,0	1,80	0,6	+ 0,4 0	
			6,5	± 0,2	5,0	1,80	0,6	+ 0,4 0	
			8,0	± 0,2	6,0	2,23	1,0	+ 0,5 0	
	As chosen by manufacturer!		9,0	± 0,2	7,0	2,73	1,0	+ 0,5 0	
			10,0	± 0,2	8,0	2,73	1,0	+ 0,5 0	
			12,0	± 0,2	10,0	2,73	1,0	+ 0,5 0	
			14,0	± 0,2	12,0	2,73	1,0	+ 0,5 0	
			16,0	± 0,2	14,0	3,23	1,5	+ 0,5 0	
			18,0	± 0,2	16,0	3,23	1,5	+ 0,5 0	
			22,0	± 0,2	20,0	3,23	1,5	+ 0,5 0	

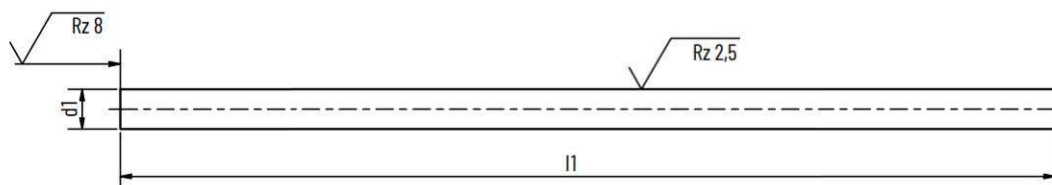
Preferred sizes = 71/80 and 100 mm
Other lengths: 60 and 90 mm

As chosen by manufacturer!

Cutting punches are not stocked, but can be manufactured at short notice. **PRICES UPON REQUEST**

CUTTING PUNCH WITHOUT HEAD

DIN 9861, type B



Item no.
1123.

Hardness
HRC 64 ± 2

Material
HSS

Other materials available on request, see material table.

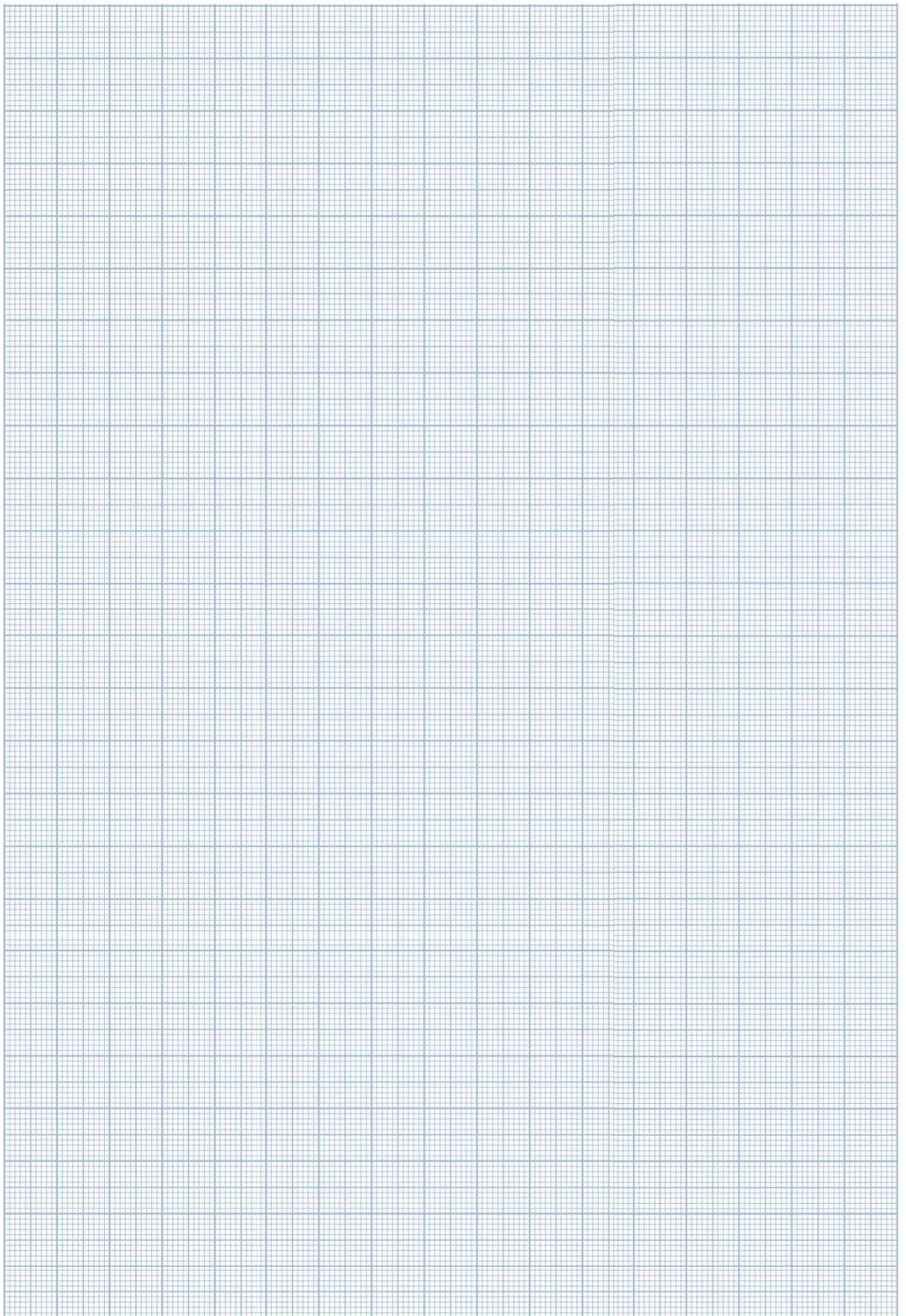
d ₁ h ₆	l ₁ +2,5 0	71	80	100
0.5		6,96	7,62	9,71
0.55		6,96	7,62	9,71
0.6		6,96	7,62	9,71
0.65		6,96	7,62	9,71
0.7		6,40	7,02	8,98
0.75		6,96		
0.8		6,40	7,02	8,98
0.85		6,96		
0.9		6,40	7,02	8,98
0.95		6,96	7,62	9,71
1		5,63	6,21	7,87
1.1		5,63	6,21	7,87
1.2		5,63	6,21	7,87
1.3		5,63	6,21	7,87
1.4		5,63	6,21	7,87
1.5		5,44	5,96	7,59
1.6		5,63	6,21	7,87
1.7		5,63	6,21	7,87
1.8		5,63	6,21	7,87
1.9		5,63	6,21	7,87
2		5,49	6,03	7,64
2.1		5,81	6,34	8,11
2.2		5,81	6,34	8,11
2.3		5,81	6,34	8,11
2.4		5,81	6,34	8,11
2.5		5,54	6,11	7,79
2.6		5,81	6,34	8,11
2.7		6,08	6,69	8,47

d ₁ h ₆	l ₁ +2,5 0	71	80	100
2.8		6,08	6,69	8,47
2.9		6,08	6,69	8,47
3		5,54	6,11	7,79
3.1		6,08	6,69	8,47
3.2		6,08	6,69	8,47
3.3		6,08	6,69	8,47
3.4		6,27	6,92	8,81
3.5		5,86	6,47	8,26
3.6		6,27	6,92	8,81
3.7		6,27	6,92	8,81
3.8		6,27	6,92	8,81
3.9		6,27	6,92	8,81
4		5,86	6,47	8,26
4.1		6,29	6,97	8,86
4.2		6,29	6,97	8,86
4.3		6,54	7,21	9,12
4.4		6,54	7,21	9,12
4.5		6,29	6,97	8,86
4.6		6,54	7,21	9,12
4.7		7,21	7,93	10,08
4.8		7,21	7,93	10,08
4.9		7,21	7,93	10,08
5		6,17	6,76	8,60
5.1		7,28	7,97	10,17
5.2		7,28	7,97	10,17
5.3		7,71	8,46	10,81
5.4		7,71	8,46	10,81
5.5		6,73	7,39	9,41

d ₁ h ₆	l ₁ +2,5 0	71	80	100
5.6		7,71	8,46	10,81
5.7		7,71	8,46	10,81
5.8		7,71	8,46	10,81
5.9		7,71	8,46	
6		6,47	7,10	9,07
6.5		7,63	8,40	10,71
7		7,63	8,40	10,71
7.5		8,59	9,40	12,00
8		8,02	8,86	11,25
8.5		10,00	11,02	14,01
9		10,00	11,02	14,01
9.5		11,90	13,09	16,64
10		10,97	12,06	15,35
12				21,40

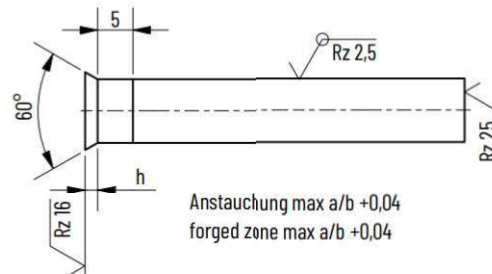
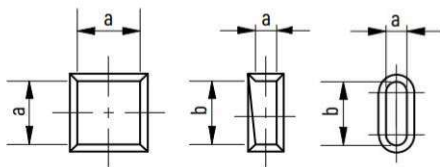
PRICES PER PIECE IN EURO





FORMING PUNCH WITH FORGED HEAD

type DA



Item

Custom made components

Head: Edge rounded or there will be a flat due to the forming.

Hardness

Shaft: HRC 64 ± 2

Head: HRC 50 ± 5

Material

HSS

Other materials available on request, see material table.

Version

With head, hardened and tempered, fine grinded, head hot forged and annealed.

a	b	h	l ₁
± 0,01	± 0,01	+0,2 0	+0,5
2,0		1,37	
2,1		1,45	
2,2		1,37	
2,3		1,54	
2,4		1,45	
2,5		1,37	
2,6		1,71	
2,7		1,63	
2,8		1,54	
2,9		1,45	
3,0		1,80	
3,1		1,71	
3,2		1,63	
3,3		1,54	
3,4		1,45	
3,5		1,80	
3,6		1,71	
3,7		1,63	
3,8		1,54	
3,9		1,45	
4,0		1,80	
4,1		1,71	
4,2		1,63	
4,3		1,54	
4,4		1,45	
4,5		1,80	
4,6		1,71	

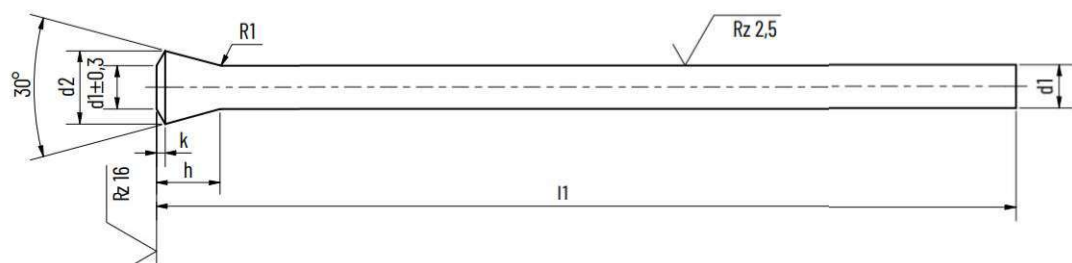
a	b	h	l ₁
± 0,01	± 0,01	+0,2 0	+0,5
4,7		1,63	
4,8		1,54	
4,9		1,45	
5,0		1,80	
5,1		1,71	
5,2		1,63	
5,3		1,54	
5,4		1,45	
5,5		1,80	
5,6		1,71	
5,7		1,63	
5,8		1,54	
5,9		1,45	
6,0		2,23	
6,5		3,17	
7,0		2,73	
7,5		3,17	
8,0		2,73	
8,5		3,17	
9,0		2,73	
10,0		2,73	
11,0		2,73	
12,0		2,73	

Forming punches are not stocked, but can be manufactured at short notice.

We also manufacture square hole punches with round head. **PRICES UPON REQUEST**

CUTTING PUNCH WITH 30°-HEAD

type D



Item no.
1353.

Hardness
Shaft: HRC 58 + 2
Head: HRC 52 ± 5

Material
HSS

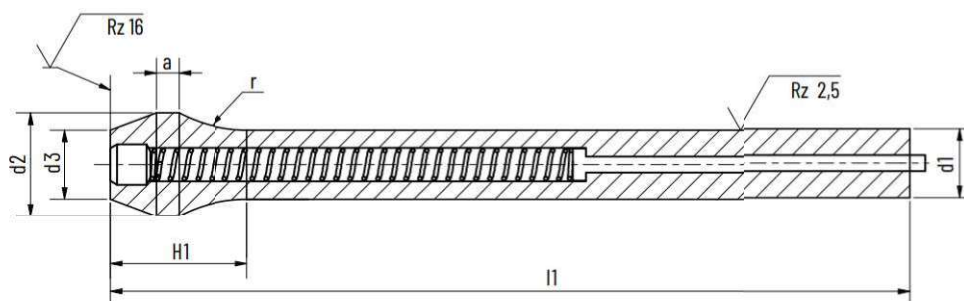
Other materials available on request, see material table.

d_1 h_6	d_2	h $+0,2$	k	l $+1$ 0	100	120
5	8,48	7,5	1		14,90	15,41
5,5	8,98	7,5	1		14,90	15,41
6	9,75	8	1		14,90	15,41
8	12,8	10	1		16,10	16,82
9	14,4	11	1		16,10	17,45
10	15,9	12	1		16,10	17,45
12	18,7	14	1,5		29,80	31,69
14	21,8	16	1,5		29,80	31,69

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH BOTTLE NECK

similar DIN 5118, type E



Item no.

2953.
without cross hole
with spring loaded pin

Hardness

Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material

HSS

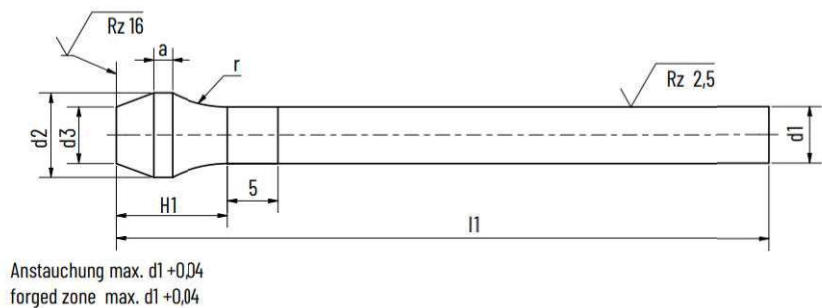
Other materials available on request, see material table.

d_1 h_6	d_2 0 -0,1	H1 +0,2 0	$a \pm 0,1$	$d3 \approx$	r 0 -0,2	l_1 +0,5 0	100	120	130
6	9	9,27	1,5	6	10		83,58		
8	11	9,81	1,5	8	12		88,49		
10	14	11,48	1,5	10	15		93,41		108,34
11	15	11,48	1,5	11	15		109,43		
13	17	11,48	1,5	13	15		116,50		131,43
14	18	11,48	1,5	14	15		138,49	148,13	
16	20	11,48	1,5	16	15		174,78	211,20	

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH BOTTLE NECK

similar DIN 5118, type DA



Item no.
2763.

Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
HSS

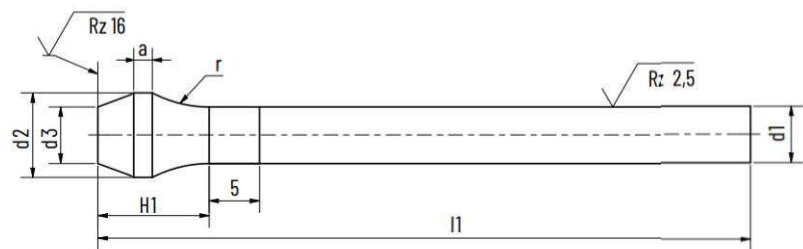
Other materials available on request, see material table.

d_1 h_6	d_2 0 -0,1	H1 +0,2 0	$a \pm 0,1$	$d3 \approx$	r 0 -0,2	l_1 +0,5 0	71	80
3,3	4,5	5,73	1	3,3	6,5		11,76	
3,4	4,5	5,62	1	3,4	6,5		11,76	
3,6	5	6,27	1	3,6	8		12,20	
3,9	5	5,92	1	3,9	8		12,20	
4,1	5,5	7,27	1,5	4,1	8		12,20	
4,2	5,5	7,16	1,5	4,2	8		12,20	
4,3	5,5	7,04	1,5	4,3	8		12,20	
4,4	5,5	6,92	1,5	4,4	8			13,41
4,6	6	7,27	1,5	4,6	8		13,07	
4,8	6	7,04	1,5	4,8	8		13,07	
5	7	8,36	1,5	5	10		11,76	
5,2	7	8,15	1,5	5,2	10			14,88
5,3	7	8,03	1,5	5,3	10		13,51	
5,4	7	7,92	1,5	5,4	10		13,51	
5,5	8	8,84	1,5	5,5	10		12,20	
5,6	8	8,75	1,5	5,6	10		13,96	
5,9	8	8,46	1,5	5,9	10		13,96	
6,5	10	10,24	1,5	6,5	12		13,96	
12,5	17	11,9	1,5	12,5	15		32,93	

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH BOTTLE NECK

similar DIN 5118, type DA



Anstauchung max. d1 +0,04
forged zone max. c1 +0,04

Item no.
2764.

Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
PM 23

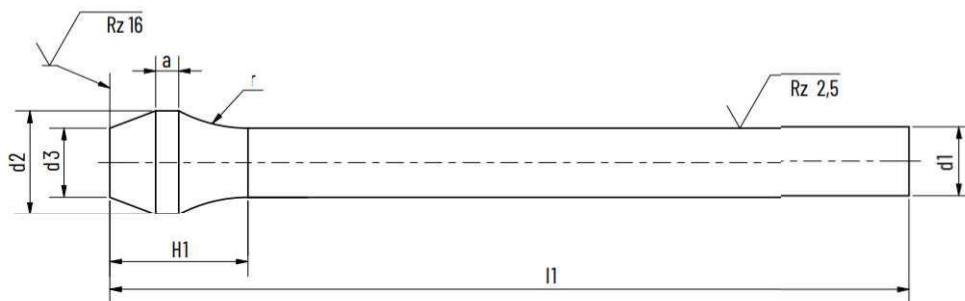
Other materials available on request, see material table.

d ₁ h ₆	d ₂ 0 -0,1	H1 +0,2 0	a ± 0,1	d3 ≈	r 0 -0,2	l ₁ +0,5 0	71	100
3	4,5	6,03	1	3	6,5		14,11	
4	5,5	7,38	1	4	8		14,11	
5	7	8,36	1,5	5	10		14,11	
6	9	9,27	1,5	6	10		14,52	
8	11	9,81	1,5	8	12		24,79	
10	14	11,48	1,5	10	15		25,98	
11	15	11,48	1,5	11	15			34,50
12	16		1,5	12	15		29,00	
16	20	11,48	1,5	16	15			94,14

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH BOTTLE NECK

similar DIN 5118, type D



Item no.
2753.

Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
HSS

Other materials available on request, see material table.

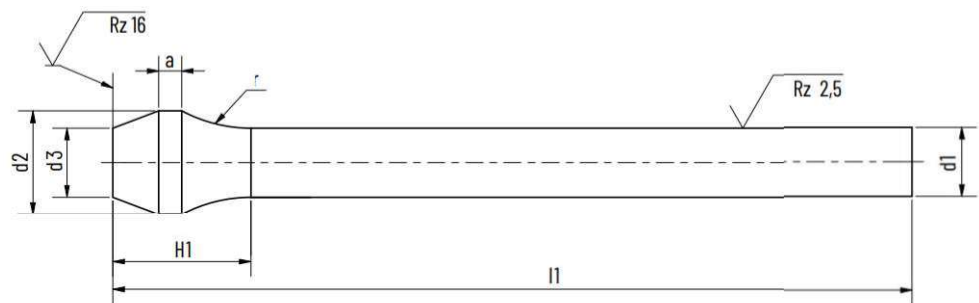
d ₁ h ₆	d ₂ 0 -0,1	H1 +0,2 0	a ± 0,1	d3 ≈	r 0 -0,2	l ₁ +0,5 0	71	80	100	110	120
2	3	4,8	1	2	3,5		12,20	13,41	17,06		22,14
2,1	3,2	5,28	1	2,1	5				17,64		
2,2	3,2	5,18	1	2,2	5			13,90	17,64		
2,3	3,5	5,37	1	2,3	5		12,65	13,90	17,64		
2,4	3,5	5,28	1	2,4	5		12,65		17,64		
2,5	3,5	5,18	1	2,5	5		12,20	13,41	17,06		22,14
2,6	4	5,93	1	2,6	6,5		12,65		17,64		
2,7	4	5,83	1	2,7	6,5		12,65	13,90	17,64		
2,8	4	5,73	1	2,8	6,5		12,65		17,64		
2,9	4	5,62	1	2,9	6,5				17,64		
3	4,5	6,03	1	3	6,5		12,20	13,41	17,06		22,14
3,1	4,5	5,93	1	3,1	6,5		12,65	13,90	17,64		
3,2	4,5	5,83	1	3,2	6,5		12,65	13,90	17,64		
3,3	4,5	5,73	1	3,3	6,5		12,65		17,64		
3,4	4,5	5,62	1	3,4	6,5		12,65		17,64		
3,5	5	6,38	1	3,5	8		12,65	13,90	17,64		22,72
3,6	5	6,27	1	3,6	8		13,96		19,51		
3,7	5	6,16	1	3,7	8				19,51		
3,8	5	6,04	1	3,8	8			15,34	19,51		
3,9	5	5,92	1	3,9	8				19,51		
4	5,5	7,38	1,5	4	8		12,65	13,90	17,64		22,72
4,1	5,5	7,27	1,5	4,1	8		14,39	15,83	20,11		
4,2	5,5	7,16	1,5	4,2	8		14,39	15,83	20,11		
4,3	5,5	7,04	1,5	4,3	8			15,83	20,11		
4,4	5,5	6,92	1,5	4,4	8				20,11		
4,5	6	7,38	1,5	4,5	8		14,39	15,83	20,11		25,10
4,6	6	7,27	1,5	4,6	8				21,33		
4,7	6	7,16	1,5	4,7	8				21,33		

d ₁ h ₆	d ₂ 0 -0,1	H1 +0,2 0	a ± 0,1	d3 ≈	r 0 -0,2	I ₁ +0,5 0	71	80	100	110	120
4,8	6	7,04	1,5	4,8	8		15,26	16,80	21,33		
4,9	6	6,92	1,5	4,9	8				21,33		
5	7	8,36	1,5	5	10		14,39	15,83	20,11		25,86
5,1	7	8,25	1,5	5,1	10		16,99		23,77		
5,2	7	8,15	1,5	5,2	10			18,66	23,77		
5,3	7	8,03	1,5	5,3	10			18,66	23,77		
5,4	7	7,92	1,5	5,4	10				23,77		
5,5	8	8,84	1,5	5,5	10		16,09	17,70	22,57		27,49
5,6	8	8,75	1,5	5,6	10		17,42	19,15	24,36		
5,7	8	8,66	1,5	5,7	10		17,42	19,15	24,36		
5,8	8	8,56	1,5	5,8	10				24,36		
5,9	8	8,46	1,5	5,9	10			19,15	24,36		
6	9	9,27	1,5	6	10		14,84	16,31	20,73		26,66
6,1	9	9,19	1,5	6,1	10				25,01		
6,2	9	9,1	1,5	6,2	10				25,01		
6,3	9	9,02	1,5	6,3	10				25,01		
6,4	9	8,93	1,5	6,4	10				25,01		
6,5	10	10,24	1,5	6,5	12		17,42	19,15	24,36		36,80
6,6	10	10,24	1,5	6,6	12				25,61		
6,7	10	10,24	1,5	6,7	12				25,61		
6,8	10	10,24	1,5	6,8	12				25,61		
7	10	9,81	1,5	7	12		17,42	19,15	24,36		36,80
7,5	11	10,24	1,5	7,5	12		20,45	22,51	28,65		38,21
8	11	9,81	1,5	8	12		20,90	22,98	29,29		37,62
8,1	11	9,81	1,5	8,1	12		20,90		29,29		
8,2	11	9,81	1,5	8,2	12				29,29		
8,3	11	9,81	1,5	8,3	12				29,29		
8,4	11	9,81	1,5	8,4	12				29,29		
8,5	13	11,9	1,5	8,5	15		21,01	24,90	31,69		40,19
9	13	11,48	1,5	9	15		21,01	24,90	31,69		40,19
9,4	13	11,48	1,5	9,4	15				37,78		
9,5	14	11,9	1,5	9,5	15		26,97	29,69	37,78		42,20
10	14	11,48	1,5	10	15		25,76	28,30	36,06	40,46	40,46
10,5	15	11,9	1,5	10,5	15		29,31	32,20	41,02		44,09
11	15	11,48	1,5	11	15		29,31	32,20	41,02		44,09
11,5	16	11,9	1,5	11,5	15		33,74	37,08	47,24		50,14
12	16	11,48	1,5	12	15		33,74	37,08	47,24		50,14
12,5	17	11,9	1,5	12,5	15		37,94	41,74	53,11		57,83
13	17	11,48	1,5	13	15		37,94	41,74	53,11	57,83	57,83
13,5	18	11,9	1,5	13,5	15		45,91	50,43	64,19		68,88
14	18	11,48	1,5	14	15		45,91	50,43	64,19		68,88
14,5	19	11,9	1,5	14,5	15		54,43	59,77	76,08		80,77
15	19	11,48	1,5	15	15		54,43	59,77	76,08		80,77
15,5	20	11,9	1,5	15,5	15		65,85	72,38	92,02		96,72
16	20	11,48	1,5	16	15		65,85	72,38	92,02		96,72
16,5	21	11,9	1,5	16,5	15		70,71	77,72	98,88		103,58
17	21	11,48	1,5	17	15		70,71	77,72	98,88	103,58	103,58
17,5	22	11,9	1,5	17,5	15		77,09	90,08	114,61		119,29
18	22	11,48	1,5	18	15		77,09	90,08	114,61		119,29
18,5	23	11,9	1,5	18,5	15		93,63	102,86	130,93		135,62
19	23	11,48	1,5	19	15		93,63	102,86	130,93	135,62	135,62
19,5	25	12,66	1,5	19,5	15		111,28	122,32	155,65		160,35
20	25	12,29	1,5	20	15		111,28	122,32	155,65		160,35
22	28	13	1,5	22	15				179,62		
25	31	13	1,5	25	15				207,32		212,02

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH BOTTLE NECK

similar DIN 5118, type D



Item no.
2754.

Hardness
Shaft: HRC 64 ± 2
Head: HRC 50 ± 5

Material
PM23

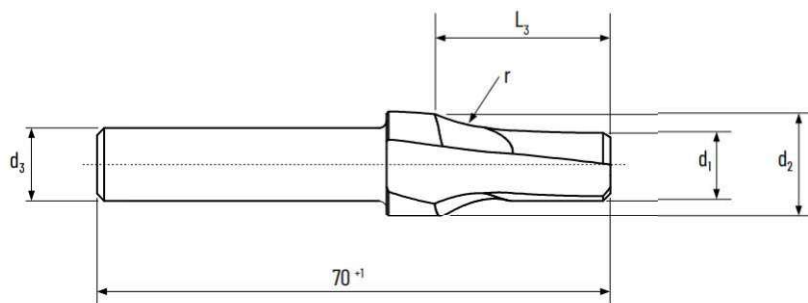
Other materials available on request, see material table.

d ₁ h ₆	d ₂ 0 -0,1	H1 +0,2 0	a ± 0,1	d3 ≈	r 0 -0,2	l ₁ +0,5 0	100
4	5,5	7,38	1,5	4	8		17,80
5	7	8,36	1,5	5	10		20,18
6	9	9,27	1,5	6	10		20,78

PRICES PER PIECE IN EURO

COUNTERSINK TOOL WITH THREE SIDE-TRIMMER

for bottle neck punches



Item no.
2793.Ø.D

Version
Hardened, tempered and grinded.

Material
HSS

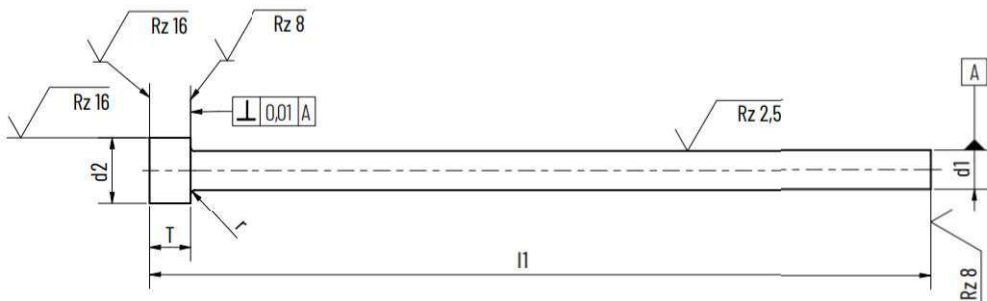
d ₁ f7	d ₂ h8	d ₃ h11	r +0,2	I3	70	d ₁ f7	d ₂ h8	d ₃ h11	r +0,2	I3	70
2	3,3	3,3	3,5	5	83,85	12	16,5	10	15	15	162,47
2,1	3,5	3,5	5	5	162,71	13	17,5	10	15	15	275,57
2,5	3,8	3,8	5	5	83,85	14	18,5	10	15	15	275,57
2,7	4,3	4,3	6,5	7	162,71	15	19,5	10	15	15	275,57
3	4,9	4,9	6,5	7	83,85	16	20,5	10	15	15	275,57
3,1	4,9	4,9	6,5	7	162,71	19	23,5	16	15	15	321,28
3,3	4,9	4,9	6,5	7	162,71	20	25,5	16	15	15	321,28
3,5	5,4	5,4	8	7	83,85						
3,6	5,4	5,4	8	7	162,71						
4	5,9	5,9	8	8	83,85						
4,1	5,9	5,9	8	8	167,79						
4,2	5,9	5,9	8	8	167,79						
4,3	5,9	5,9	8	8	167,79						
4,5	6,4	6,4	8	8	90,27						
4,8	6,4	6,4	8	8	170,85						
5	7,4	7,4	10	10	101,13						
5,2	7,4	7,4	10	10	175,92						
5,5	8,5	8,5	10	10	101,13						
5,7	8,5	8,5	10	10	181,68						
5,8	8,5	8,5	10	10	181,68						
6	9,5	9,5	10	10	111,33						
6,5	10,5	10,5	12	12	117,97						
7	10,5	10,5	12	12	117,97						
7,5	11,5	10	12	12	129,96						
8	11,5	10	12	12	129,96						
8,5	13,5	10	15	12	150,49						
9	13,5	10	15	12	150,49						
9,5	14,5	10	15	12	162,47						
10	14,5	10	15	12	162,47						
10,5	15,5	10	15	15	162,47						
11	15,5	10	15	15	162,47						
11,5	16,5	10	15	15	162,47						

PRICES PER PIECE IN EURO

CUTTING PUNCH

WITH CYLINDRICAL HEAD

DIN ISO 8020, type A



Item no.
2112.

Hardness
Shaft: HRC 60 ± 2
Head: HRC 45 ± 5

Material
HWS

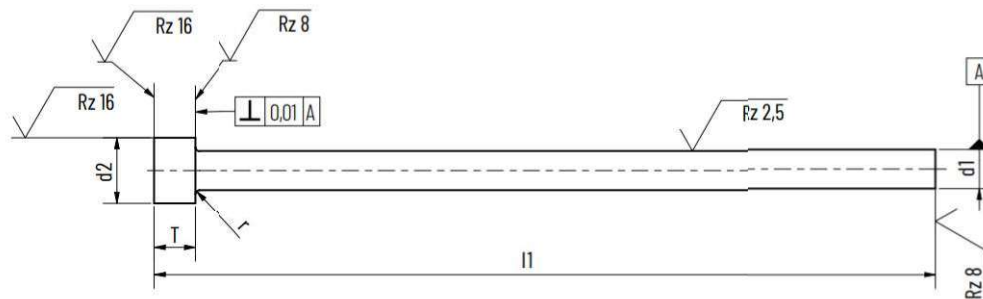
Other materials available on request, see material table.

d_1 m 5	d_2 0 -0,15	T +0,2 +0,1	r +0,1 0	l_1 +0,5 +0,2	63	71	80	90	100
3	5	3	0,2		10,93	10,93	10,93		
4	6	3	0,2		10,93	10,93	10,93		
5	8	5	0,3		11,36	11,36	11,36	12,87	14,48
6	9	5	0,3		11,93	11,93	11,93	13,53	15,22
8	11	5	0,3		14,48	14,48	14,48	16,37	18,30
10	13	5	0,3		17,11	17,11	17,11	19,42	21,85
13	16	5	0,4			22,81	22,81	25,88	29,01
16	19	5	0,4			31,22	31,22	35,53	39,81
20	23	5	0,4				43,77	49,73	53,55
25	28	5	0,4				58,64	66,46	74,66
32	35	5	0,4			105,50			

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type A



Item no.
2113.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material
HSS

Other materials available on request, see material table.

d ₁ m5	d ₂ 0 -0,15	T +0,2 +0,1	r +0,1 0	l ₁ +0,5 +0,2	63	71	80	90	100	120	130
1,5	3	3	0,2						29,18		
1,5	3	5	0,2						29,18		
2	4	3	0,2						29,18		
2	4	5	0,2						29,18		
2,5	5	3	0,2						27,74		
2,5	5	5	0,2						27,74		
3	5	3	0,2		12,89	12,89	12,89	14,69	16,39		
3	5	5	0,2		12,89	12,89	12,89		16,39		
3,5	6	3	0,2						24,66		
3,5	6	5	0,2						24,66		
4	6	3	0,2		13,24	13,24	13,24	15,05	16,85	20,21	
4	6	5	0,2		13,24	13,24	13,24		16,85		
4,5	7	3	0,2						25,34		
4,5	7	5	0,2						25,34		
5	8	5	0,3		13,58	13,58	13,58	15,46	17,31	20,78	
5,5	9	5	0,3						26,31		
6	9	5	0,3		13,96	13,96	13,96	15,85	17,78	21,29	
6,5	10	5	0,3						27,74		
7	10	5	0,3						31,21		
7,5	11	5	0,3						47,30		
8	11	5	0,3		17,17	17,17	17,17	19,58	21,92	26,30	34,35
8,5	12	5	0,3						47,30		
9	12	5	0,3						47,30		
10	13	5	0,3		21,92	21,92	21,92	24,85	27,88	33,45	43,83

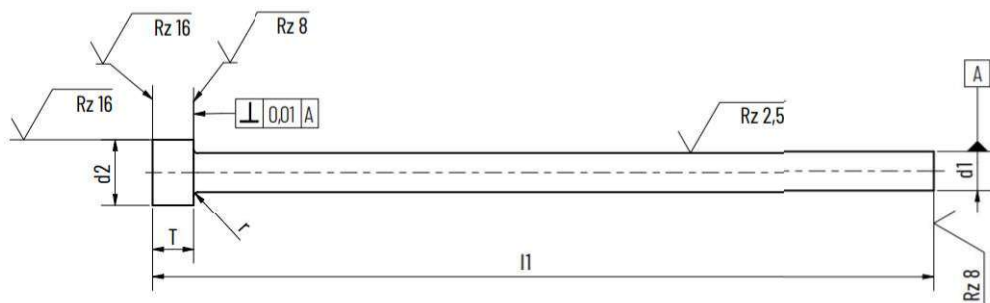
d ₁ m5	d ₂ 0 -0,15	T +0,2 +0,1	r +0,1 0	l ₁ +0,5 +0,2	63	71	80	90	100	120	130
11	14	5	0,4						48,56		
12	15	5	0,4						58,95		
13	16	5	0,4		29,56	29,56	29,56	33,64	37,56	45,12	
16	19	5	0,4		42,87	42,87	42,87	48,85	54,67	65,57	
20	23	5	0,4		57,88	57,88	57,88	65,85	73,68		
25	28	5	0,4			66,76	66,76	75,82	84,95		
32	35	5	0,4			100,24	100,24	113,69	127,65		

Dimension d1: < Ø 5 mm partly with T = head-height 5 mm available – see table! Please specify when ordering. **PRICES PER PIECE IN EURO**

CUTTING PUNCH

WITH CYLINDRICAL HEAD

DIN ISO 8020, type A



Item no.
2114.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material
PM23

Other materials available on request, see material table.

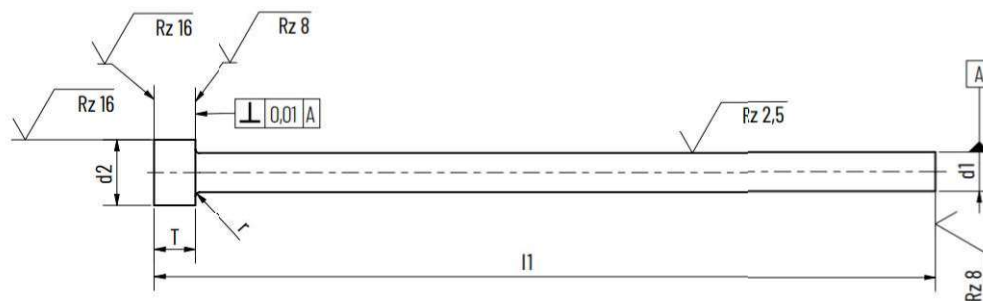
d_1 m 5	d_2 0 -0,15	T +0,2 +0,1	r +0,1 0	l_1 +0,5 +0,2	63	71	80	90	100
3	5	3	0,2		26,33	26,33			
4	6	3	0,2		30,40	30,40	30,40		42,51
4	6	5	0,2						42,51
5	8	5	0,3		31,40	31,40	31,40	39,23	43,76
6	9	5	0,3		33,40	33,40	33,40	41,75	46,79
8	11	5	0,3		39,99	39,99	39,99	50,01	55,98
10	13	5	0,3		46,06	46,06	46,06	57,61	64,49
13	16	5	0,4			60,26	60,26	75,32	84,35
16	19	5	0,4			80,00			111,97
20	23	5	0,4						172,87

Dimension d1: < Ø 5 mm partly with T = head-height 5 mm available - see table! Please specify when ordering. **PRICES PER PIECE IN EURO**

CUTTING PUNCH

WITH CYLINDRICAL HEAD

DIN ISO 8020, type A



Item no.
2116.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material
PM 10

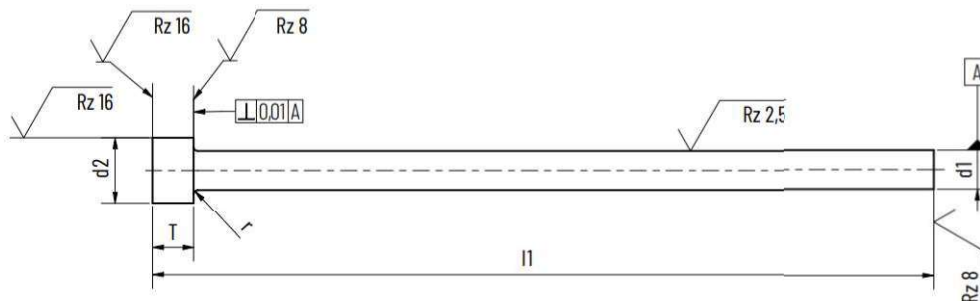
Other materials available on request, see material table.

d ₁ m 5	d ₂ 0 -0,15	T +0,2 +0,1	r +0,1 0	l ₁ +0,5 +0,2	100
3	5	3	0,2		70,36
4	6	3	0,2		81,15
5	8	5	0,3		83,60
6	9	5	0,3		89,30
8	11	5	0,3		106,99
10	13	5	0,3		123,08
13	16	5	0,4		129,17
16	19	5	0,4		179,93

PRICES PER PIECE IN EURO

SOLID CARBIDE PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type A



Item no.

2810.Ø.length.V

Version

Grinded from solid carbide.

Material

Solid carbide

d ₁ m 5	d ₂ 0 -0,25	T +0,25 0	r +0,1 0	l ₁ +1 0	71
1	2	5	0,3		42,96
1,1	2,2	5	0,3		42,96
1,2	2,2	5	0,3		42,96
1,3	2,5	5	0,3		42,96
1,4	2,5	5	0,3		42,96
1,5	3	5	0,3		45,56
1,6	3	5	0,3		50,08
1,7	3	5	0,3		50,08
1,8	3,2	5	0,3		50,08
1,9	3,2	5	0,3		50,08
2	3,5	5	0,3		47,69
2,1	3,7	5	0,3		52,54
2,2	3,7	5	0,3		52,54
2,3	4	5	0,3		52,54
2,4	4	5	0,3		52,54
2,5	4	5	0,3		35,68
2,6	4,5	5	0,3		54,50
2,7	4,5	5	0,3		54,50
2,8	4,5	5	0,3		54,50
2,9	4,5	5	0,3		54,50
3	5	5	0,3		51,84
3,1	5	5	0,3		57,11
3,2	5	5	0,3		57,11
3,3	5	5	0,3		57,11
3,4	5	5	0,3		57,11
3,5	5,5	5	0,3		55,85
3,6	5,5	5	0,3		61,38
3,7	5,5	5	0,3		61,38
3,8	5,5	5	0,3		61,38
3,9	5,5	5	0,3		61,38
4	6	5	0,3		57,00
4,1	6	5	0,3		64,08

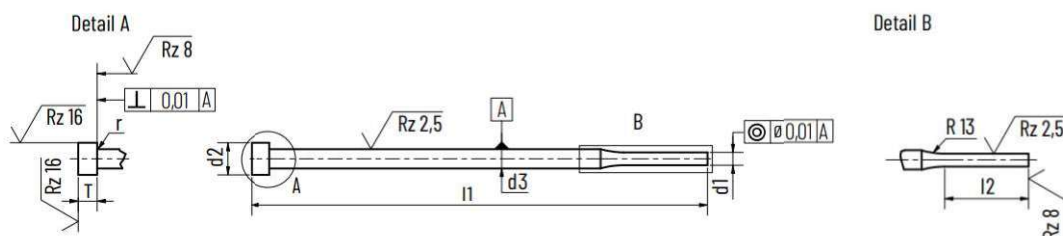
d ₁ m 5	d ₂ 0 -0,25	T +0,25 0	r +0,1 0	l ₁ +1 0	71
4,2	6	5	0,3		64,08
4,3	6	5	0,3		64,08
4,4	6	5	0,3		64,08
4,5	7	5	0,3		60,27
4,6	7	5	0,3		65,52
4,7	7	5	0,3		65,52
4,8	7	5	0,3		65,52
4,9	7	5	0,3		65,52
5	8	5	0,3		63,58
5,5	8,5	5	0,3		66,86
6	9	5	0,3		69,30
6,5	9,5	5	0,3		77,94
7	10	5	0,3		83,14
7,5	10,5	5	0,3		87,79
8	11	5	0,3		91,71
9	12	5	0,3		105,55
10	13	5	0,3		110,05

PRICES PER PIECE IN EURO



CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type B



Item no.

2153.

l2 = 10 mm

Hardness

Shaft: HRC 62 ± 2

Head: HRC 52 ± 5

Material

HSS

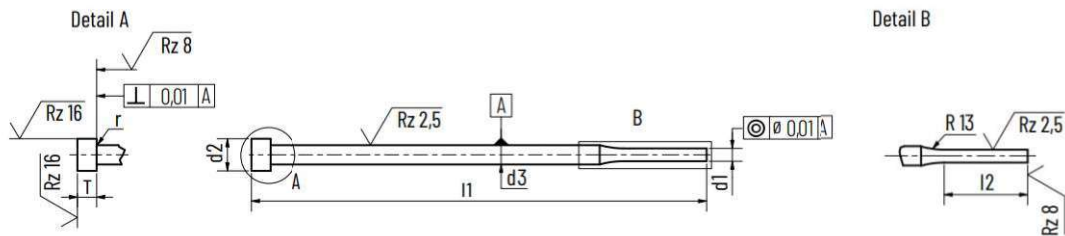
Other materials available on request, see material table.

d ₁ ± 0,01	d ₃ m 5	d ₂ 0 -0,15	T +0,2 +0,1	r +0,1 0	l ₂ +0,5 0	l ₁ +0,5 +0,2	71	80	90	100
0,8 - 1,9	3	5	3	0,2	10		27,62	30,35		
2,0 - 2,9	3	5	3	0,2	10		27,62	30,35		
1,0 - 1,9	4	6	3	0,2	10		28,14	31,01		
2,0 - 2,9	4	6	3	0,2	10		24,88	27,39		
3,0 - 3,9	4	6	3	0,2	10		24,88	27,39		
1,2 - 1,9	5	8	5	0,3	10		28,75	31,59		
2,0 - 2,9	5	8	5	0,3	10		28,75	31,59		
3,0 - 3,9	5	8	5	0,3	10		24,24	26,67		
4,0 - 4,9	5	8	5	0,3	10		24,24	26,67		
1,6 - 2,9	6	9	5	0,3	10		30,06	33,08	37,55	42,09
3,0 - 3,9	6	9	5	0,3	10		30,06	33,08	37,55	42,09
4,0 - 4,9	6	9	5	0,3	10		25,35	27,91	31,65	35,51
5,0 - 5,9	6	9	5	0,3	10		25,35	27,91	31,65	35,51

PRICES PER PIECE IN EURO - VALID FROM MIN. 10 UNITS PER DIMENSION!

CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type B



Item no.

2133.
l2 = 13 mm

Hardness

Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material

HSS

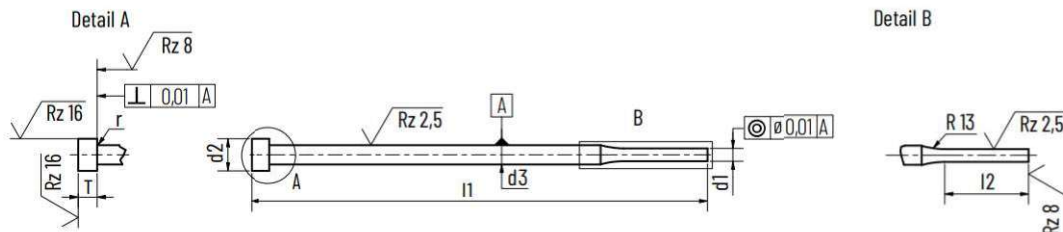
Other materials available on request, see material table.

d ₁ ± 0,01	d ₃ m 5	d ₂ 0 -0,15	T +0,2 +0,1	r +0,1 0	l ₂ +0,5 0	l ₁ +0,5 +0,2	71	80	90	100
2,5 - 3,9	8	11	5	0,3	13		37,40	41,11	46,68	52,33
4,0 - 4,9	8	11	5	0,3	13		37,40	41,11	46,68	52,33
5,0 - 5,9	8	11	5	0,3	13		33,12	36,45	41,41	46,39
6,0 - 6,9	8	11	5	0,3	13		33,12	36,45	41,41	46,39
7,0 - 7,9	8	11	5	0,3	13		28,59	31,50	35,80	40,13

PRICES PER PIECE IN EURO - VALID FROM MIN. 10 UNITS PER DIMENSION!

CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type B



Item no.
2143.
l2 = 17 mm

Hardness
Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material
HSS

Other materials available on request, see material table.

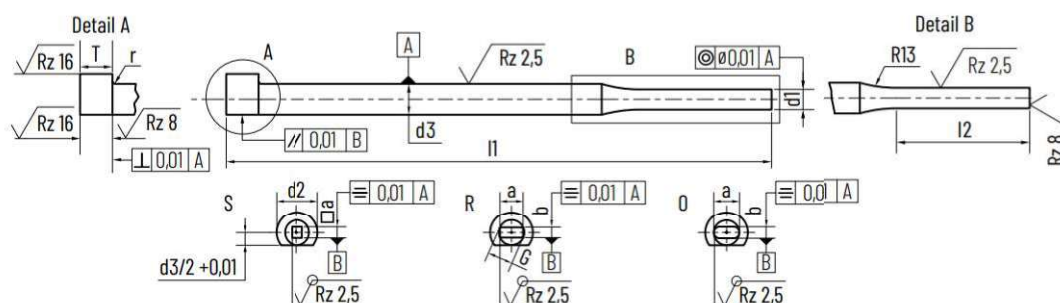
d ₁ ± 0,01	d ₃ m 5	d ₂ 0 -0,15	T +0,2 +0,1	r +0,1 0	l ₂ +0,5 0	l ₁ +0,5 +0,2	71	80	90	100
4,0 - 4,9	10	13	5	0,3	17		43,50	47,85	54,33	64,14
5,0 - 5,9	10	13	5	0,3	17		43,50	47,85	54,33	64,14
6,0 - 6,9	10	13	5	0,3	17		39,45	43,37	49,26	55,21
7,0 - 7,9	10	13	5	0,3	17		39,45	43,37	49,26	55,21
8,0 - 8,9	10	13	5	0,3	17		35,36	38,87	44,18	49,54
9,0 - 9,9	10	13	5	0,3	17		35,36	38,87	44,18	49,54
5,0 - 5,9	13	16	5	0,4	17		53,69	59,10	67,09	75,19
6,0 - 6,9	13	16	5	0,4	17		53,69	59,10	67,09	75,19
7,0 - 7,9	13	16	5	0,4	17		50,14	55,16	62,64	70,20
8,0 - 8,9	13	16	5	0,4	17		50,14	55,16	62,64	70,20
9,0 - 9,9	13	16	5	0,4	17		46,56	51,21	58,19	65,15
10,0 - 10,9	13	16	5	0,4	17		46,56	51,21	58,19	65,15
11,0 - 11,9	13	16	5	0,4	17		42,98	47,27	53,68	60,16
12,0 - 12,9	13	16	5	0,4	17		42,98	47,27	53,68	60,16
8,0 - 8,9	16	19	5	0,4	17		67,40	74,20	84,25	94,39
10,0 - 10,9	16	19	5	0,4	17		62,91	69,21	78,63	88,12
11,0 - 11,9	16	19	5	0,4	17		62,91	69,21	78,63	88,12
12,0 - 12,9	16	19	5	0,4	17		58,41	64,29	73,03	81,83
13,0 - 13,9	16	19	5	0,4	17		58,41	64,29	73,03	81,83
14,0 - 14,9	16	19	5	0,4	17		53,95	59,31	67,39	75,53
15,0 - 15,9	16	19	5	0,4	17		53,95	59,31	67,39	75,53
12,0 - 13,0	20	23	5	0,4	17			102,91	116,89	131,00
13,5 - 14,5	20	23	5	0,4	17			102,91	116,89	131,00
15,0 - 16,0	20	23	5	0,4	17			91,27	103,68	116,16

d ₁ ± 0,01	d ₃ m 5	d ₂ 0 -0,15	T +0,2 +0,1	r +0,1 0	l ₂ +0,5 0	l ₁ +0,5 +0,2	71	80	90	100
16,5 - 17,5	20	23	5	0,4	17			91,27	103,68	116,16
18,0 - 19,5	20	23	5	0,4	17			78,89	89,63	100,43
19,5 - 21,5	25	28	5	0,4	17			119,57	135,83	152,20
22,0 - 23,0	25	28	5	0,4	17			119,57	135,83	152,20

PRICES PER PIECE IN EURO - VALID FROM MIN. 10 UNITS PER DIMENSION!

CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type C



Item

Custom made components

Version

Type CS: square stepped cutting shaft

Type CR: rectangular stepped cutting shaft

Type CO: oblong stepped cutting shaft

Material

HWS, HSS, PM 23

Other materials available on request, see material table.

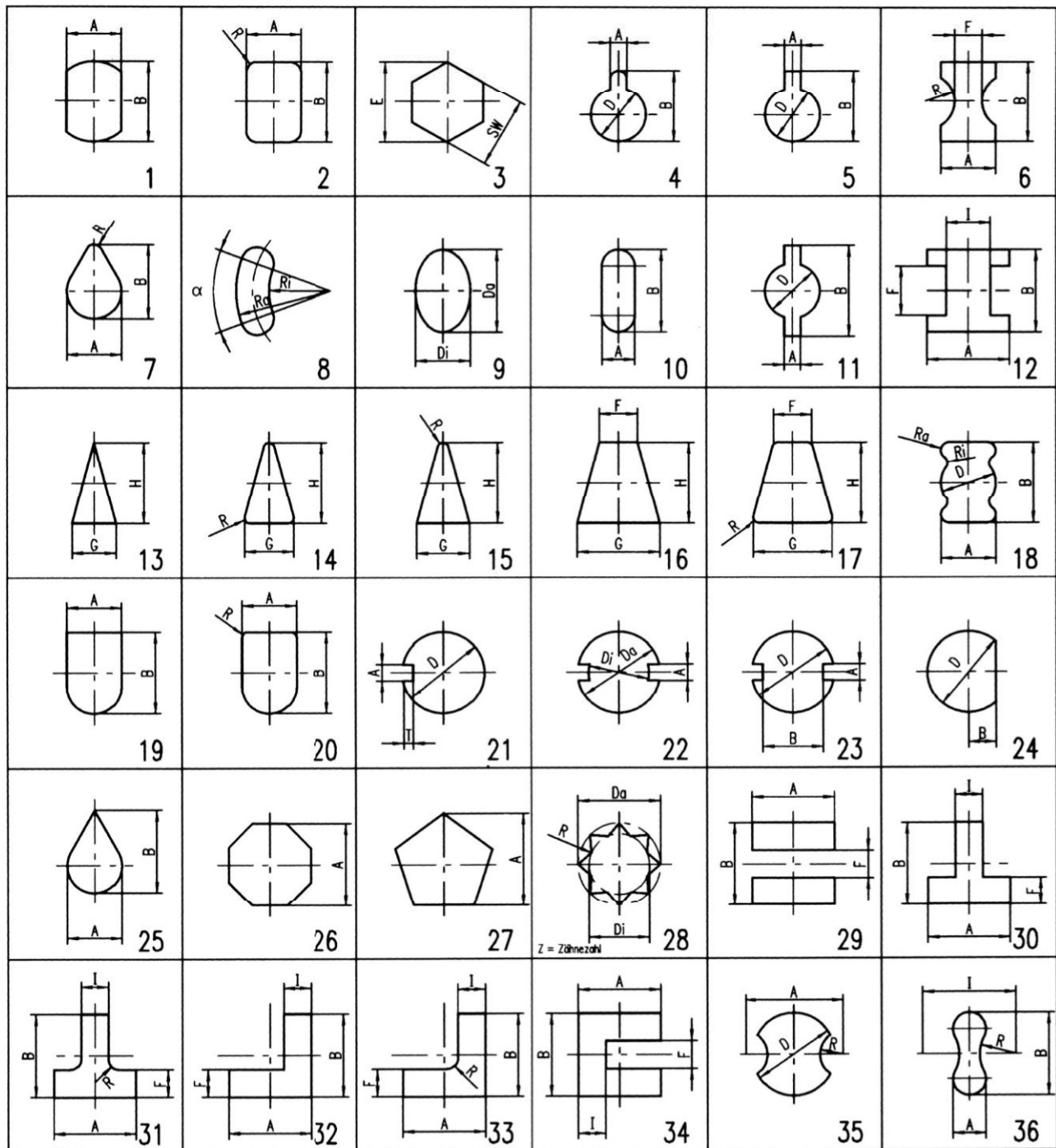
a	b	d ₂	d ₃	T	r	l ₂	l ₁				
± 0,01	± 0,01	0 -0,15	m5	+ 0,2 + 0,1	+ 0,1 0	+ 0,5 0	+ 0,5 + 0,2				
								71	80	90	100
		6	4	3	0,2						
		8	5	5	0,3						
		9	6	5	0,3	Preferred					
		11	8	5	0,3	sizes =					
		13	10	5	0,3	10, 13, 17					
		16	13	5	0,4	Other					
		19	16	5	0,4	lengths					
		23	20	5	0,4	possible					
		28	25	5	0,4						

Cutting punches are not stocked, but can be produced at short notice. The anti-twist lock is always at the longest form side. On request, we can manufacture the anti-twist lock at the short form side. **PRICES UPON REQUEST**

TYPE VARIATIONS

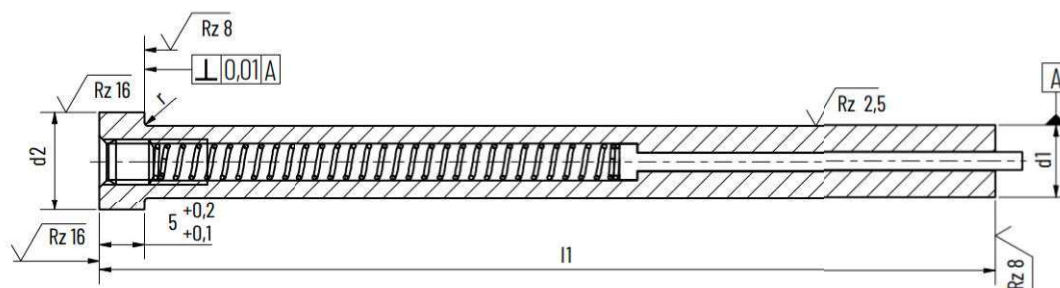
Punches and dies

We can supply these tools according to your requirements from a range of materials: HWS, HSS and powder metallurgic steels. Also coated if requested.



CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type E



Item no.

2356.
without cross hole
with spring loaded pin

Hardness

Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material

PM10

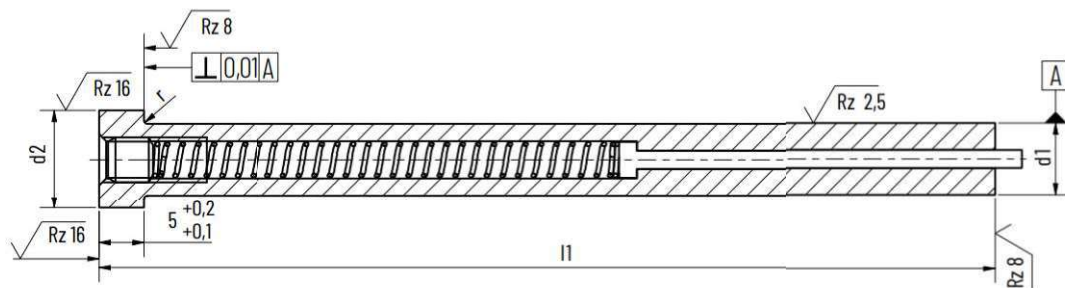
Other materials available on request, see material table.

d ₁ m 5	d ₂ 0 -0,15	r +0,1 0	l ₁ +0,5 +0,2	63	71	80	90	100
6	9	0,3		73,85	73,85	73,85	92,55	103,41
8	11	0,3		79,00	79,00	79,00	98,77	110,66
10	13	0,3			87,34	87,34	109,21	122,31
13	16	0,4			93,61	93,61	117,03	131,04
16	19	0,4		131,04	131,04	131,04	163,82	183,45
20	23	0,4		203,80	203,80	203,80	254,83	285,40

The delivery takes place, depending on availability, with cross hole. **PRICES PER PIECE IN EURO**

CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type E



Item no.

2353.
without cross hole
with spring loaded pin

Hardness

Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material

HSS

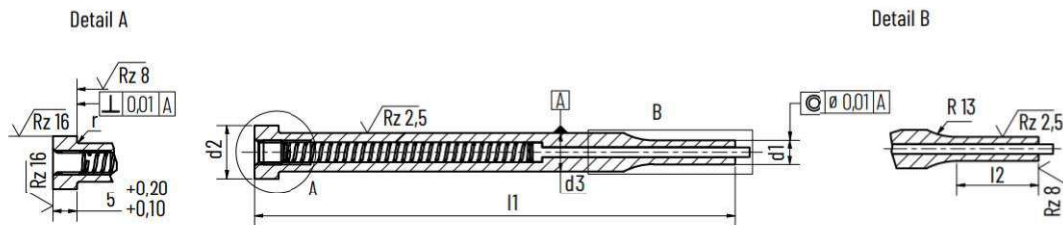
Other materials available on request, see material table.

d_1 m 5	d_2 0 -0,15	r +0,1 0	l_1 +0,5 +0,2	63	71	80	90	100	120
4	6	0,3						90,18	
5	8	0,3		52,73	52,73	58,01	65,89	75,13	
6	9	0,3		52,73	52,73	58,01	65,89	75,13	90,18
7	10	0,3			65,97			88,37	
8	11	0,3		52,73	52,73	58,01	65,89	75,13	90,18
10	13	0,3		54,29	54,29	59,71	67,79	77,34	92,83
11	14	0,4			74,70			97,76	
13	16	0,4		58,57	58,57	64,42	73,15	83,39	100,07
16	19	0,4		65,70	65,70	72,28	82,12	93,64	110,31
20	23	0,4		99,18	99,18	106,86	121,37	138,37	
25	28	0,4		111,53	111,53	122,54	139,20	158,73	

The delivery takes place, depending on availability, with cross hole. **PRICES PER PIECE IN EURO**

CUTTING PUNCH WITH CYLINDRICAL HEAD

DIN ISO 8020, type F



Item no.

217x. = length $l_2=10$ mm
218x. = length $l_2=13$ mm
219x. = length $l_2=17$ mm

The 4th digit of the item no.
indicates the material:
xxx3.=HSS/xxx6.=CPM 10 V

Version

without cross hole
with spring loaded pin

Hardened, tempered, shaft fine
grinded, completely assembled.

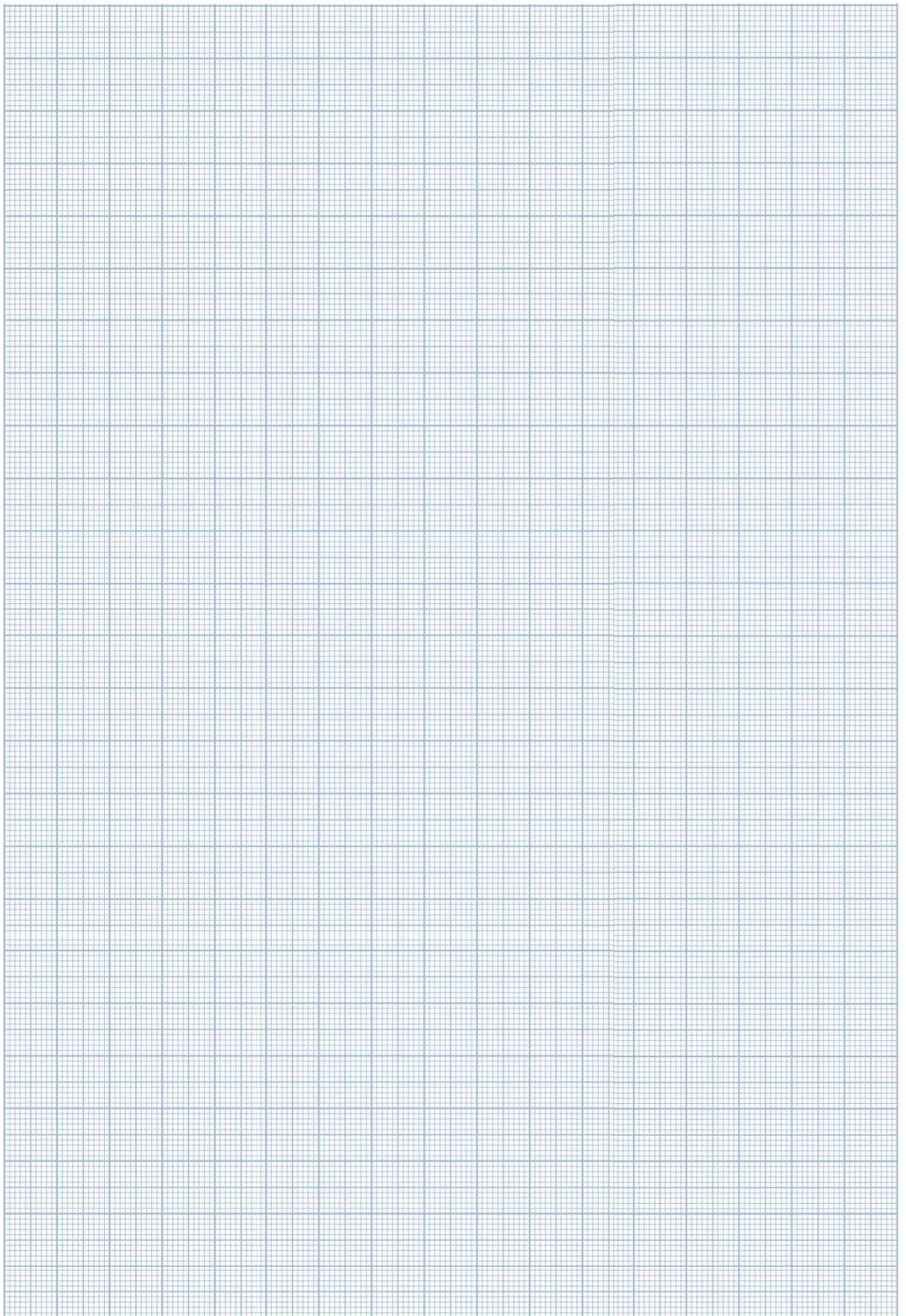
Material

HSS, PM 10

Other materials available on
request, see material table.

d_1	Gradation	d_2	d_3	r	l_2	l_1			
j6	d_1	0 -0,15	m5	+0,1 0	+0,5 0	71	80	90	100
1,6 - 5,9	0,1	9	6	0,3	10				
2,5 - 7,9	0,1	11	8	0,3	13				
4,0 - 9,9	0,1	13	10	0,3	17				
5,0 - 12,9	0,1	16	13	0,4	17				
8,0 - 15,9	0,1	19	16	0,4	17				
12,0 - 19,5	0,5	23	20	0,4	17				
16,5 - 24,5	0,5	28	25	0,4	17				

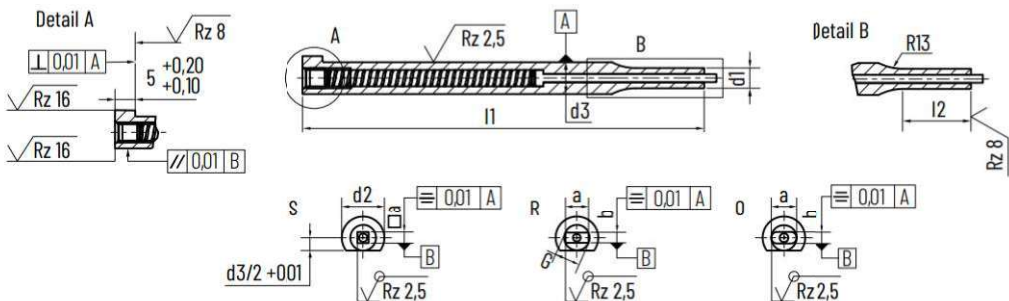
Cutting punches are not stocked, but can be produced at short notice. The delivery takes place, depending on availability, with cross hole.
PRICES UPON REQUEST



CUTTING PUNCH

WITH CYLINDRICAL HEAD

DIN ISO 8020, type G



Item

Custom made components

Version

- Type GS: square stepped cutting shaft with spring loaded pin
- Type GR: rectangular stepped cutting shaft with spring loaded pin
- Type GO: oblong stepped cutting shaft with spring loaded pin

Material

HSS, PM 10

Other materials available on request, see material table.

a	b	d ₂	d ₃	r	l ₂	l ₁	
± 0,01	± 0,01	0 -0,15	m5	+0,1 0	+ 0,5 0	+ 0,5 + 0,2	
						71	80 90
		9	6	0,3			
		11	8	0,3	Preferred		
		13	10	0,3	sizes =		
		16	13	0,4	10, 13, 17		
		19	16	0,4	Other lengths		
		23	20	0,4	possible		
		28	25	0,4			

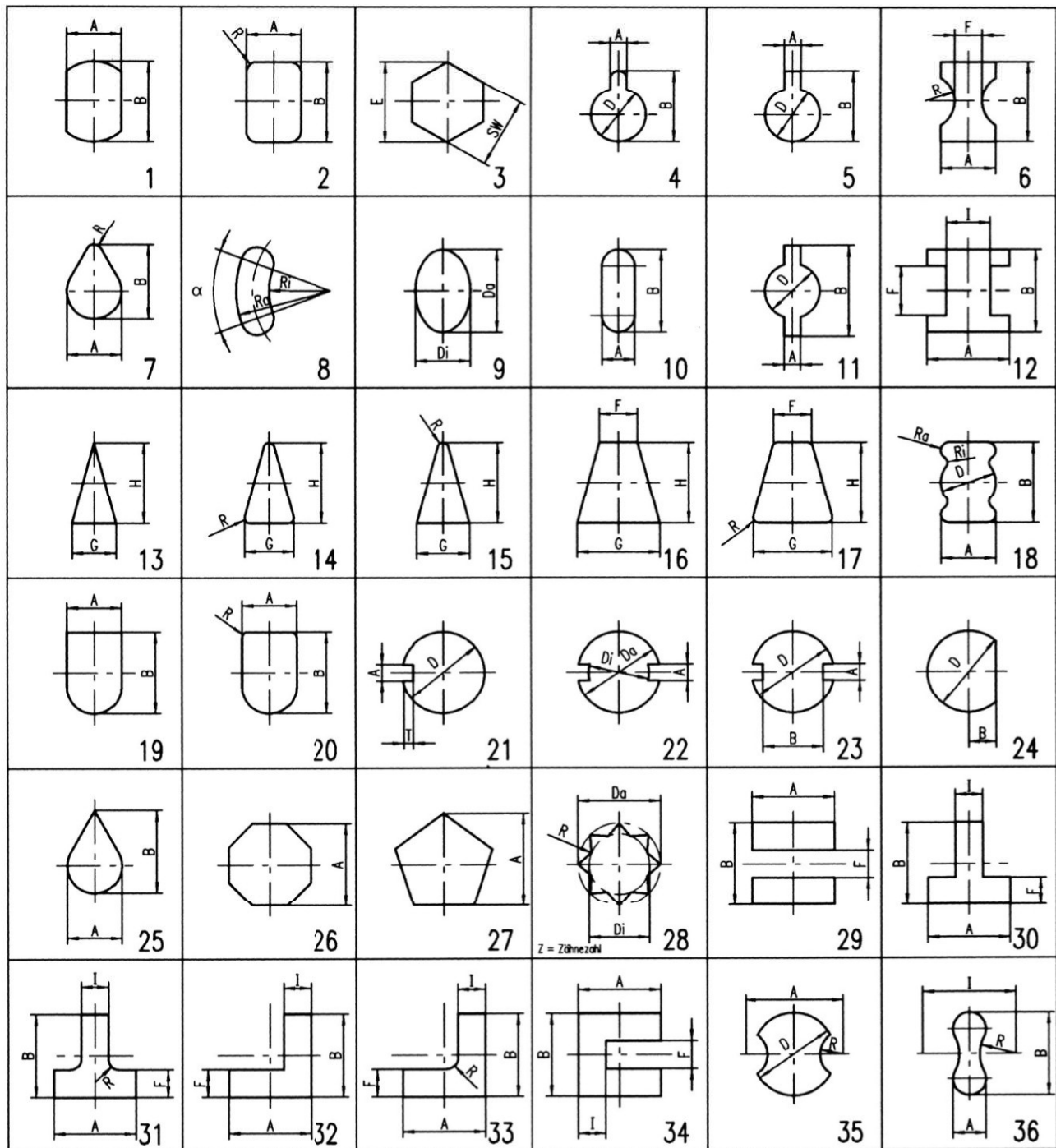
Cutting punches are not stocked, but can be produced at short notice. The anti-twist lock is always at the longest form side. On request, we can manufacture the anti-twist lock at the short form side. The delivery takes place, depending on availability, with cross hole.

PRICES UPON REQUEST

TYPE VARIATIONS

Punches and dies

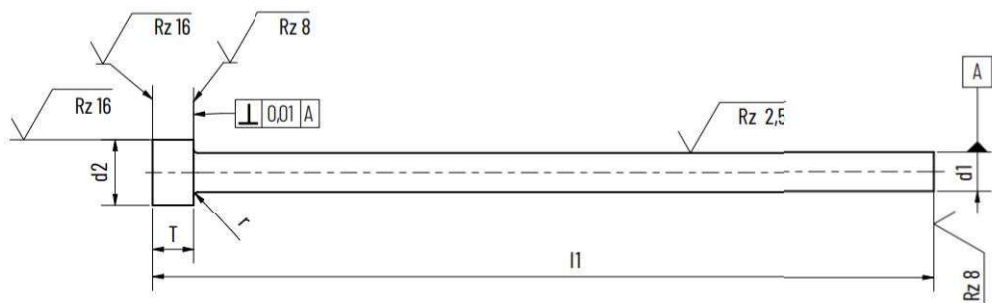
We can supply these tools according to your requirements from a range of materials: HWS, HSS and powder metallurgic steels. Also coated if requested.



CUTTING PUNCH

WITH CYLINDRICAL HEAD

type EA



Item no.
2512.

Hardness
Shaft: HRC 60 ± 2
Head: HRC 45 ± 5

Material
HWS

Other materials available on request, see material table.

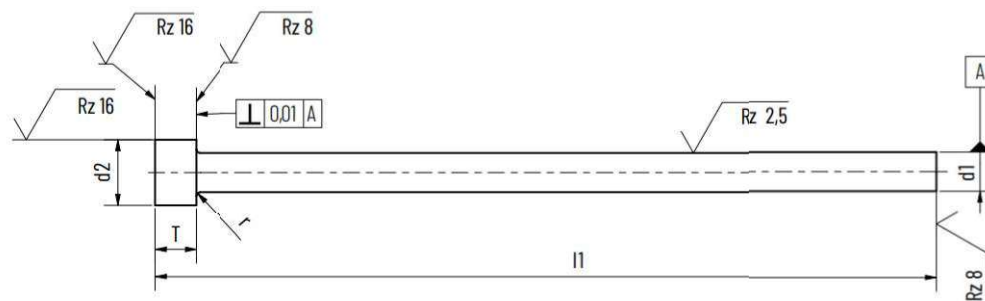
d_1	d_2	T	r	l_1	63	71	80	90	100
h_6	0	0	+0,2	+0,5					
	-0,15	-0,1	0	0					
10	13	4,2	0,3		18,53				
13	16	4,2	0,3		23,23		25,61		34,99
16	19	4,2	0,3			28,69	31,59	36,35	42,09
20	23	4,2	0,3				57,71		

Product expires. **PRICES PER PIECE IN EURO**

CUTTING PUNCH

WITH CYLINDRICAL HEAD

type EA



Item no.
2513.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 52 ± 5

Material
HSS

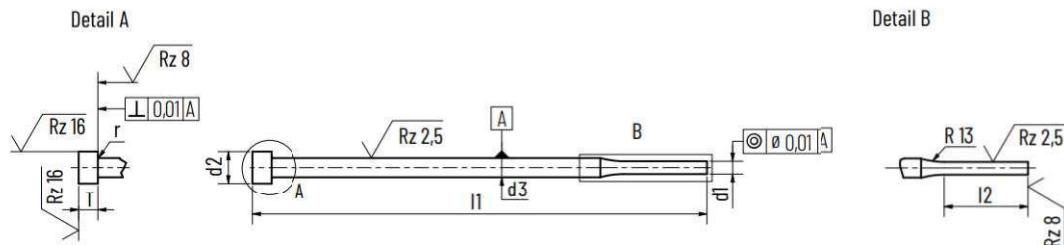
Other materials available on request, see material table.

d ₁ h ₆	d ₂ 0 -0,15	T 0 -0,1	r +0,2 0	l ₁ +0,5 0	63	71	80	100
3	5	3,15	0,3		13,83	13,83		20,27
4	6,5	3,15	0,3		14,39	14,39	16,04	21,09
5	8	3,15	0,3		14,25	14,25	15,91	20,98
6	9	3,15	0,3			15,28		22,59
8	11	4,2	0,3			18,84	21,29	28,57
10	13	4,2	0,3			21,58	23,35	
13	16	4,2	0,3		28,06			

PRICES PER PIECE IN EURO

CUTTING PUNCH WITH CYLINDRICAL HEAD

type EB



Item no.

252x. = length l2= 7 mm
253x. = length l2=13 mm
254x. = length l2=17 mm

The 4th digit of the item no.
indicates the material:
xxx2.=HWS/xxx3.=HSS

Version

Hardened, tempered, shaft fine
grinded, head hot forged and
annealed.

Material

HSS, HWS*

Other materials available on
request, see material table.

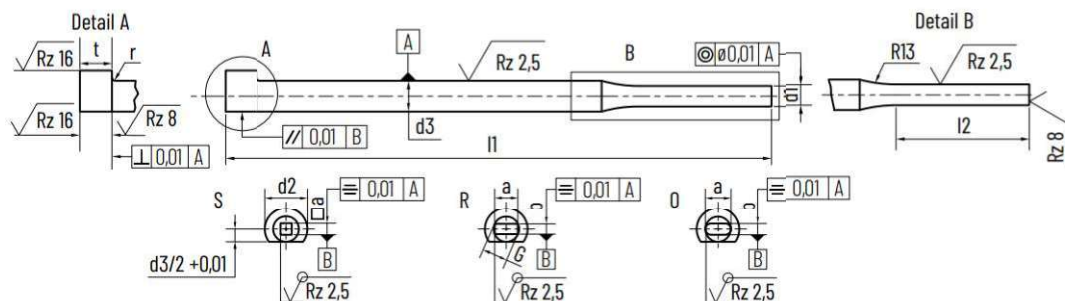
d ₁	Gradation	d ₂	d ₃	T	r	l ₂	l ₁
h6	d ₁	0 -0,15	h6	0 -0,1	+0,2 0	+0,5 0	+0,5 0
							71 80 90 100
1,0 - 2,2	0,1	5	3	3,15	0,3	7	
2,0 - 3,9	0,1	6,5	4	3,15	0,3		
2,5 - 4,9	0,1	8	5	3,15	0,3	Choice	
3,0 - 5,9	0,1	9	6	3,15	0,3	of 7 or 17	
4,0 - 7,9	0,1	11	8	4,2	0,3	17	
5,0 - 9,9	0,1	13	10	4,2	0,3	17	
5,0 - 12,9	0,1	16	13	4,2	0,3	17	
7,5 - 15,9	0,1	19	16	4,2	0,3	17	

Cutting punches are not stocked, but can be produced at short notice.

*Only in a limited range of dimensions available in HWS from stock. **PRICES UPON REQUEST**

CUTTING PUNCH WITH CYLINDRICAL HEAD

with stepped shaft, square, rectangular and oblong, type EC



Item

Custom made components

Version

Type ECS: square stepped cutting shaft
Type ECR: rectangular stepped cutting shaft
Type ECO: oblong stepped cutting shaft

Material

HSS, HWS*
Other materials available on request, see material table.

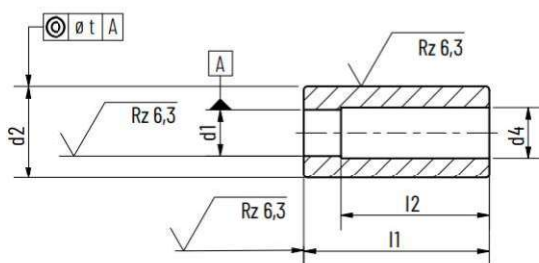
a	b	d ₂	d ₃	t	r	l ₂	l ₁
k8	k8	0 -0,15	h6	0 -0,1	+0,2 0	+0,5 0	+0,5 0
						71	80 90
		9	6	3,15	0,3	Preferred	
At the option		11	8	4,2	0,3	sizes = 13	
of the orderer		13	10	4,2	0,3	Other lengths	
G= max d3		16	13	4,2	0,3	possible	

Cutting punches are not stocked, but can be produced at short notice. The anti-twist lock is always at the longest form side.
On request, we can manufacture the anti-twist lock at the short form side.

*Only in a limited range of dimension available in HWS from stock. **PRICES UPON REQUEST**

DIE BUSH OF MATERIAL HSS

DIN 9845, type A without collar



Item no.
5113.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, inside
and outside grinded in tolerance,
with insertion chamfer.

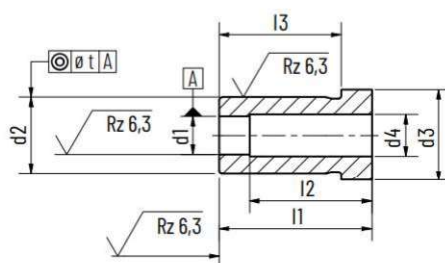
Items under revision – Prices and stock availability are subject to change.

d ₁ H8	d ₂ n6	d ₄	l ₁ +0,5 0	l ₂	t	
1	5	d1 + 0,3	20	18	0,01	20,54
1.1/1.2/1.3/1.4/1.5/1.6/1.7/1.8/1.9/2	6	d1 + 0,3	20	17	0,01	14,02
1.1/1.2/1.3/1.4/1.5/1.6/1.7/1.8/1.9/2	6	d1 + 0,3	28	25	0,01	18,16
2.1/2.2/2.3/2.4/2.5/2.6/2.7/2.8/2.9/3	7	d1 + 0,5	20	17	0,01	11,71
2.1/2.2/2.3/2.4/2.5/2.6/2.7/2.8/2.9/3	7	d1 + 0,5	28	25	0,01	14,66
3.1/3.2/3.3/3.4/3.5/3.6/3.7/3.8/3.9/4	8	d1 + 0,5	20	17	0,01	11,71
3.1/3.2/3.3/3.4/3.5/3.6/3.7/3.8/3.9/4	8	d1 + 0,5	28	25	0,01	14,66
4.1/4.2/4.3/4.4/4.5/4.6/4.7/4.8/4.9/5	10	d1 + 0,7	20	16	0,01	11,71
4.1/4.2/4.3/4.4/4.5/4.6/4.7/4.8/4.9/5	10	d1 + 0,7	28	24	0,01	14,66
5.1/5.2/5.3/5.4/5.5/5.6/5.7/5.8/5.9/6	12	d1 + 0,7	20	16	0,02	11,71
5.1/5.2/5.3/5.4/5.5/5.6/5.7/5.8/5.9/6	12	d1 + 0,7	28	24	0,02	14,66
6.1/6.2/6.3/6.4/6.5/6.6/6.7/6.8/6.9/7/7.1/7.2/7.3/7.4/7.5/7.6/7.7/7.8/7.9/8	15	d1 + 0,7	20	16	0,02	12,60
6.1/6.2/6.3/6.4/6.5/6.6/6.7/6.8/6.9/7/7.1/7.2/7.3/7.4/7.5/7.6/7.7/7.8/7.9/8	15	d1 + 0,7	28	24	0,02	15,80
8.1/8.2/8.3/8.4/8.5/8.6/8.7/8.8/8.9/9/9.1/9.2/9.3/9.4/9.5/9.6/9.7/9.8/9.9/10	18	d1 + 1,0	20	16	0,02	14,02
8.1/8.2/8.3/8.4/8.5/8.6/8.7/8.8/8.9/9/9.1/9.2/9.3/9.4/9.5/9.6/9.7/9.8/9.9/10	18	d1 + 1,0	28	24	0,02	16,74
10.1/10.2/10.3/10.4/10.5/10.6/10.7/10.8/10.9/11/11.1/11.2/11.3/11.4/11.5/11.6/11.7/11.8/11.9/12	22	d1 + 1,0	20	15	0,02	14,39
10.1/10.2/10.3/10.4/10.5/10.6/10.7/10.8/10.9/11/11.1/11.2/11.3/11.4/11.5/11.6/11.7/11.8/11.9/12	22	d1 + 1,0	28	23	0,02	17,64
12.1/12.2/12.3/12.4/12.5/12.6/12.7/12.8/12.9/13/13.2/13.3/13.5/13.6/13.7/13.8/14/14.1/14.3/14.4/14.5/14.6/14.7/14.8/14.9/15	26	d1 + 1,0	20	15	0,02	19,09
12.1/12.2/12.3/12.4/12.5/12.6/12.7/12.8/12.9/13/13.2/13.3/13.4/13.5/13.6/13.7/13.8/14/14.2/14.5/14.7/14.9/15	26	d1 + 1,0	28	23	0,02	23,11
15.5/16/16.5/17/17.5/18	30	d1 + 1,0	28	23	0,02	28,69

Consider cutting clearance for the assignment of cutting punches and die bushes! **PRICES PER PIECE IN EURO**

DIE BUSH OF MATERIAL HSS

DIN 9845, type B with collar



Item no.
5123.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, inside
and outside grinded in tolerance,
with insertion chamfer.

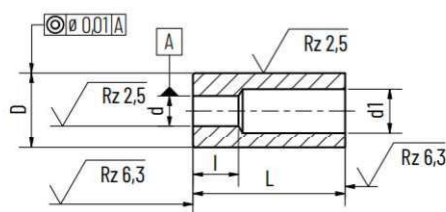
Items under revision – Prices and stock availability are subject to change.

d ₁ H8	d ₂ k6	d ₃	d ₄	l ₁ +0,5 0	l ₂	l ₃	t	
1	5	7	d1 + 0,3	20	18	16	0,01	24,79
1.1/1.2/1.3/1.4/1.5/1.6/1.7/1.9/2	6	8	d1 + 0,3	20	17	16	0,01	16,53
1.1/1.2/1.3/1.4/1.5/1.6/1.7/1.8/1.9/2	6	8	d1 + 0,3	28	25	24	0,01	21,88
2.1/2.2/2.3/2.5/2.6/2.7/2.8/2.9/3	7	9	d1 + 0,5	20	17	16	0,01	14,06
2.1/2.2/2.3/2.4/2.5/2.6/2.7/2.8/2.9/3	7	9	d1 + 0,5	28	25	24	0,01	17,71
3.1/3.2/3.3/3.4/3.5/3.6/3.7/3.8/3.9/4	8	10	d1 + 0,5	20	17	16	0,01	14,06
3.1/3.2/3.3/3.4/3.5/3.6/3.7/3.8/3.9/4	8	10	d1 + 0,5	28	25	24	0,01	17,71
4.1/4.2/4.3/4.4/4.5/4.6/4.7/4.8/4.9/5	10	12	d1 + 0,7	20	16	16	0,01	14,06
4.1/4.2/4.3/4.4/4.5/4.6/4.7/4.8/4.9/5	10	12	d1 + 0,7	28	24	24	0,01	17,71
5.1/5.2/5.3/5.4/5.5/5.6/5.7/5.8/5.9/6	12	14	d1 + 0,7	20	16	16	0,02	14,06
5.1/5.2/5.3/5.4/5.5/5.6/5.7/5.8/5.9/6	12	14	d1 + 0,7	28	24	24	0,02	17,71
6.1/6.2/6.3/6.4/6.5/6.6/6.7/6.8/6.9/7/7.1/7.2/7.3/7.4/7.5/7.6/7.7/7.8/7.9/8	15	17	d1 + 0,7	20	16	16	0,02	15,25
6.1/6.2/6.3/6.4/6.5/6.6/6.7/6.8/6.9/7/7.1/7.2/7.3/7.4/7.5/7.6/7.7/7.8/7.9/8	15	17	d1 + 0,7	28	24	24	0,02	19,10
8.1/8.2/8.3/8.4/8.5/8.6/8.7/8.8/8.9/9/9.1/9.2/9.3/9.4/9.5/9.7/9.8/10	18	20	d1 + 1,0	20	16	16	0,02	16,85
8.1/8.2/8.3/8.4/8.5/8.6/8.7/8.8/8.9/9/9.1/9.2/9.3/9.4/9.5/9.6/9.7/9.8/9.9/10	18	20	d1 + 1,0	28	24	24	0,02	20,24
10.1/10.2/10.3/10.4/10.5/10.6/10.7/10.8/11/11.2/11.4/11.5/11.9/12	22	24	d1 + 1,0	20	15	16	0,02	17,35
10.1/10.2/10.3/10.4/10.5/10.6/10.7/10.8/10.9/11/11.1/11.2/11.3/11.4/11.5/11.6/11.7/11.8/11.9/12	22	24	d1 + 1,0	28	23	24	0,02	21,37
12.1/12.2/12.4/12.5/13/13.2/13.3/13.5/13.6/13.7/14/14.2/14.3/14.5/14.6/14.9/15	26	28	d1 + 1,0	20	15	16	0,02	23,15
12.1/12.2/12.3/12.4/12.5/12.6/12.7/12.8/12.9/13/13.1/13.2/13.3/13.4/13.5/13.6/13.8/13.9/14	26	28	d1 + 1,0	28	23	24	0,02	27,99
14/14.1/14.2/14.3/14.4/14.5/14.6/14.7/14.8/14.9/15								
15.5/16/16.5/17/17.5/18	30	32	d1 + 1,0	28	23	24	0,02	35,27

Consider cutting clearance for the assignment of cutting punches and die bushes! **PRICES PER PIECE IN EURO**

DIE BUSH OF MATERIAL HSS

ISO 8977, type A without collar



Item no.
5213.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, inside
and outside grinded in tolerance,
with insertion chamfer.

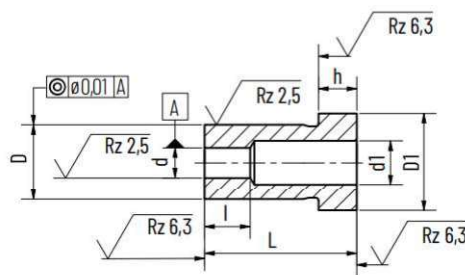
Items under revision – Prices and stock availability are subject to change.

d +0,02	D n 5	d _i max.	I min.	L +0,5 0	16	20	25	32	d +0,02	D n 5	d _i max.	I min.	L +0,5 0	16	20	25	32
1	5	2,8	2		23,44	25,69	28,90		2	8	4	4		21,90	23,72	25,60	28,62
1.1	5	2,8	2			25,69			2.1	8	4	4		21,90	23,72	25,60	28,62
1.2	5	2,8	2		23,44	25,69	28,90		2.2	8	4	4		21,90	23,72	25,60	28,62
1.3	5	2,8	2			25,69			2.3	8	4	4		21,90	23,72	25,60	28,62
1.4	5	2,8	2		23,44	25,69			2.4	8	4	4			23,72	25,60	28,62
1.5	5	2,8	2			25,69	28,90		2.5	8	4	4		21,90	23,72	25,60	28,62
1.6	5	2,8	2		23,44	25,69			2.6	8	4	4		21,90	23,72	25,60	28,62
1.7	5	2,8	2			25,69	28,90		2.7	8	4	4			23,72	25,60	28,62
1.8	5	2,8	2		23,44	25,69	28,90		2.8	8	4	4			23,72	25,60	28,62
1.9	5	2,8	2			25,69			2.9	8	4	4			23,72	25,60	28,62
2	5	2,8	2		23,44	25,69	28,90		3	8	4	4		21,90	23,72	25,60	28,62
2.1	5	2,8	2		23,44	25,69	28,90		3.1	8	4	4		21,90	23,72	25,60	28,62
2.2	5	2,8	2		23,44	25,69	28,90		3.2	8	4	4		21,90	23,72	25,60	28,62
2.3	5	2,8	2		23,44	25,69			3.3	8	4	4			23,72	25,60	28,62
2.4	5	2,8	2		23,44	25,69	28,90		3.4	8	4	4		21,90	23,72	25,60	28,62
1.6	6	3,5	3		23,07	25,13	27,71		3.5	8	4	4		21,90	23,72	25,60	28,62
1.7	6	3,5	3			25,13	27,71		3	10	5,8	4		21,83	23,35	25,11	28,20
1.8	6	3,5	3		23,07	25,13	27,71		3.1	10	5,8	4			23,35	25,11	28,20
1.9	6	3,5	3			25,13	27,71		3.2	10	5,8	4		21,83	23,35	25,11	28,20
2	6	3,5	3		23,07	25,13	27,71		3.3	10	5,8	4		21,83	23,35	25,11	28,20
2.1	6	3,5	3		23,07	25,13	27,71		3.4	10	5,8	4		21,83	23,35	25,11	28,20
2.2	6	3,5	3			25,13	27,71		3.5	10	5,8	4		21,83	23,35	25,11	28,20
2.3	6	3,5	3		23,07	25,13	27,71		3.6	10	5,8	4		21,83	23,35	25,11	28,20
2.4	6	3,5	3			25,13	27,71		3.7	10	5,8	4			23,35	25,11	28,20
2.5	6	3,5	3		23,07	25,13	27,71		3.8	10	5,8	4			23,35	25,11	28,20
2.6	6	3,5	3		23,07	25,13	27,71		3.9	10	5,8	4		21,83	23,35	25,11	28,20
2.7	6	3,5	3			25,13	27,71		4	10	5,8	4		21,83	23,35	25,11	28,20
2.8	6	3,5	3		23,07	25,13			4.1	10	5,8	4		21,83	23,35	25,11	28,20
2.9	6	3,5	3		23,07	25,13	27,71		4.2	10	5,8	4		21,83	23,35	25,11	28,20
3	6	3,5	3		23,07	25,13	27,71		4.3	10	5,8	4		21,83	23,35	25,11	28,20

d +0,02	D n 5	d _i max.	l min.	L +0,5 0	16	20	25	32	d +0,02	D n 5	d _i max.	l min.	L +0,5 0	16	20	25	32
4,4	10	5,8	4		21,83	23,35	25,11	28,20	10,3	20	12	8		26,03	28,94	33,18	
4,5	10	5,8	4		21,83	23,35	25,11	28,20	10,4	20	12	8		26,03	28,94	33,18	
4,6	10	5,8	4		21,83	23,35	25,11	28,20	10,5	20	12	8		26,03	28,94	33,18	
4,7	10	5,8	4		21,83	23,35	25,11	28,20	10,6	20	12	8		26,03	28,94	33,18	
4,8	10	5,8	4		21,83	23,35	25,11	28,20	10,7	20	12	8		26,03	28,94	33,18	
4,9	10	5,8	4			23,35	25,11	28,20	10,8	20	12	8		26,03	28,94	33,18	
5	10	5,8	4		21,83	23,35	25,11	28,20	10,9	20	12	8		26,03	28,94	33,18	
4	13	8	5			23,53	25,69	28,94	11	20	12	8		26,03	28,94	33,18	
4,1	13	8	5			23,53	25,69	28,94	11,1	20	12	8			28,94		
4,2	13	8	5			23,53	25,69	28,94	11,2	20	12	8		26,03	28,94		
4,3	13	8	5			23,53	25,69	28,94	11,3	20	12	8		26,03	28,94	33,18	
4,4	13	8	5			23,53	25,69	28,94	11	25	17,3	8		27,01	30,45	35,76	
4,5	13	8	5			23,53	25,69	28,94	11,1	25	17,3	8				35,76	
4,6	13	8	5			23,53	25,69	28,94	11,2	25	17,3	8		27,01			
4,7	13	8	5			23,53	25,69	28,94	11,3	25	17,3	8			30,45	35,76	
4,8	13	8	5			23,53	25,69	28,94	11,4	25	17,3	8		27,01			
4,9	13	8	5			23,53	25,69	28,94	11,5	25	17,3	8		27,01	30,45	35,76	
5	13	8	5			23,53	25,69	28,94	11,6	25	17,3	8		27,01	30,45	35,76	
5,1	13	8	5			23,53	25,69	28,94	11,8	25	17,3	8		27,01	30,45	35,76	
5,2	13	8	5			23,53	25,69	28,94	11,9	25	17,3	8				35,76	
5,3	13	8	5			23,53	25,69	28,94	12	25	17,3	8		27,01	30,45	35,76	
5,4	13	8	5			23,53	25,69	28,94	12,1	25	17,3	8		27,01	30,45	35,76	
5,5	13	8	5			23,53	25,69	28,94	12,2	25	17,3	8		27,01	30,45	35,76	
5,6	13	8	5			23,53	25,69	28,94	12,3	25	17,3	8		27,01	30,45	35,76	
5,7	13	8	5			23,53	25,69	28,94	12,4	25	17,3	8		27,01	30,45	35,76	
5,8	13	8	5			23,53	25,69	28,94	12,5	25	17,3	8		27,01	30,45	35,76	
5,9	13	8	5			23,53	25,69	28,94	12,6	25	17,3	8		27,01	30,45	35,76	
6	13	8	5			23,53	25,69	28,94	12,7	25	17,3	8			30,45	35,76	
6,1	13	8	5			23,53	25,69	28,94	12,8	25	17,3	8		27,01		35,76	
6,2	13	8	5			23,53	25,69	28,94	12,9	25	17,3	8		27,01			
6,3	13	8	5			23,53	25,69	28,94	13	25	17,3	8		27,01	30,45	35,76	
6,4	13	8	5			23,53	25,69	28,94	13,1	25	17,3	8		27,01	30,45	35,76	
6,5	13	8	5			23,53	25,69	28,94	13,2	25	17,3	8		27,01		35,76	
6,6	13	8	5			23,53	25,69	28,94	13,3	25	17,3	8		27,01	30,45		
6,7	13	8	5			23,53	25,69	28,94	13,4	25	17,3	8		27,01		35,76	
6,8	13	8	5			23,53	25,69	28,94	13,5	25	17,3	8		27,01	30,45	35,76	
6,9	13	8	5			23,53	25,69	28,94	13,6	25	17,3	8			30,45		
7	13	8	5			23,53	25,69	28,94	13,7	25	17,3	8				35,76	
7,1	13	8	5			23,53	25,69	28,94	13,8	25	17,3	8			30,45	35,76	
7,2	13	8	5			23,53	25,69	28,94	13,9	25	17,3	8			30,45		
6	16	9,5	5			24,27	26,93	30,55	14	25	17,3	8		27,01	30,45	35,76	
6,1	16	9,5	5			24,27	26,93	30,55	14,1	25	17,3	8			35,76		
6,2	16	9,5	5			24,27	26,93	30,55	14,2	25	17,3	8		27,01	30,45		
6,3	16	9,5	5			24,27	26,93	30,55	14,3	25	17,3	8				35,76	
6,4	16	9,5	5			24,27	26,93	30,55	14,4	25	17,3	8			30,45		
6,5	16	9,5	5			24,27	26,93	30,55	14,5	25	17,3	8		27,01	30,45	35,76	
6,6	16	9,5	5			24,27	26,93	30,55	14,6	25	17,3	8			30,45		
6,7	16	9,5	5			24,27	26,93	30,55	14,7	25	17,3	8			30,45		
6,8	16	9,5	5			24,27	26,93	30,55	14,8	25	17,3	8		27,01	30,45	35,76	
6,9	16	9,5	5			24,27	26,93	30,55	15	25	17,3	8		27,01	30,45	35,76	
7	16	9,5	5			24,27	26,93	30,55	15,2	25	17,3	8		27,01			
7,1	16	9,5	5			24,27	26,93	30,55	15,3	25	17,3	8				35,76	
7,2	16	9,5	5			24,27	26,93	30,55	15,4	25	17,3	8		27,01	30,45	35,76	
7,3	16	9,5	5			24,27	26,93	30,55	15,5	25	17,3	8		27,01	30,45	35,76	
7,4	16	9,5	5			24,27	26,93	30,55	15,6	25	17,3	8				35,76	
7,5	16	9,5	5			24,27	26,93	30,55	15,8	25	17,3	8			30,45		
7,6	16	9,5	5			24,27	26,93	30,55	15,9	25	17,3	8			30,45	35,76	
7,7	16	9,5	5			24,27	26,93	30,55	16	25	17,3	8		27,01	30,45	35,76	
7,8	16	9,5	5			24,27	26,93	30,55	16,1	25	17,3	8				35,76	
7,9	16	9,5	5			24,27	26,93	30,55	16,2	25	17,3	8		27,01			
8	16	9,5	5			24,27	26,93	30,55	16,3	25	17,3	8		27,01		35,76	
8,1	16	9,5	5			24,27	26,93	30,55	16,5	25	17,3	8		27,01	30,45	35,76	
8,2	16	9,5	5			24,27	26,93	30,55	16,6	25	17,3	8				35,76	
8,3	16	9,5	5			24,27	26,93	30,55	15	32	20,7	8			56,69		
8,4	16	9,5	5			24,27	26,93	30,55	15,5	32	20,7	8		51,61			
8,5	16	9,5	5			24,27	26,93	30,55	16	32	20,7	8		51,61	56,69	67,75	
8,6	16	9,5	5			24,27	26,93	30,55	16,5	32	20,7	8		51,61	56,69	67,75	
8,7	16	9,5	5			24,27	26,93		17	32	20,7	8		51,61		67,75	
8,8	16	9,5	5				30,55		17,5	32	20,7	8		51,61	56,69		
7,5	20	12	8		26,03	28,94	33,18		18	32	20,7	8		51,61		67,75	
7,6	20	12	8				33,18		18,5	32	20,7	8			56,69	67,75	
7,7	20	12	8				33,18		19	32	20,7	8			56,69	67,75	
7,8	20	12	8				28,94	33,18	20	32	20,7	8			56,69	67,75	
8	20	12	8		26,03	28,94	33,18		18	40	27,7	8		56,00	61,43	70,62	
8,1	20	12	8		26,03	28,94	33,18		19	40	27,7	8		56,00	61,43		
8,2	20	12	8		26,03	28,94	33,18		20	40	27,7	8		56,00	61,43	70,62	
8,3	20	12	8		26,03	28,94	33,18		20,5	40	27,7	8		56,00		70,62	
8,4	20	12	8		26,03	28,94	33,18		21	40	27,7	8		56,00		70,62	
8,5	20	12	8		26,03	28,94	33,18		22	40	27,7	8		56,00	61,43	70,62	
8,6	20	12	8		26,03	28,94	33,18		22,5	40	27,7	8			61,43		
8,7	20	12	8		26,03	28,94	33,18		23	40	27,7	8			61,43		
8,8	20	12	8		26,03	28,94	33,18		24	40	27,7	8		56,00		70,62	
8,9	20	12	8		26,03	28,94	33,18		24,5	40	27,7	8				70,62	
9	20	12	8		26,03	28,94	33,18		25	40	27,7	8		56,00	61,43	70,62	
9,1	20	12	8		26,03	28,94	33,18		26	40	27,7	8		56,00	61,43	70,62	
9,2	20	12	8		26,03	28,94	33,18		26,5	40	27,7	8			61,43		
9,3	20	12	8		26,03	28,94	33,18		27	40	27,7	8		56,00	61,43		
9,4	20	12	8		26,03	28,94	33,18		28	50	37	8				74,04	
9,5	20	12	8		26,03	28,94	33,18		28,5	50	37	8				74,04	
9,6	20	12	8		26,03	28,94	33,18		30	50	37	8			67,75	74,04	
9,7	20	12	8		26,03	28,94	33,18		30,5	50	37	8			67,75	74,04	
9,8	20	12	8														

DIE BUSH OF MATERIAL HSS

ISO 8977, type B with collar



Item no.
5223.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, inside
and outside grinded in tolerance,
with insertion chamfer.

Items under revision – Prices and stock availability are subject to change.

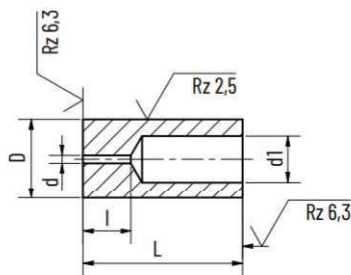
d +0,02	D m 5	D ₁ 0 -0,25	d ₁ max.	l min.	h +0,25 0	L +0,5 0	16	20	25	32	d +0,02	D m 5	D ₁ 0 -0,25	d ₁ max.	l min.	h +0,25 0	L +0,5 0	16	20	25	32
1	5	8	2,8	2	5		25,83	29,30	33,75		2,2	8	11	4	4	5		26,03	29,23	32,54	
1.1	5	8	2,8	2	5		25,83	29,30	33,75		2,3	8	11	4	4	5		26,03	29,23	32,54	
1.2	5	8	2,8	2	5		25,83	29,30	33,75		2,4	8	11	4	4	5		26,03	29,23	32,54	
1.3	5	8	2,8	2	5		25,83	29,30	33,75		2,5	8	11	4	4	5		24,18	26,03	29,23	32,54
1.5	5	8	2,8	2	5		25,83	29,30	33,75		2,6	8	11	4	4	5		24,18	26,03	29,23	32,54
1.6	5	8	2,8	2	5			29,30	33,75		2,7	8	11	4	4	5		26,03	29,23	32,54	
1.7	5	8	2,8	2	5				33,75		2,8	8	11	4	4	5		24,18	26,03	29,23	32,54
1.8	5	8	2,8	2	5			29,30	33,75		2,9	8	11	4	4	5		26,03	29,23		
1.9	5	8	2,8	2	5			29,30	33,75		3	8	11	4	4	5		24,18	26,03	29,23	32,54
2	5	8	2,8	2	5		25,83	29,30			3,1	8	11	4	4	5		24,18	26,03	29,23	32,54
2.1	5	8	2,8	2	5		25,83	29,30			3,2	8	11	4	4	5		26,03	29,23	32,54	
2.3	5	8	2,8	2	5			29,30	33,75		3,3	8	11	4	4	5		24,18	26,03	29,23	32,54
2.4	5	8	2,8	2	5		25,83	29,30	33,75		3,4	8	11	4	4	5		26,03	29,23	32,54	
1.6	6	9	3,5	3	5		25,25	28,49	32,54		3,5	8	11	4	4	5		24,18	26,03	29,23	32,54
1.7	6	9	3,5	3	5		25,25	28,49	32,54		3	10	13	5,8	4	5		23,90	25,93	28,90	31,89
1.8	6	9	3,5	3	5		25,25	28,49	32,54		3,1	10	13	5,8	4	5		25,93	28,90	31,89	
1.9	6	9	3,5	3	5				32,54		3,2	10	13	5,8	4	5		23,90	25,93	28,90	31,89
2	6	9	3,5	3	5			28,49	32,54		3,3	10	13	5,8	4	5		23,90	25,93	28,90	31,89
2.1	6	9	3,5	3	5		25,25	28,49	32,54		3,4	10	13	5,8	4	5		23,90	25,93	28,90	31,89
2.2	6	9	3,5	3	5			28,49	32,54		3,5	10	13	5,8	4	5		25,93	28,90	31,89	
2.3	6	9	3,5	3	5			28,49	32,54		3,6	10	13	5,8	4	5		25,93	28,90	31,89	
2.4	6	9	3,5	3	5				32,54		3,7	10	13	5,8	4	5		23,90	25,93	28,90	31,89
2.5	6	9	3,5	3	5			28,49	32,54		3,8	10	13	5,8	4	5		25,93	28,90	31,89	
2.6	6	9	3,5	3	5			28,49	32,54		3,9	10	13	5,8	4	5		25,93	28,90	31,89	
2.7	6	9	3,5	3	5			28,49	32,54		4	10	13	5,8	4	5		25,93	28,90	31,89	
2.8	6	9	3,5	3	5			28,49	32,54		4,1	10	13	5,8	4	5		25,93	28,90	31,89	
2.9	6	9	3,5	3	5			28,49	32,54		4,2	10	13	5,8	4	5		23,90	25,93	28,90	31,89
3	6	9	3,5	3	5		25,25	28,49	32,54		4,3	10	13	5,8	4	5		23,90	25,93	28,90	31,89
2	8	11	4	4	5		24,18	26,03	29,23	32,54	4,4	10	13	5,8	4	5		23,90	25,93	28,90	31,89
2.1	8	11	4	4	5			26,03	29,23	32,54	4,5	10	13	5,8	4	5		23,90	25,93	28,90	31,89

Consider cutting clearance for the assignment of cutting punches and die bushes! PRICES PER PIECE IN EURO

DIE BUSH

WITH STARTING HOLE OF MATERIAL HSS

ISO 8977, type C without collar



Item no.
5283.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, outside grinded in tolerance, with insertion chamfer.

d	D n 5	d ₁ max.	I min.	L +0,5 0	16	20	22	25	28	30	32	35
1	8	4	4		19,71	21,00	21,37	22,59	23,00	23,42	25,35	25,83
1	10	5,8	4		19,30	20,60	20,97	22,21	22,63	23,02	24,96	25,41
1,2	13	8	5			20,83	21,22	22,68	23,11	23,53	25,60	26,06
1,2	16	9,5	5			21,47	21,85	23,83	24,27	24,72	27,02	27,53
1,5	20	12	8			23,01	23,43	25,60	26,08	26,56	29,38	29,91
1,5	25	17,3	8			23,90	22,88	26,93	27,41	27,89	31,64	32,21
1,5	32	20,7	8			45,60	46,44	50,19	51,09	52,00	59,94	61,01
1,5	40	27,7	8			49,57	50,62	54,35	55,90	56,91	62,43	63,57
1,5	50	37	8			54,35	54,83	59,94	59,01	60,01	65,54	66,75

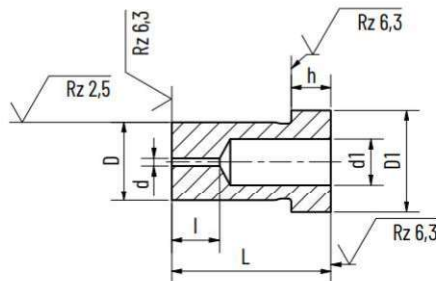
Attention: The diagonal profile should not be larger than max. d₁ on dies for square and rectangular shapes.

PRICES PER PIECE IN EURO

DIE BUSH

WITH STARTING HOLE OF MATERIAL HSS

ISO 8977, type D with collar



Item no.
5293.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, outside grinded in tolerance, with insertion chamfer.

d	D m 5	D ₁ 0 -0,25	d ₁ max.	l min.	h +0,25 0	L +0,5 0	16	20	22	25	28	30	32	35
1	8	11	4	4	5		21,45	23,01	23,43	25,91	26,35	26,87	28,86	29,35
1	10	13	5,8	4	5		21,17	22,98	23,38	25,60	26,03	26,50	28,21	28,70
1,2	13	16	8	5	5			23,25	23,64	25,93	26,38	26,85	29,43	29,94
1,2	16	19	9,5	5	5			24,96	25,40	27,97	28,44	28,94	31,97	32,54
1,5	20	23	12	8	5			26,70	27,20	30,07	30,59	31,12	35,11	35,72
1,5	25	28	17,3	8	5			27,97		31,47	32,03	32,62	38,01	38,69
1,5	32	35	20,7	8	5			48,52	49,38	55,72	56,71	57,72	68,29	69,49
1,5	40	43	27,7	8	5			53,65	54,37	60,74	61,72	62,72	70,79	72,04
1,5	50	53	37	8	5			73,23	66,16	73,45	71,45	72,69	73,93	75,25

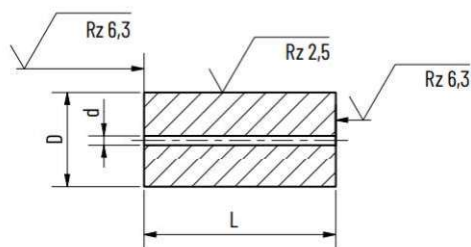
Attention: The diagonal profile should not be larger than max. d₁ on dies for square and rectangular shapes.

PRICES PER PIECE IN EURO

DIE BUSH

WITH THROUGH-GOING STARTING HOLE OF MATERIAL HSS

ISO 8977, type E without collar



Item no.
5263.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, outside grinded in tolerance, with insertion chamfer.

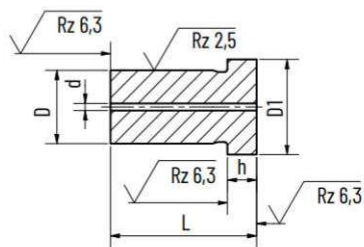
d	D n 5	L +0,5 0	20	22	25	28	30	32	35
1	8		23,10	23,53	24,86	25,31	25,75	27,89	28,39
1	10		22,65		24,43	24,88	25,33	27,49	27,98
1,2	13		22,95	23,36	24,96	25,43	25,88	28,15	28,66
1,2	16		23,61	24,03	26,24	26,68	27,18	29,76	30,27
1,5	20		25,32	25,78	28,15	28,68	29,21	32,30	32,89
1,5	25		26,28		29,60	30,13	30,71	34,79	35,45
1,5	32		50,19	51,09	55,21	56,21		65,92	67,11
1,5	40				59,81	61,50	62,62	68,69	69,89
1,5	50							72,08	73,40

PRICES PER PIECE IN EURO

DIE BUSH

WITH THROUGH-GOING STARTING HOLE OF MATERIAL HSS

ISO 8977, type F with collar



Item no.
5273.

Hardness
HRC 62 ± 2

Material
HSS

Hardened and tempered, outside grinded in tolerance, with insertion chamfer.

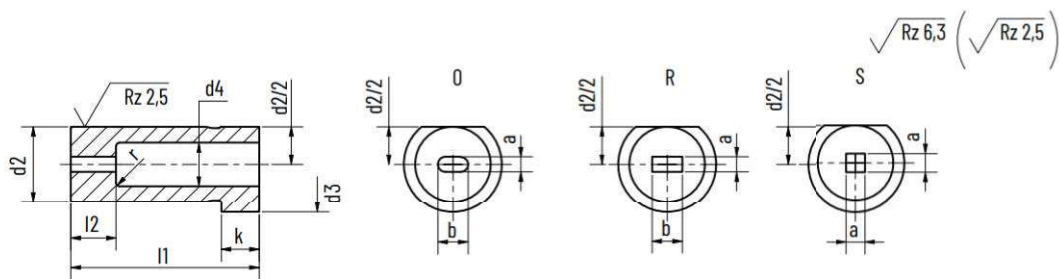
d	D m 5	D ₁ 0 -0,25	h +0,25 0	L +0,5 0	20	22	25	28	30	32	35
1	8	11	5		24,86	25,31	27,99	28,45	29,01	31,15	31,70
1	10	13	5		24,80	25,25	27,62	28,13	28,62	30,48	31,02
1,2	13	16	5		25,11	25,54	28,02	28,49	29,00	31,76	32,33
1,2	16	19	5		26,98	27,45	30,17	30,73	31,27	34,55	35,14
1,5	20	23	5		28,87	29,38	32,47	33,05	33,63	37,91	38,56
1,5	25	28	5		30,17		34,01	34,60	35,20	41,07	41,77
1,5	32	35	5		52,41	53,32	60,21	61,24	62,33	73,73	75,04
1,5	40	43	5				65,58	66,65	67,75	76,43	77,79

PRICES PER PIECE IN EURO

FORMING DIE

WITH COLLAR OF MATERIAL HSS

similar ISO 8977



Item no.

5533. Type S
5543. Type R
5553. Type O

Version

Type S: square cutting form
Type R: rectangular cutting form
Type O: oblong cutting form

Material

HSS

a	b	Gradation	d ₂	d ₃	d ₄	k	l ₁	l ₂
H8	H8		m5		max.	+0,25 0	+0,5 0	min.
1,6 - 5,4	2,0 - 5,5	0,1	10	13	5,8	5,0		4
2,0 - 7,4	2,5 - 7,5	0,1	13	16	8,0	5,0		5
2,0 - 9,9	2,5 - 10,0	0,1	16	19	9,5	5,0	16	5
2,5 - 12,9	3,2 - 13,0	0,1	20	23	12,0	5,0	20	8
3,2 - 15,9	4,0 - 16,0	0,1	25	28	17,3	5,0	25	8
4,0 - 20,9	5,0 - 21,0	0,1	32	35	20,7	5,0	32	8
5,0 - 26,9	6,3 - 27,0	0,1	40	43	27,7	5,0		8

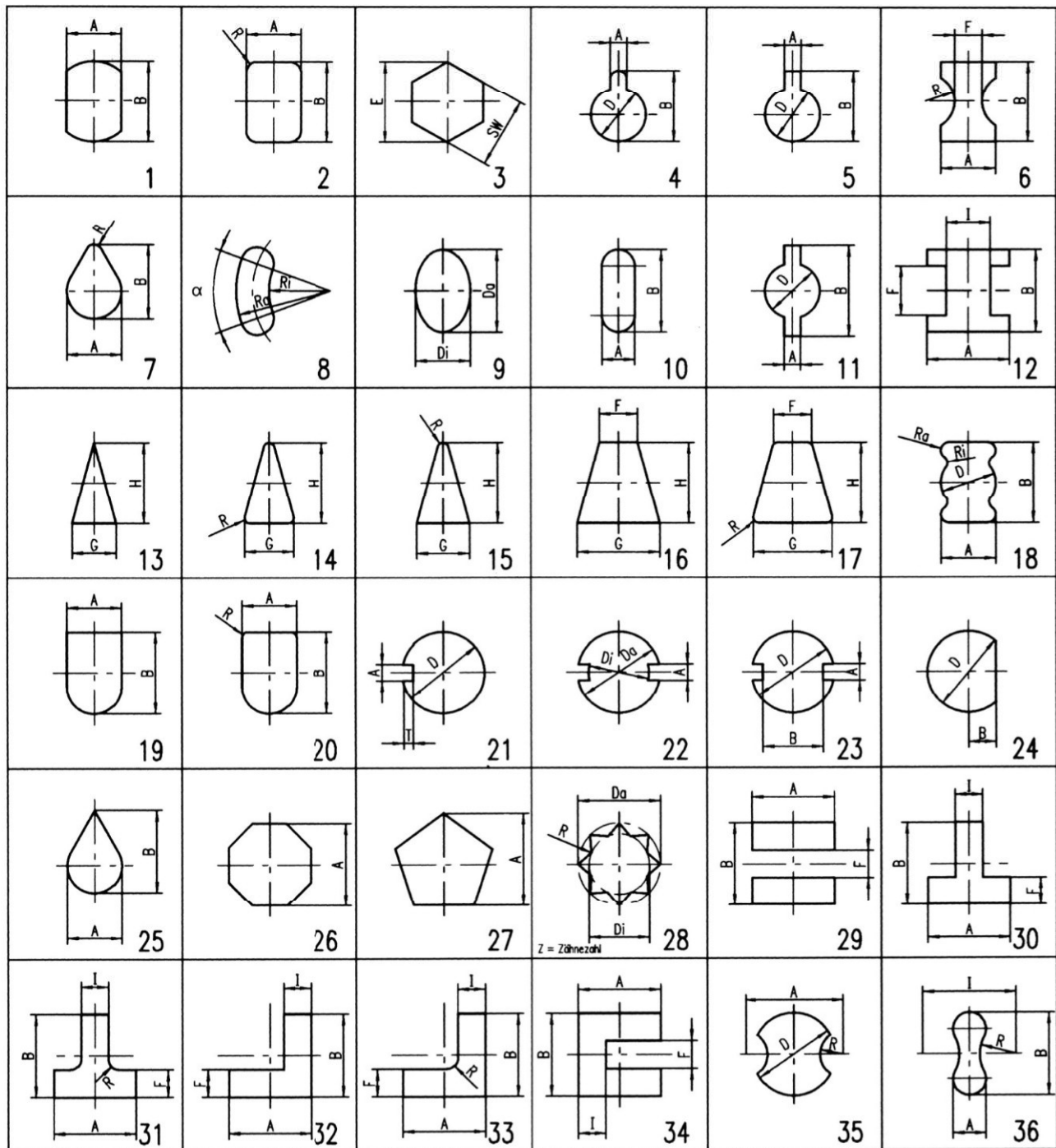
Attention: The diagonal profile should not be larger than d₄ max. on dies for square and rectangular forming.
Consider cutting clearance for the assignment of cutting punches and die bushes!

PRICES UPON REQUEST

TYPE VARIATIONS

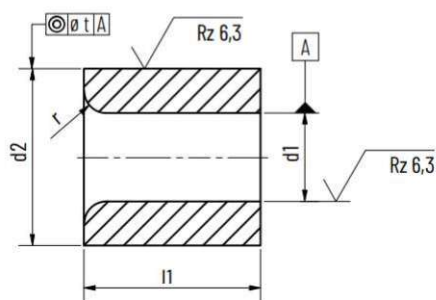
Punches and dies

We can supply these tools according to your requirements from a range of materials: HWS, HSS and powder metallurgic steels. Also coated if requested.



PUNCH GUIDE BUSH

DIN 9845, type C



Item no.

5411.

Hardness

HRC 62 + 2

Material

Case-hardened steel as chosen by manufacturer.

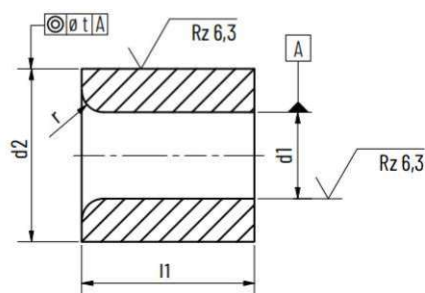
Inside and outside grinded in tolerance, with insertion chamfer.

d ₁ H7	d ₂ n6	l1	r	t	
2.1 / 2.2 / 2.3 / 2.4 / 2.5 / 2.6 / 2.7 / 2.8 / 2.9 / 3	7	12	1	0,01	8,97
3.1 / 3.2 / 3.3 / 3.4 / 3.5 / 3.6 / 3.7 / 3.8 / 3.9 / 4	8	12	1	0,01	6,76
4.1 / 4.2 / 4.3 / 4.4 / 4.5 / 4.6 / 4.7 / 4.8 / 4.9 / 5	10	16	1	0,01	7,47
5.1 / 5.2 / 5.3 / 5.4 / 5.5 / 5.6 / 5.7 / 5.8 / 5.9 / 6	12	16	1,5	0,02	8,37
6.1 / 6.2 / 6.3 / 6.4 / 6.5 / 6.6 / 6.7 / 6.8 / 6.9 / 7 / 7.1 / 7.2 / 7.3 / 7.4 / 7.5 / 7.6 / 7.7 / 7.8 / 7.9 / 8	15	20	1,5	0,02	9,76
8.1 / 8.2 / 8.3 / 8.4 / 8.5 / 9 / 9.2 / 9.3 / 9.4 / 9.5 / 9.8 / 9.9 / 10	18	20	2	0,02	11,19
10.1 / 10.2 / 10.3 / 10.4 / 10.5 / 11.1 / 11.2 / 11.3 / 11.4 / 11.5 / 11.6 / 11.7 / 12	22	28	2	0,02	14,26
12.2 / 12.3 / 12.4 / 12.5 / 12.9 / 13 / 13.2 / 13.3 / 13.4 / 13.5 / 13.7 / 13.8 / 13.9 / 14 / 14.6 / 14.7 / 14.9 / 15	26	28	2	0,02	17,21
15.5 / 16 / 16.5 / 17 / 17.5 / 18	30	36	2	0,02	28,55

PRICES PER PIECE IN EURO

PUNCH GUIDE BUSH

ISO 8978



Item no.
5312.

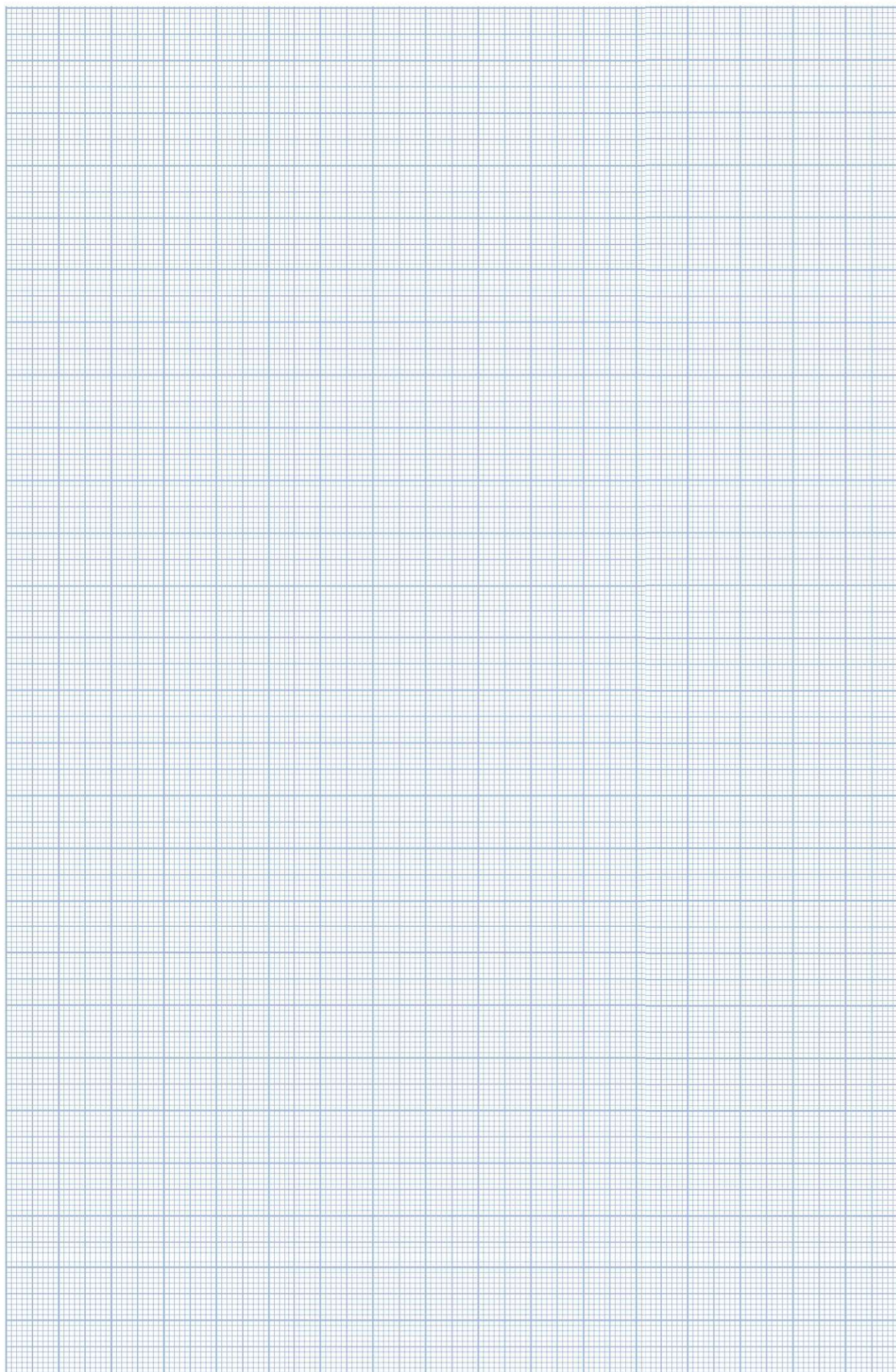
Hardness
HRC 62 ± 2

Material
Case-hardened steel as chosen by manufacturer.

Inside and outside grinded in tolerance, with insertion chamfer.

d ₁ H6	d ₂ h6	l1	r	t	
1/1.1/1.2/1.3/1.4/1.5/1.6/1.8/2/2.1	5	8	1	0,01	28,27
1.6/1.7/1.9/2/2.1/2.2/2.3/2.5/2.6/2.7/2.8/3	6	12,5	1	0,01	21,18
2/2.1/2.2/2.4/2.5/2.6/2.7/2.8/3/3.1/3.2/3.3/3.4/3.5	8	12,5	1,5	0,01	17,78
3/3.1/3.2/3.4/3.5/3.6/3.7/3.8/4/4.1/4.2/4.3/4.4/4.5/4.6/4.8/4.9/5	10	16	2	0,01	18,98
4/4.1/4.2/4.3/4.4/4.5/4.6/5/5.2/5.3/5.5/5.7/5.8/5.9/6/6.1/6.2/6.3/6.4/6.5/6.6/6.8/6.9/7/7.2	13	16	2	0,01	20,60
6/6.1/6.2/6.4/6.5/6.6/7/7.3/7.4/7.5/7.7/7.8/8/8.1/8.2/8.3/8.5/8.6/8.8	15	20	2	0,01	23,35
7.5/8/8.1/8.2/8.4/8.5/8.9/9/9.1/9.2/9.3/9.4/9.5/9.8/9.9/10/10.2/10.3/10.4/10.5/10.8/11/11.2/11.3	20	20	2,5	0,01	26,02
11.4/11.8/11.9/12/12.1/12.5/12.7/13/14/14.4/14.5/14.8/15/16/16.5/16.6	25	25	2,5	0,01	31,94
15/15.5/16/17/18/19/20	32	25	4	0,01	61,15
18/19/20/20.5/21/22/24/25/25.5/26/27	40	32	4	0,01	64,70
28/30/32/32.5/34/36	50	40	4	0,01	69,09

PRICES PER PIECE IN EURO



MOULD COMPONENTS

The standard components required for mould making are as diverse as the end products. Standard components include ejectors, flat ejectors, round stepped ejectors, ejector sleeves, ejector pins and core pins in all DIN and ISO versions.

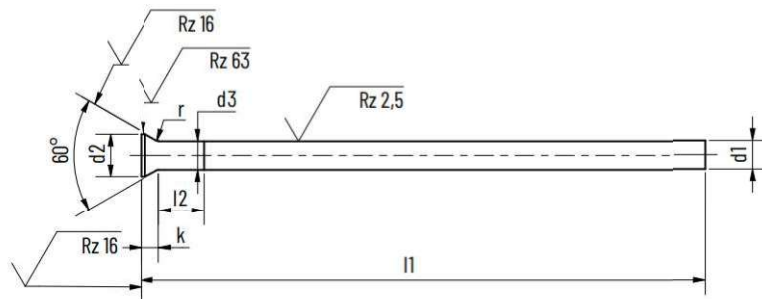
EBERHARD Precision Parts offers same-day-shipping from a stock of highest quality DIN standard components, both in basic and in intermediate dimensions. Special orders with custom dimensions can be produced at short notice. If you require special components with the tightest tolerances in dimension, shape, position, and surface finishing, you can rely on EBERHARD Precision Parts. We guarantee the highest level of quality and manufacturing expertise.



EJECTOR PIN

WITH COUNTERSUNK HEAD

DIN 1530 part 3, type D



Item no.
6151.

Hardness
Shaft: HRC 60 + 4/- 2
Head: HRC 45 +10/- 5

Material
WS

d ₁ g6	d ₂	d ₃ max.	k +0,2 0	r	l ₂ max.	l ₁ +2 0	100	125	160	200	250	315
0,5	0,9 ±0,05	0,52	0,55	0,2 +0,2	5		8,85					
0,6	1,1 ±0,05	0,62	0,63	0,2 +0,2	5		8,85					
0,7	1,3 ±0,05	0,72	0,72	0,2 +0,2	5		8,07					
0,8	1,4 ±0,05	0,82	0,92	0,2 +0,2	5		6,96	9,11	12,32	15,53		
0,9	1,6 ±0,05	0,92	1,01	0,2 +0,2	5		6,96	9,11	11,39	14,35		
1	1,8 ±0,05	1,03	1,19	0,4 +0,3	5		4,80	5,67	6,90	8,66		
1,1	1,8 ±0,05	1,13	1,11	0,4 +0,3	5		5,54	6,47	7,69	9,69		
1,2	2 ±0,05	1,23	1,19	0,4 +0,3	5		5,54	6,47	7,69	9,69		
1,25	2 ±0,05	1,28	1,15	0,4 +0,3	5		5,54	6,47	7,69			
1,3	2 ±0,05	1,33	1,11	0,4 +0,3	5		5,54	6,47	7,69	9,69		
1,4	2,2 ±0,05	1,43	1,19	0,4 +0,3	5		5,54	6,47	7,69	9,69		
1,5	2,2 ±0,05	1,53	1,11	0,4 +0,3	5		4,12	4,85	5,92	7,45		
1,6	2,5 ±0,05	1,63	1,28	0,4 +0,3	5		4,77	5,54	6,59	8,31		
1,7	2,5 ±0,05	1,73	1,19	0,4 +0,3	5		4,77	5,54	6,59	8,31		
1,75	2,5 ±0,05	1,78	1,15	0,4 +0,3	5		4,77	5,54	6,59			
1,8	2,8 ±0,05	1,83	1,37	0,4 +0,3	5		4,77	5,54	6,59	8,31		
1,9	2,8 ±0,05	1,93	1,28	0,4 +0,3	5		4,77	5,54	6,59	8,31		
2	3 ±0,1	2,03	1,37	0,4 +0,3	5		4,12	4,85	5,92	7,45	11,26	
2,1	3,2 ±0,1	2,13	1,45	0,4 +0,3	5		4,77	5,54	6,59	8,31		
2,2	3,2 ±0,1	2,23	1,37	0,4 +0,3	5		4,77	5,54	6,59	8,31		
2,25	3,2 ±0,1	2,28	1,32	0,4 +0,3	5		4,77					
2,3	3,5 ±0,1	2,33	1,54	0,4 +0,3	5		4,77	5,54	6,59	8,31		
2,4	3,5 ±0,1	2,43	1,45	0,4 +0,3	5		4,77	5,54	6,59	8,31		
2,5	3,5 ±0,1	2,53	1,37	0,6 +0,4	5		4,12	4,85	5,92	7,45	11,26	
2,6	4 ±0,1	2,63	1,71	0,6 +0,4	5		4,77	5,54	6,59	8,31		
2,7	4 ±0,1	2,73	1,63	0,6 +0,4	5		4,77	5,54	6,59	8,31	14,14	
2,75	4 ±0,1	2,78	1,58	0,6 +0,4	5					8,31		
2,8	4 ±0,1	2,83	1,54	0,6 +0,4	5		4,77	5,54	6,59	8,31		
2,9	4 ±0,1	2,93	1,45	0,6 +0,4	5		4,77	5,54		8,31		
3	4,5 ±0,1	3,03	1,8	0,6 +0,4	5		4,12	4,85	5,92	7,45	14,14	
3,1	4,5 ±0,1	3,13	1,71	0,6 +0,4	5		5,88	6,66	7,67	9,70		
3,2	4,5 ±0,1	3,23	1,63	0,6 +0,4	5		5,88	6,66	7,67	9,70	14,14	

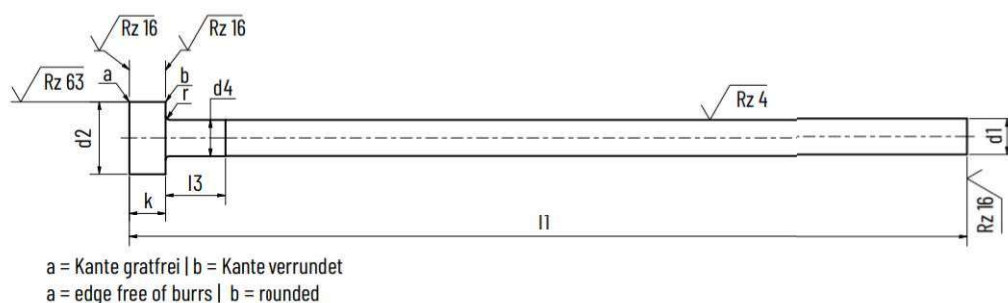
d ₁ g6	d ₂	d ₃ max.	k + 0,2 0	r	l ₂ max.	l ₁ +2 0	100	125	160	200	250	315
3,25	4,5 ±0,1	3,28	1,58	0,6 +0,4	5		5,88	6,66				
3,3	4,5 ±0,1	3,33	1,54	0,6 +0,4	5		5,88	6,66	7,67	9,70		
3,35	4,5 ±0,1	3,38	1,5	0,6 +0,4	5				7,67			
3,4	4,5 ±0,1	3,43	1,45	0,6 +0,4	5		5,88	6,66	7,67	9,70		
3,5	5 ±0,1	3,53	1,8	0,6 +0,4	5		4,48	5,26	6,10	8,04	11,65	
3,6	5 ±0,1	3,63	1,71	0,6 +0,4	5		5,88	6,66	7,67	9,70		
3,7	5 ±0,1	3,73	1,63	0,6 +0,4	5		5,88	6,66	7,67	9,70		
3,75	5 ±0,1	3,78	1,58	0,6 +0,4	5					9,70		
3,8	5 ±0,1	3,83	1,54	0,6 +0,4	5		5,88	6,66	7,67	9,70		
3,9	5 ±0,1	3,93	1,45	0,6 +0,4	5		5,88	6,66	7,67	9,70		
4	5,5 ±0,1	4,03	1,8	0,6 +0,4	5		4,48	5,26	6,10	8,04	11,65	14,08
4,1	5,5 ±0,1	4,13	1,71	0,6 +0,4	5		6,59	7,52	8,65	10,85		
4,2	5,5 ±0,1	4,23	1,63	0,6 +0,4	5		6,59	7,52	8,65	10,85		
4,25	5,5 ±0,1	4,28	1,58	0,6 +0,4	5		6,59			10,85		
4,3	5,5 ±0,1	4,33	1,54	0,6 +0,4	5		6,59	7,52	8,65	10,85		
4,4	5,5 ±0,1	4,43	1,45	0,6 +0,4	5		6,59	7,52	8,65	10,85		
4,5	6 ±0,1	4,53	1,8	0,6 +0,4	5		5,14	5,92	6,91	8,64	12,17	
4,6	6 ±0,1	4,63	1,71	0,6 +0,4	5		6,59	7,52	8,65	10,85		
4,7	6 ±0,1	4,73	1,63	0,6 +0,4	5		7,52	8,62	10,00	12,51		
4,75	6 ±0,1	4,78	1,58	0,6 +0,4	5		7,52					
4,8	6 ±0,1	4,83	1,54	0,6 +0,4	5		7,52	8,62	10,00	12,51		
4,9	6 ±0,1	4,93	1,45	0,6 +0,4	5		7,52	8,62	10,00	12,51		
5	6,5 ±0,1	5,03	1,8	0,6 +0,4	6		5,14	5,92	6,91	8,64	12,17	15,54
5,1	6,5 ±0,1	5,13	1,71	0,6 +0,4	6		7,52	8,62	10,00	12,51		
5,2	6,5 ±0,1	5,23	1,63	0,6 +0,4	6		7,52	8,62	10,00	12,51		
5,3	6,5 ±0,1	5,33	1,54	0,6 +0,4	6		7,52	8,62	10,00	12,51		
5,4	6,5 ±0,1	5,43	1,45	0,6 +0,4	6		7,52	8,62	10,00	12,51		
5,5	7 ±0,1	5,53	1,8	0,6 +0,4	6		6,01	7,17	8,53	10,33		
5,6	7 ±0,1	5,63	1,71	0,6 +0,4	6		7,52	8,62	10,00	12,51		
5,7	7 ±0,1	5,73	1,63	0,6 +0,4	6		7,52	8,62	10,00	12,51		
5,8	7 ±0,1	5,83	1,54	0,6 +0,4	6		7,52	8,62	10,00	12,51		
5,9	7 ±0,1	5,93	1,45	0,6 +0,4	6		7,52	8,62	10,00	12,51		
6	8 ±0,2	6,04	2,23	1 +0,5	6		6,01	7,17	8,53	10,33	14,21	16,31
6,1	8 ±0,2	6,14	2,15	1 +0,5	6		8,82					
6,2	8 ±0,2	6,24	2,06	1 +0,5	6		8,82	10,80	13,04	17,11		
6,3	8 ±0,2	6,34	1,97	1 +0,5	6			10,80		17,11		
6,4	8 ±0,2	6,44	1,89	1 +0,5	6					17,11		
6,5	9 ±0,2	6,54	3,17	1 +0,5	6		8,64	10,57	12,76	16,79		
6,7	9 ±0,2	6,74	2,99	1 +0,5	6		8,82	10,80	13,04	17,11		
7	9 ±0,2	7,04	2,73	1 +0,5	6		7,17	8,75	10,70	14,21		
7,5	10 ±0,2	7,54	3,17	1 +0,5	6		8,64	10,57	12,76	16,79		
7,9	10 ±0,2	7,94	2,82	1 +0,5	6		12,68					
8	10 ±0,2	8,04	2,73	1 +0,5	8		7,17	8,75	10,70	14,21	17,86	20,54
8,1	10 ±0,2	8,14	2,65	1 +0,5	8					23,52		
8,2	10 ±0,2	8,24	2,56	1 +0,5	8		12,68			23,52		
8,4	10 ±0,2	8,44	2,39	1 +0,5	8			15,63		23,52		
8,5	11 ±0,2	8,54	3,17	1 +0,5	8		12,43	15,29	17,99	23,07		
9	11 ±0,2	9,04	2,73	1 +0,5	8				17,99	23,07		
9,5	12 ±0,2	9,54	3,17	1 +0,5	8		12,80	15,66	18,35	23,43		
10	12 ±0,2	10,04	2,73	1 +0,5	10		10,90	13,05	15,24	20,03	24,22	28,03
11	13 ±0,2	11,04	2,73	1 +0,5	10		16,85	21,20	24,46	31,05		
11,5	14 ±0,2	11,54	3,17	1 +0,5	10			21,20				
12	14 ±0,2	12,04	2,73	1 +0,5	10		14,00	16,78	20,00	25,75	28,65	35,89
13	15 ±0,2	13,04	2,73	1 +0,5	10		17,85	22,17	26,75	32,67		
14	16 ±0,2	14,04	3,23	1 +0,5	10		17,85	22,17	26,75	32,67	40,57	49,89
16	18 ±0,2	16,04	3,23	1 +0,5	10		24,08	27,87	32,24	40,74	53,00	63,58

PRICES PER PIECE IN EURO

EJECTOR PIN

WITH CYLINDRICAL HEAD

DIN 1530 part 1, type A, nitrided & oxidized (similar DIN ISO 6751)



Item no.
6115.

Hardness
Shaft: min. 950 HV 0,3 on the surface. Core tensile strength approx. 1400 N/mm².
Head: HRC 45 +10/- 5

Material
Hot working tool steel

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	125	160	200	250	315	400	500	630	800	1.000	1.250
1	2,5	1,03	1,2	0,2	5		26,11	34,35	46,12	53,69								
1,1	2,5	1,13	1,2	0,2	5		28,91	30,53	33,66	39,20								
1,2	2,5	1,23	1,2	0,2	5		28,91	30,53	33,66	39,20								
1,3	3	1,33	1,5	0,2	5		28,91	30,53	33,66	39,20								
1,4	3	1,43	1,5	0,2	5		28,91	30,53	33,66	39,20								
1,5	3	1,53	1,5	0,2	5		9,16	9,97	10,49	11,48	12,54							
1,6	3	1,63	1,5	0,2	5		9,89	10,74	11,32	12,34								
1,7	3	1,73	1,5	0,2	5		9,89	10,74	11,32	12,34								
1,8	3	1,83	1,5	0,2	5		9,89	10,74	11,32	12,34								
1,9	3	1,93	1,5	0,2	5		9,89	10,74	11,32	12,34								
2	4	2,03	2	0,2	5		7,48	7,93	8,37	9,12	9,81	11,19	14,03					
2,1	4	2,13	2	0,2	5		8,76	9,20	9,69	10,58	10,72							
2,2	4	2,23	2	0,2	5		8,76	9,20	9,69	10,58	10,72	12,20						
2,5	5	2,53	2	0,3	5		8,56	9,08	9,35	10,64	10,75	12,25						
2,6	5	2,63	2	0,3	5		9,20	9,78	10,06	11,43	11,57							
2,7	5	2,73	2	0,3	5		9,20	9,78	10,06	11,43	11,57	13,21						
2,8	5	2,83	2	0,3	5		9,20	9,69	10,58	12,03								
3	6	3,03	3	0,3	5		6,82	7,17	7,48	8,45	9,35	10,31	12,99	14,81				
3,1	6	3,13	3	0,3	5		9,00	9,89	10,16	11,32	12,34	13,90	14,84					
3,2	6	3,23	3	0,3	5		9,00	9,89	10,16	11,32	12,34	13,90	14,84					
3,3	6	3,33	3	0,3	5		9,33	10,02	10,66	11,73								
3,4	6	3,43	3	0,3	5		9,33	10,02	10,66	11,73								
3,5	7	3,53	3	0,3	5		8,66	9,32	9,89	10,86	11,78	13,31	14,35	16,72	20,46			
3,6	7	3,63	3	0,3	5		10,06	11,07	11,43	12,91	13,79	17,01	20,59					
3,7	7	3,73	3	0,3	5		10,06	11,07	11,43	12,91	13,79	17,01	20,59					
3,8	7	3,83	3	0,3	5		10,06	11,07	11,43	12,91								
4	8	4,03	3	0,3	5		7,25	7,65	7,93	8,70	9,32	10,64	13,36	15,55	19,04	55,26		
4,1	8	4,13	3	0,3	5		10,53		11,53	12,88	13,71	14,84	18,61					

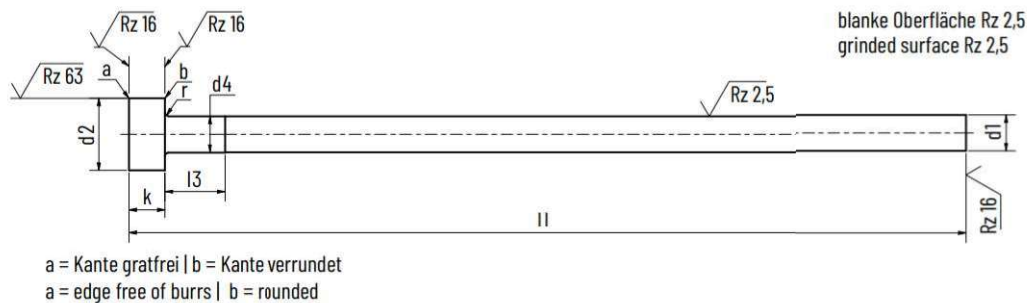
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	125	160	200	250	315	400	500	630	800	1.000	1.250
4,2	8	4,23	3	0,3	5		9,89	10,66	11,15	12,56	13,62	15,90	19,40	26,04				
4,3	8	4,33	3	0,3	5				11,53	12,88								
4,4	8	4,43	3	0,3	5			11,32	11,53									
4,5	8	4,53	3	0,3	5		9,78	10,49	10,68	11,96	13,02	15,40	19,13	25,75		39,31		
4,6	8	4,63	3	0,3	5			11,32	11,53	12,88								
4,7	8	4,73	3	0,3	5		10,53	11,32	11,53	12,88	13,71							
4,8	8	4,83	3	0,3	5				11,53									
5	10	5,03	3	0,3	5		7,88	8,31	8,98	9,74	10,75	11,86	15,16	16,69	19,31	22,38		
5,1	10	5,13	3	0,3	5		10,66	11,39	11,87	13,62	15,10	17,08	22,56	30,36				
5,2	10	5,23	3	0,3	5		10,66	11,39	11,87	13,62	15,10	17,08	22,56	30,36	33,67	38,70		
5,3	10	5,33	3	0,3	5		11,39	12,01	12,44	14,02	16,19							
5,4	10	5,43	3	0,3	5			12,01	12,44	14,02	16,19							
5,5	10	5,53	3	0,3	5		10,59	11,13	11,54	13,02	15,04	16,84	21,92	29,35	40,67	49,50		
5,7	10	5,73	3	0,3	5		11,73											
6	12	6,03	5	0,5	6		8,09	8,98	9,67	10,49	11,96	13,63	17,61	23,56	30,98	37,69	53,25	
6,1	12	6,13	5	0,5	6				13,54	16,15								
6,2	12	6,23	5	0,5	6		11,73	12,56	13,54	16,15	18,99	21,05	28,05	34,59	41,96	54,24		
6,3	12	6,33	5	0,5	6				14,51	17,20								
6,5	12	6,53	5	0,5	6		11,78	13,02	13,49	15,99	19,03	21,47	29,01	35,19	42,79	55,33	93,20	
6,7	12	6,73	5	0,5	6		12,72	14,02										
6,8	12	6,83	5	0,5	6						20,52							
6,9	12	6,93	5	0,5	6					17,20								
7	12	7,03	5	0,5	6		12,43	13,56	14,35	16,84	19,76	22,10	30,15	36,89	46,02	56,57	94,57	
7,1	12	7,13	5	0,5	6						21,28							
7,2	12	7,23	5	0,5	6		13,37	14,58	15,44	18,12	21,28	23,81		47,35				
7,5	12	7,53	5	0,5	6		12,43	13,56	14,35	16,84	19,76	22,10	30,15	36,89			96,48	
7,6	12	7,63	5	0,5	6									47,35				
8	14	8,03	5	0,5	8		9,12	10,35	11,28	12,89	15,16	16,40	22,84	28,16	34,04	41,79	58,98	229,91
8,1	14	8,13	5	0,5	8									47,45				
8,2	14	8,23	5	0,5	8		16,69	17,72	18,81	21,79	24,75	28,94	37,72	47,45	59,45	67,34		
8,5	14	8,53	5	0,5	8		15,99	17,08	18,12	21,15	24,30	28,19	36,89	46,29	57,04	70,00	108,77	
9	14	9,03	5	0,5	8		16,96	17,80	19,31	21,84	24,98	29,19	38,28	48,13	59,90		111,60	
9,1	14	9,13	5	0,5	8									54,50				
9,2	14	9,23	5	0,5	8									54,50				
9,5	14	9,53	5	0,5	8		16,96	17,80	19,31	21,84	24,98	29,19	38,28	48,13	59,90	112,56		
10	16	10,04	5	0,5	10		11,97	13,22	14,61	18,07	20,14	22,93	33,67	42,11	51,25	62,74	65,85	236,77
10,2	16	10,24	5	0,5	10		21,91	23,09	24,76	29,37	33,23	39,08	50,34	61,54	76,10	163,18	228,72	
10,5	16	10,54	5	0,5	10		22,09	23,08	24,91	29,56	33,67	37,86	50,82	62,14	76,73	160,41	224,87	
11	16	11,04	5	0,5	10		23,27	24,47	26,34	31,37	35,16	40,11	53,50	65,47	80,78		120,84	
11,5	16	11,54	5	0,5	10		23,27	24,47	26,34	31,37			94,57			141,45		
12	18	12,04	7	0,8	12		16,43	18,98	21,56	26,57	32,62	35,88	46,55	59,22	71,86	85,19	95,36	266,28
12,2	18	12,24	7	0,8	12		21,17	25,97	29,39	32,73	36,62	42,98	57,68	74,35	87,42		239,95	
12,5	18	12,54	7	0,8	12		19,95	24,55	27,78	30,93	34,65	40,63	54,54	70,32	84,14	99,31	155,54	
13	18	13,04	7	0,8	13		22,72	29,89	30,71	35,64	39,72	43,78	59,44		127,83			
13,5	18	13,54	7	0,8	13								99,81					
14	22	14,04	7	0,8	14		22,72	29,89	30,71	35,64	39,72	43,78	59,44	73,24	92,03	108,50	133,00	
14,2	22	14,24	7	0,8	14										150,27			
14,5	22	14,54	7	0,8	14								115,15		147,74			
15	22	15,04	7	0,8	14		26,61	32,80	34,17	41,26	47,09		68,85		150,93			
16	22	16,04	7	0,8	16		27,66	34,10	35,50	42,92	49,00	54,99	70,27	91,03	119,55	160,30	193,95	284,05
16,2	22	16,24	7	0,8	16								216,85	237,95	266,98			
16,5	22	16,54	7	0,8	16					178,33			199,62	220,36				
18	24	18,07	7	0,8	18		37,93	40,28	41,85	57,50	67,19	80,69	114,68	146,93	181,01	222,60	369,81	
18,5	24	18,57	7	0,8	18							214,95						
19	24	19,07	7	0,8	18					99,81								
19,5	24	19,57	7	0,8	18								222,63					
20	26	20,07	8	1,1	20			40,79	42,32	58,20	67,72	81,19	115,15	147,49	181,76	228,59	380,52	
20,2	26	20,27	8	1,1	20										351,39			
20,5	26	20,57	8	1,1	20										360,81			
25	32	25,1	10	1,1	25				81,34	97,35	116,99	142,88	165,85	212,31	263,67	334,68	550,96	
32	40	32,1	10	1,1	32					165,47	185,55	209,90	277,10	346,55	426,23	550,96	878,10	

PRICES PER PIECE IN EURO

EJECTOR PIN

WITH CYLINDRICAL HEAD

DIN 1530 part 1, type A, bright nitrided (similar DIN ISO 6751)



Item no.
6175.

Hardness
Shaft: min. 950 HV 0,3 on the surface. Core tensile strength approx. 1400 N/mm².
Head: HRC 45 +10/- 5

Material
Hot working tool steel

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	125	160	200	250	315	400	500	630	800	1.000
1	2,5	1,03	1,2	0,2	5		26,43	34,78	46,69	54,36							
1,1	2,5	1,13	1,2	0,2	5		29,27	30,92	34,07	39,68							
1,2	2,5	1,23	1,2	0,2	5		29,27	30,92	34,07	39,68							
1,3	3	1,33	1,5	0,2	5		29,27	30,92	34,07	39,68							
1,4	3	1,43	1,5	0,2	5		29,27	30,92	34,07	39,68							
1,5	3	1,53	1,5	0,2	5		9,27	10,09	10,62	11,62	12,70						
1,6	3	1,63	1,5	0,2	5		10,02	10,88	11,47	12,49	13,70						
1,7	3	1,73	1,5	0,2	5		10,02	10,88	11,47	12,49							
1,8	3	1,83	1,5	0,2	5		10,02	10,88	11,47	12,49	13,70						
1,9	3	1,93	1,5	0,2	5		10,02	10,88	11,47	12,49							
2	4	2,03	2	0,2	5		7,58	8,03	8,48	9,23	9,94	11,32	14,21				
2,1	4	2,13	2	0,2	5		8,87	9,32	9,81	10,71	10,85						
2,2	4	2,23	2	0,2	5		8,87	9,32	9,81	10,71	10,85	12,35					
2,5	5	2,53	2	0,3	5		8,66	9,19	9,46	10,77	10,89	12,41	15,31				
2,6	5	2,63	2	0,3	5		9,32	9,89	10,18	11,56	11,72	13,37					
2,7	5	2,73	2	0,3	5		9,32	9,89	10,18	11,56	11,72	13,37					
2,8	5	2,83	2	0,3	5		9,32	9,81	10,71	12,17							
3	6	3,03	3	0,3	5		6,91	7,26	7,58	8,55	9,46	10,43	13,15	14,99			
3,1	6	3,13	3	0,3	5		9,12	10,02	10,30	11,47	12,49	14,08	15,03				
3,2	6	3,23	3	0,3	5		9,12	10,02	10,30	11,47	12,49	14,08	15,03				
3,3	6	3,33	3	0,3	5		9,44	10,14	10,80	11,87							
3,4	6	3,43	3	0,3	5		9,44	10,14	10,80	11,87							
3,5	7	3,53	3	0,3	5		8,77	9,43	10,02	10,99	11,92	13,48	14,52	16,92	20,72		
3,6	7	3,63	3	0,3	5		10,18	11,21	11,56	13,06	13,96	17,21					
3,7	7	3,73	3	0,3	5		10,18	11,21	11,56	13,06	13,96	17,21	20,83				
3,8	7	3,83	3	0,3	5		10,18	11,21	11,56	13,06							
4	8	4,03	3	0,3	5		7,34	7,74	8,03	8,82	9,43	10,77	13,53	15,73	19,28	55,94	
4,1	8	4,13	3	0,3	5		10,65	11,47	11,67	13,03	13,89	15,03	18,85				

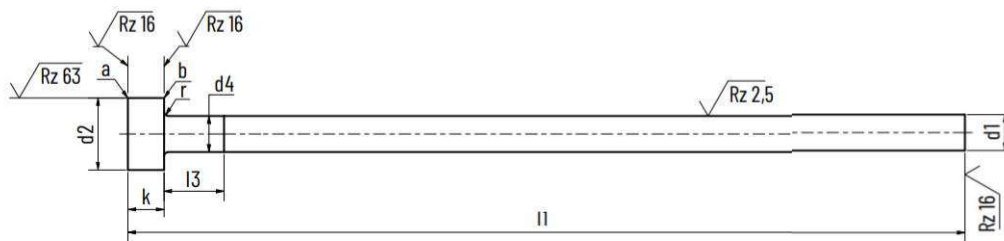
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	I ₃	I ₁ +2 0	100	125	160	200	250	315	400	500	630	800	1.000
4,2	8	4,23	3	0,3	5		10,02	10,80	11,29	12,72	13,79	16,09	19,63	26,37			
4,3	8	4,33	3	0,3	5				11,67	13,03							
4,4	8	4,43	3	0,3	5			11,47	11,67								
4,5	8	4,53	3	0,3	5		9,89	10,62	10,82	12,11	13,19	15,60	19,36	26,07		39,80	
4,6	8	4,63	3	0,3	5			11,47	11,67	13,03							
4,7	8	4,73	3	0,3	5		10,65	11,47	11,67	13,03	13,89						
4,8	8	4,83	3	0,3	5				11,67								
4,9	8	4,93	3	0,3	5					13,03							
5	10	5,03	3	0,3	5		7,97	8,41	9,10	9,85	10,89	12,02	15,35	16,91	19,56	22,66	
5,1	10	5,13	3	0,3	5		10,80	11,53	12,03	13,79	15,29	17,29	22,84	30,74			
5,2	10	5,23	3	0,3	5		10,80	11,53	12,03	13,79	15,29	17,29	22,84	30,74	34,09	39,19	
5,3	10	5,33	3	0,3	5		11,53	12,15	12,60	14,20	16,39						
5,4	10	5,43	3	0,3	5			12,15	12,60	14,20	16,39						
5,5	10	5,53	3	0,3	5		10,72	11,27	11,69	13,19	15,22	17,05	22,20	29,71	41,17	50,11	
6	12	6,03	5	0,5	6		8,19	9,10	9,79	10,62	12,11	13,80	17,82	23,85	31,36	38,16	53,91
6,1	12	6,13	5	0,5	6				13,71	16,35							
6,2	12	6,23	5	0,5	6		11,87	12,72	13,71	16,35	19,23	21,31	28,39	35,01	42,48	54,92	
6,3	12	6,33	5	0,5	6				14,70	17,41							
6,5	12	6,53	5	0,5	6		11,92	13,19	13,65	16,19	19,27	21,74	29,37	35,64	43,31	56,02	
6,6	12	6,63	5	0,5	6				14,70	17,41							
6,7	12	6,73	5	0,5	6		12,88	14,20									
6,8	12	6,83	5	0,5	6						20,78						
6,9	12	6,93	5	0,5	6					17,41							
7	12	7,03	5	0,5	6		12,59	13,73	14,52	17,05	20,01	22,37	30,53	37,35	46,60	57,28	
7,2	12	7,23	5	0,5	6		13,54	14,76	15,64	18,35	21,54	24,11					
7,5	12	7,53	5	0,5	6		12,59	13,73	14,52	17,05	20,01	22,37	30,53	37,35			
8	14	8,03	5	0,5	8		9,23	10,48	11,42	13,04	15,35	16,61	23,12	28,51	34,47	42,31	59,72
8,2	14	8,23	5	0,5	8		16,91	17,94	19,04	22,06	25,06	29,30	38,18	48,06	60,20		
8,5	14	8,53	5	0,5	8		16,19	17,29	18,35	21,40	24,60	28,55	37,35	46,85	57,75		
8,7	14	8,73	5	0,5	8		18,54	19,43	21,06	23,84							
9	14	9,03	5	0,5	8		17,17	18,02	19,56	22,11	25,30	29,56	38,76	48,73	60,64		
9,5	14	9,53	5	0,5	8		17,17	18,02	19,56	22,11	25,30	29,56	38,76				
10	16	10,04	5	0,5	10		12,12	13,38	14,79	18,30	20,39	23,22	34,09	42,64	51,89	63,52	66,66
10,2	16	10,24	5	0,5	10		22,19	23,38	25,07	29,75	33,65	39,57	50,97	62,31	77,05		
10,5	16	10,54	5	0,5	10		22,36	23,37	25,22	29,93	34,09	33,33	51,46	62,91	77,70		
11	16	11,04	5	0,5	10		23,56	24,77	26,66	31,75	35,60	43,60	54,16	66,29	81,79		
11,5	16	11,54	5	0,5	10		23,56	24,77	26,66	31,75							
12	18	12,04	7	0,8	12		16,63	19,22	21,83	26,89	33,03	33,33	47,13	59,97	72,75	86,26	96,54
12,2	18	12,24	7	0,8	12		21,43	26,29	29,77	33,14	37,07	43,51	58,39	75,29	88,50		
12,5	18	12,54	7	0,8	12		20,20	24,86	28,12	31,31	35,09	41,14	55,22	71,19	85,18	100,55	
13	18	13,04	7	0,8	13		23,00	30,26	31,09	36,08	40,22	44,33	60,19				
14	22	14,04	7	0,8	14		23,00	30,26	31,09	36,08	40,22	44,33	60,19	74,15	93,18	109,85	134,65
15	22	15,04	7	0,8	14		26,94	33,21	34,59	41,76	47,68						
16	22	16,04	7	0,8	16		28,00	34,53	35,94	43,45	49,61	55,67	71,15	92,16	121,04	162,30	196,36
18	24	18,07	7	0,8	18		38,40	40,78	42,36	58,22	68,02	81,69	116,11	148,76	183,27	225,37	374,40
20	26	20,07	8	1,1	20			41,30	42,85	58,92	68,56	82,19	116,59	149,32	184,02	231,44	385,26
25	32	25,1	10	1,1	25				82,35	98,56	118,44	138,49	167,91	214,96	266,95	338,85	557,82
32	40	32,1	10	1,1	32					167,53	187,86	212,52	280,55	350,85	431,54	557,82	889,03

PRICES PER PIECE IN EURO

EJECTOR PIN | CORE PIN

UNNITRIDED

similar DIN 1530 part 1, type A (similar DIN ISO 6751)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6177.

Hardness
Shaft: Core tensile strength
approx. 1400 N/mm².
Head: HRC 45 +10/- 5

Material
Hot working tool steel

d ₁ g6 -0,005	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	125	160	200	250	315	400	500	630	800
1,5	3	1,53	1,5	0,2	5		9,16	9,97								
2	4	2,03	2	0,2	5		7,48	7,93	8,37	9,12	9,81	11,19				
2,1	4	2,13	2	0,2	5					10,58						
2,2	4	2,23	2	0,2	5		8,76			10,58		12,20				
2,5	5	2,53	2	0,3	5		8,56	9,08	9,35		10,75	12,25				
2,7	5	2,73	2	0,3	5		9,20					13,21				
3	6	3,03	3	0,3	5		6,82	7,17	7,48	8,45	9,35	10,31	12,99	14,81		
3,2	6	3,23	3	0,3	5		9,00	9,89		11,32			14,84			
3,5	7	3,53	3	0,3	5		8,66	9,32	9,89	10,86	11,78	13,31	14,35			
3,7	7	3,73	3	0,3	5		10,06	11,07			13,79					
4	8	4,03	3	0,3	5		7,25	7,65	7,93	8,70	9,32	10,64	13,36	15,55		
4,2	8	4,23	3	0,3	5		9,89	10,66	11,15	12,56	13,62		19,40	26,04		
4,5	8	4,53	3	0,3	5		9,78	10,49	10,68	11,96	13,02	15,40	19,13	25,75		
5	10	5,03	3	0,3	5		7,88	8,31	8,98	9,74	10,75	11,86	15,16	16,69	19,31	
5,2	10	5,23	3	0,3	5		10,66	11,39	11,87	13,62		17,08		30,36		
5,5	10	5,53	3	0,3	5		10,59	11,13	11,54	13,02	15,04	16,84	21,92	29,35		
6	12	6,03	5	0,5	6		8,09	8,98	9,67	10,49	11,96	13,63	17,61	23,56	30,98	
6,2	12	6,23	5	0,5	6		11,73	12,56	13,54	16,15	18,99	21,05	28,05	34,59		
6,5	12	6,53	5	0,5	6		11,78	13,02	13,49	15,99	19,03	21,47	29,01	35,19		
6,6	12	6,63	5	0,5			14,02									
7	12	7,03	5	0,5	6		12,43	13,56	14,35	16,84	19,76	22,10	30,15	36,89	46,02	
7,2	12	7,23	5	0,5	6				15,44							
7,5	12	7,53	5	0,5	6		12,43	13,56	14,35	16,84	19,76	22,10	30,15			
8	14	8,03	5	0,5	8		9,12	10,35	11,28	12,89	15,16	16,40	22,84	28,16	34,04	41,79
8,2	14	8,23	5	0,5	8		16,69	17,72	18,81	21,79		28,94	37,72		59,45	
8,5	14	8,53	5	0,5	8		15,99	17,08	18,12	21,15	24,30	28,19	36,89		57,04	70,00
9	14	9,03	5	0,5	8		16,96	17,80	19,31	21,84	24,98	29,19	38,28	48,13	59,90	
9,5	14	9,53	5	0,5	8		16,96	17,80	19,31	21,84	24,98	29,19	38,28	48,13		

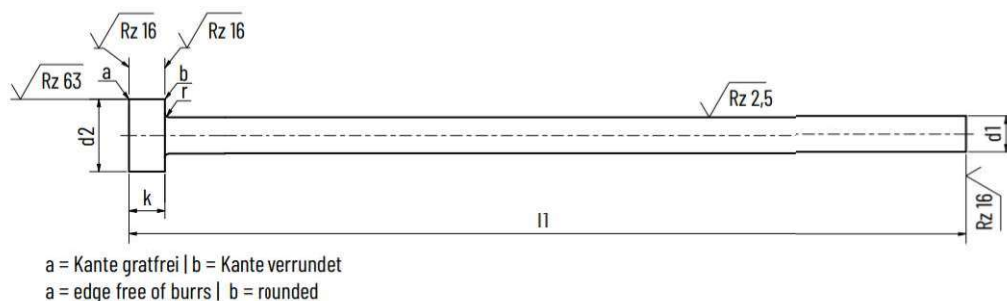
d ₁ g6 -0,005	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	125	160	200	250	315	400	500	630	800
10	16	10,04	5	0,5	10		11,97	13,22	14,61	18,07	20,14	22,93	33,67	42,11	51,24	62,74
10,2	16	10,24	5	0,5	10		21,91	23,09		29,37		39,08	50,34	61,54	76,10	
10,5	16	10,54	5	0,5	10		22,09	23,08	24,91	29,56	33,67	37,86	50,82	62,14	76,73	94,24
11	16	11,04	5	0,5	10		23,27	24,47	26,34	31,37	35,16	40,11	53,50	65,47	80,78	
11,5	16	11,54	5	0,5	10					31,37						
12	18	12,04	7	0,8	12		16,43	18,98	21,56	26,57	32,62	35,88	46,55	59,22	71,86	85,19
12,2	18	12,24	7	0,8	12		21,17	25,97		32,73	36,62	42,98				
12,5	18	12,54	7	0,8	12		19,95	24,55	27,78	30,93	34,65	40,63	54,54		84,14	
13	18	13,04	7	0,8	13			29,89	30,71	35,64			59,44			108,69
13,5	18	13,54	7	0,8	13								67,70			
14	22	14,04	7	0,8	14		22,72	29,89	30,71	35,64	39,72	43,78	59,44	73,24	92,03	108,50
14,5	22	14,54	7	0,8	14								68,85			
15	22	15,04	7	0,8	14		26,61	32,80	34,17	41,26	47,09	52,03	68,85			
15,5	22	15,54	7	0,8	14								70,27			
16	22	16,04	7	0,8	16		27,66	34,10	35,50	42,92	49,00	54,99	70,27	91,03	119,55	160,30
16,2	22	16,24	7	0,8	16							65,18				
16,5	22	16,54	7	0,8	16									105,00		
17	22	17,04	7	0,8	16								142,51			
18	24	18,07	7	0,8	18		37,93	40,28	41,85	57,50	67,19	80,69	119,43	146,93	181,01	
19	24	19,07	7	0,8	18							81,19				
20	26	20,07	8	1,1	20		38,38	40,79	42,32	58,20	67,72	81,19	115,15	147,49	181,76	
21	26	21,07	8	1,1	20							139,42				
25	32	25,1	10	1,1	25				81,34		116,99	142,88	165,85	212,31	263,67	
32	40	32,1	10	1,1	32					165,47		209,89	277,10	346,55	426,23	

PRICES PER PIECE IN EURO

EJECTOR PIN | CORE PIN

HIGH TEMPERED

similar DIN 1530 part 1, type A (similar DIN ISO 6751)



Item no.
6116.

Hardness
Shaft: ca. HRC 53
Head: ca. HRC 45

Material
Hot working tool steel

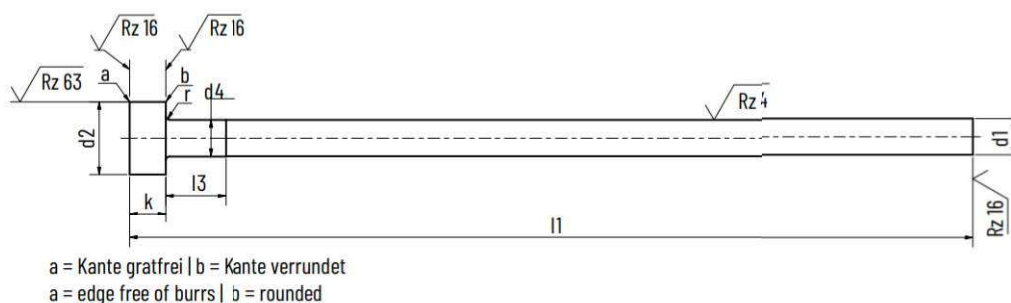
d ₁ g6	d ₂ 0 -0,2	k 0 -0,03	r +0,2 0	l ₁ +2 0	160	200	250	400
2	4	2	0,2		8,07		10,72	
2,5	5	2	0,3		11,11		14,80	
3	6	3	0,3		8,46		11,11	
3,5	7	3	0,3		12,43		16,13	
4	8	3	0,3			10,44		15,34
4,5	8	3	0,3			13,90		17,58
5	10	3	0,3			11,26		17,47
5,5	10	3	0,3			15,22		18,90
6	12	5	0,5			12,17		20,24
6,5	12	5	0,5			18,90		22,61
7	12	5	0,5			19,72		20,90
7,5	12	5	0,5			23,26		26,97
8	14	5	0,5			14,95		26,44
10	16	5	0,5			20,51		38,35
12	18	7	0,8			23,63		51,71
16	22	7	0,8			43,45		64,39

PRICES PER PIECE IN EURO

PIN

UNNITRIDED APPROX. 54 HRC

similar DIN 1530 part 1, type A (similar DIN ISO 6751)



Item no.
6178.

Hardness
Highly tough-hardened and
tempered to approx. HRC 54.

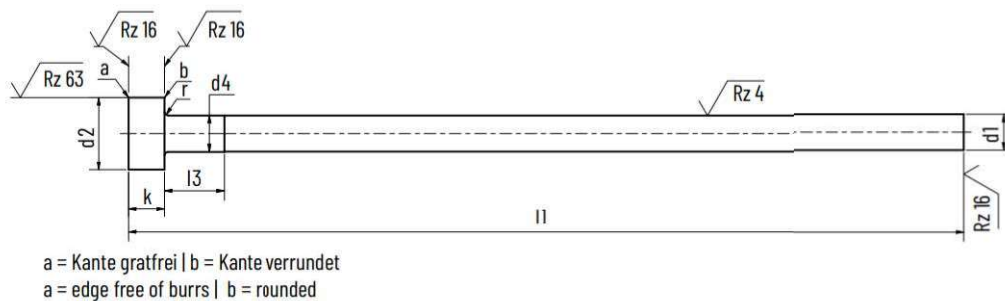
Material
Hot working tool steel

d ₁ g6 -0,005	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	125	160	200	250	315	400	500
3	6	3,03	3	0,3	5		5,43			6,78				
3,2	6	3,23	3	0,3	5		7,32			9,47				
3,5	7	3,53	3	0,3	5		7,14			9,21				
4	8	4,03	3	0,3	5					7,19				
4,2	8	4,23	3	0,3	5		8,15			10,61				
4,5	8	4,53	3	0,3	5		8,19			10,67				
5	10	5,03	3	0,3	5		6,01			7,74				
5,5	10	5,53	3	0,3	5		8,95			10,46				
6	12	6,03	5	0,5	6		6,66			8,35				
6,2	12	6,23	5	0,5	6		9,84							
6,5	12	6,53	5	0,5	6		10,06							
7	12	7,03	5	0,5	6		10,67			13,55				
7,2	12	7,23	5	0,5	6					15,56				
8	14	8,03	5	0,5	8		7,58		9,59	10,28		13,60		24,63
8,5	14	8,53	5	0,5	8		14,77			19,61				
9	14	9,03	5	0,5	8		15,70			20,27	23,22			
10	16	10,04	5	0,5	10		8,36		10,85	14,10	16,04	18,67	26,39	
11	16	11,04	5	0,5	10					24,90	28,45			
12	18	12,04	7	0,8	12		10,76	13,18	15,58	20,37	26,05	29,15		
12,5	18	12,54	7	0,8	12		14,07							
13	18	13,04	7	0,8	13					28,91				
14	22	14,04	7	0,8	14		16,78			28,91	32,74	36,56	51,23	
16	22	16,04	7	0,8	16		19,74			34,05	39,74	45,40		
16,5	22	16,54	7	0,8	16									79,21
20	26	20,07	8	1,1	20			32,04			57,34			132,21
25	32	25,1	10	1,1	25								149,44	

Annealing colour varies. **PRICES PER PIECE IN EURO**

COPPER CORE PIN WITH CYLINDRICAL HEAD

similar DIN 1530 part 1, type A (similar DIN ISO 6751)



Item no.
6118.

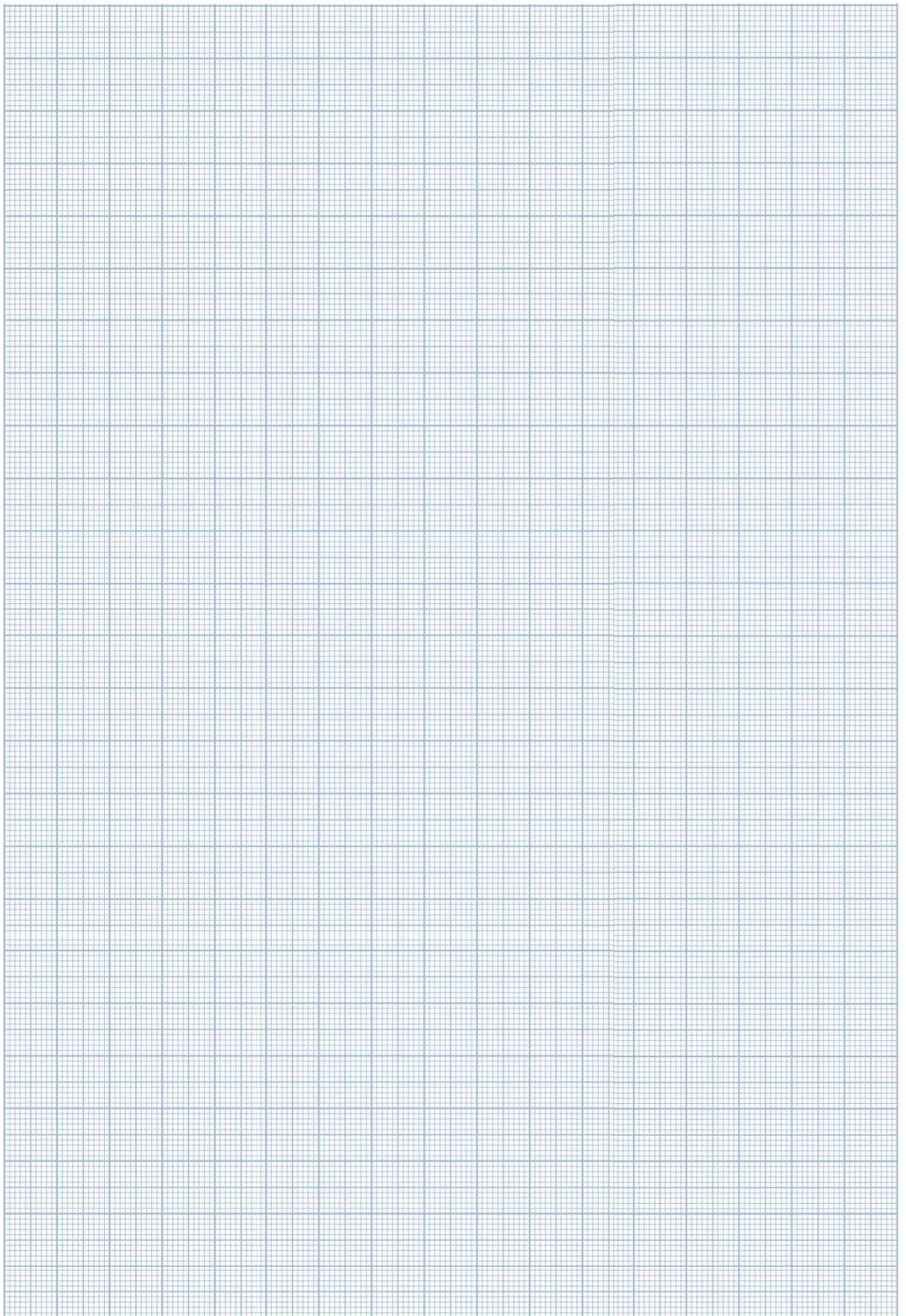
Hardness
Shaft: HRC min. 180 HB
Head: HRC min. 180 HB

Material
Beryllium-free copper alloy

Thermal conductivity:
approx. 180-208 W/m°K

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	160	250	500
2	4	2,03	2	0,2	5			41,66	48,48	
2,5	5	2,53	2	0,3	5			41,66	48,48	
2,7	5	2,73	2	0,3	5			41,66	48,48	
3	6	3,03	3	0,3	5			42,05	48,89	
3,2	6	3,23	3	0,3	5			42,05	48,89	
3,5	7	3,53	3	0,3	5			42,05	48,89	
3,7	7	3,73	3	0,3	5			42,05	48,89	
4	8	4,03	3	0,3	5			37,24	45,00	70,98
4,2	8	4,23	3	0,3	5			37,24	45,00	
4,5	8	4,53	3	0,3	5			37,24	45,00	
5	10	5,03	3	0,3	5			37,24	45,00	70,98
5,2	10	5,23	3	0,3	5			43,27	51,44	
6	12	6,03	5	0,5	6		39,92	39,92	49,35	75,34
6,2	12	6,23	5	0,5	6			43,27	51,44	
7	12	7,03	5	0,5	6			43,27	51,44	
8	14	8,03	5	0,5	8			43,27	51,44	92,42
8,2	14	8,23	5	0,5	8			56,13	64,17	
10	16	10,04	5	0,5	10			58,00	70,45	116,67
12	18	12,04	7	0,8	12			60,66	72,99	119,21
14	22	14,04	7	0,8	14			84,93	108,49	187,51
16	22	16,04	7	0,8	16			102,22	144,12	241,10

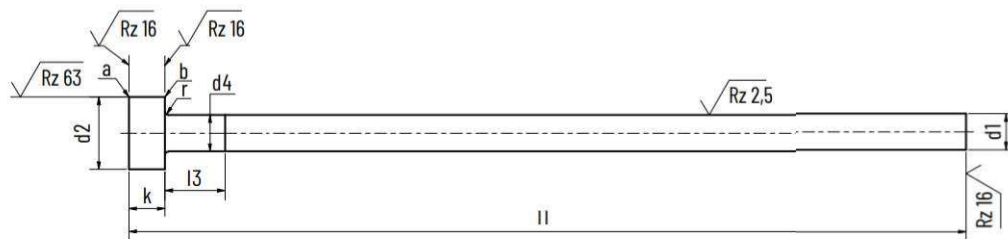
PRICES PER PIECE IN EURO



EJECTOR PIN

WITH CYLINDRICAL HEAD

DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6121.

Hardness
Shaft: HRC 60 + 4/- 2
Head: HRC 45 +10/- 5

Material
WS

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	63	80	100	125	160	200	250	315	400	500	630	800
0,5	2,5	0,53	1,2	0,2	5						46,47									
0,6	2,5	0,63	1,2	0,2	5						47,05									
0,7	2,5	0,73	1,2	0,2	5						47,05									
0,8	2,5	0,83	1,2	0,2	5		15,44	15,44	15,94	16,68	18,39	23,93	27,36	56,56						
0,9	2,5	0,93	1,2	0,2	5		11,69	11,69	12,10	12,68	13,98	18,38	21,04							
1	2,5	1,03	1,2	0,2	5		11,25	11,25	11,62	12,15	13,42	17,60	20,18	20,76	27,88					
1,1	2,5	1,13	1,2	0,2	5		11,69	11,69	12,10	12,68	13,98	18,38	21,04	21,65						
1,2	2,5	1,23	1,2	0,2	5		11,69	11,69	12,10	12,68	13,98	18,38	21,04	21,65	28,86					
1,3	3	1,33	1,5	0,2	5		11,69	11,69	12,10	12,68	13,98	18,38	21,04	21,65	28,86					
1,4	3	1,43	1,5	0,2	5		11,69	11,69	12,10	12,68	13,98	18,38	21,04	21,65	28,86					
1,5	3	1,53	1,5	0,2	5		5,74	5,74	5,74	5,74	5,83	6,69	7,42	9,21	12,31	13,93				
1,6	3	1,63	1,5	0,2	5		6,05	6,05	6,05	6,05	6,20	7,10	7,89	9,78	13,05					
1,7	3	1,73	1,5	0,2	5		8,35	8,35	8,69	9,07	9,64	11,93	13,17	14,77	21,98					
1,8	3	1,83	1,5	0,2	5		8,35	8,35	8,69	9,07	9,64	11,93	13,17	14,77	21,98					
1,9	3	1,93	1,5	0,2	5		4,95	4,95	5,26	5,50	5,73	6,35	7,33	8,88	11,83					
2	4	2,03	2	0,2	5		4,25	4,25	4,47	4,98	5,07	5,79	6,69	8,16	10,88	13,80	14,48			
2,1	4	2,13	2	0,2	5					5,50	5,73	6,35	7,33	8,88	11,83					
2,2	4	2,23	2	0,2	5					5,39	5,62	6,23	7,18	8,70	11,57	13,20	19,88			
2,3	4	2,33	2	0,2	5					5,40	5,82	6,39	7,40	8,98	12,00					
2,4	4	2,43	2	0,2	5					5,40	5,82	6,39	7,40	8,98	12,00					
2,5	5	2,53	2	0,3	5		4,25	4,25	4,47	4,98	5,07	5,79	6,69	8,16	10,88	13,80	14,48	38,31		
2,6	5	2,63	2	0,3	5					5,82	6,39	7,40	8,98	12,00						
2,7	5	2,73	2	0,3	5					5,40	5,82	6,39	7,40	8,98	12,00	14,12	14,80			
2,8	5	2,83	2	0,3	5		5,91			5,91	6,57	7,47	9,36			16,28				
2,9	5	2,93	2	0,3	5					5,91	6,57	7,47	9,36							
3	6	3,03	3	0,3	5		4,25	4,25	4,47	4,98	5,07	5,79	6,69	8,16	10,88	13,23	19,95	23,71		
3,1	6	3,13	3	0,3	5					5,91	6,57	7,47	9,36			12,82	16,28	24,70		
3,2	6	3,23	3	0,3	5					5,39	5,84	6,42	7,32	9,18	12,56	15,94	24,22			
3,3	6	3,33	3	0,3	5					5,91	6,57	7,47	9,36							
3,4	6	3,43	3	0,3	5					5,91	6,57	7,47	9,36			16,28		28,59		

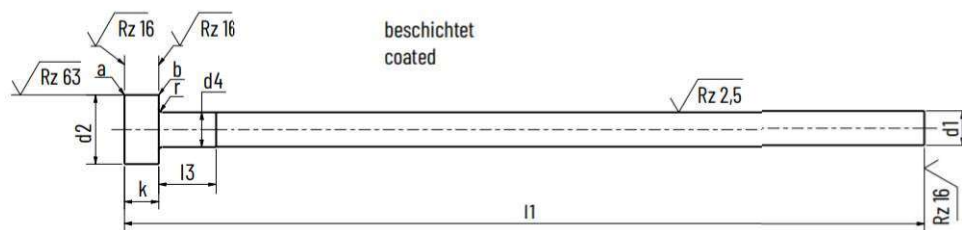
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	63	80	100	125	160	200	250	315	400	500	630	800
3,5	7	3,53	3	0,3	5					5,19	5,37	5,96	6,96	8,75	11,94	15,12	22,98	34,43		
3,6	7	3,63	3	0,3	5						5,91	6,57	7,47	9,36	12,82		24,70			
3,7	7	3,73	3	0,3	5					5,50	5,91	6,57	7,47	9,36	12,82	16,28	24,70			
3,8	7	3,83	3	0,3	5						5,91	6,57	8,16	9,89		16,40				
3,9	7	3,93	3	0,3	5						5,91	6,57	8,16	9,89	13,38		24,95			
4	8	4,03	3	0,3	5		4,41	4,41	4,74	5,24	5,28	5,87	6,90	8,65	11,81	14,98	22,61	26,32	72,02	113,02
4,1	8	4,13	3	0,3	5						6,39	7,33	8,16	9,89	13,38		24,95			
4,2	8	4,23	3	0,3	5					5,89	6,26	7,18	8,05	9,74	13,17	16,10	24,48	28,70		
4,3	8	4,33	3	0,3	5						6,39	7,33	8,16	9,89						
4,4	8	4,43	3	0,3	5						6,39	7,33	8,16	9,89						
4,5	8	4,53	3	0,3	5					5,74	5,83	6,74	7,56	9,14	13,40	16,98	24,57	28,68		
4,6	8	4,63	3	0,3	5						6,39	7,33	8,16	9,89	13,38		24,95			
4,7	8	4,73	3	0,3	5						6,39	7,33		9,89	13,38	16,40	24,95			
4,8	8	4,83	3	0,3	5						6,39	7,33	8,16	9,89						
4,9	8	4,93	3	0,3	5						6,39	7,33	8,16	9,89						
5	10	5,03	3	0,3	5		4,98	4,98	5,24	5,72	5,83	6,69	7,50	9,08	13,40	16,19	24,57	28,37	38,65	72,02
5,1	10	5,13	3	0,3	5						7,29	8,03	9,36	11,34			27,20			
5,2	10	5,23	3	0,3	5					7,04	7,29	8,16	9,36	11,28	15,47	17,93	27,20	32,29		
5,3	10	5,33	3	0,3	5						7,29	8,03	9,36	11,28	15,47					
5,4	10	5,43	3	0,3	5						7,29	8,03	9,36	11,28	15,47					
5,5	10	5,53	3	0,3	5						6,86	7,70	8,83	10,59	14,58	17,76	27,40	32,31	42,56	75,96
5,6	10	5,63	3	0,3	5						8,26	9,89	11,69	14,86	21,65		42,61			
5,7	10	5,73	3	0,3	5						8,26	9,89	11,69	14,86	21,65	27,67	42,61			
5,8	10	5,83	3	0,3	5						8,26	9,89	11,69	14,86	21,65					
5,9	10	5,93	3	0,3	5						8,26	9,89	11,69	14,86	21,65					
6	12	6,03	5	0,5	6		5,79	5,79	5,83	6,55	6,74	7,55	8,75	10,55	14,58	17,76	27,40	32,31	42,56	75,96
6,1	12	6,13	5	0,5	6						8,26	9,89	11,69	14,86		27,67				
6,2	12	6,23	5	0,5	6					7,89	8,26	9,89	11,69	14,86	21,65	27,67	42,61	52,51	68,48	
6,3	12	6,33	5	0,5	6						8,26	9,89	11,69	14,86						
6,4	12	6,43	5	0,5	6						8,26	9,89		14,86						
6,5	12	6,53	5	0,5	6						7,75	9,32	10,99	13,99	20,35	26,02	40,13	48,67		
6,6	12	6,63	5	0,5	6						8,26		11,69	14,86						
6,7	12	6,73	5	0,5	6						8,26			14,86						
6,8	12	6,83	5	0,5	6							9,89		14,86	21,65					
6,9	12	6,93	5	0,5	6									14,86	21,65					
7	12	7,03	5	0,5	6						7,75	9,32	10,99	13,99	20,35	26,02	40,13	48,67		
7,2	12	7,23	5	0,5	6						8,26	9,89	11,69	14,86						
7,5	12	7,53	5	0,5	6						7,75	9,32	10,99	13,99	20,35	26,02	40,13			
8	14	8,03	5	0,5	8				6,50	7,15	7,50	9,08	10,93	13,91	17,76	23,61	35,82	41,92	50,68	89,49
8,1	14	8,13	5	0,5	8							16,11		23,42	31,59					
8,2	14	8,23	5	0,5	8					10,95	11,59	13,74	15,66	20,01	26,97	34,24	53,45			100,92
8,5	14	8,53	5	0,5	8						10,93	12,97	14,72	18,86	25,44	32,25	50,28			
9	14	9,03	5	0,5	8					9,96	10,93	12,97	14,72	18,86	25,44	32,25	50,28	65,10	75,63	
9,5	14	9,53	5	0,5	8						13,73	16,27	19,38	23,97		40,30	63,75			
10	16	10,04	5	0,5	10					9,96	10,92	12,84	14,84	19,02	24,14	27,21	42,46	49,02	59,58	97,80
10,1	16	10,14	5	0,5	10									26,48	38,81					
10,2	16	10,24	5	0,5	10					13,90	14,80	17,51	20,86	25,85	34,76	43,47	68,67		95,04	
10,5	16	10,54	5	0,5	10						13,93	16,47	19,64	24,33	32,73	40,89	64,64	67,15	89,99	
10,7	16	10,74	5	0,5	10								23,23							
11	16	11,04	5	0,5	10						16,40	20,65	21,86	27,58	34,76	42,86	67,72		110,00	
12	18	12,04	7	0,8	12					13,03	14,13	16,76	19,74	24,92	29,79	34,30	54,21	62,85	71,92	131,19
12,1	18	12,14	7	0,8	12										37,10					
12,2	18	12,24	7	0,8	12									23,35	29,45	45,76	72,29	87,75		
12,5	18	12,54	7	0,8	12									22,36	28,25	35,59	43,90	69,36	112,67	
13	18	13,04	7	0,8	13						17,50	21,38	25,91	31,32	39,99	47,68	71,86			
14	22	14,04	7	0,8	14						17,50	21,38	25,91	31,32	39,99	47,68	83,26		146,57	
14,5	22	14,54	7	0,8	14						17,50	21,38	25,91	31,32	39,99	47,68				
15	22	15,04	7	0,8	14						25,99	29,95	34,78	43,49	56,56					
16	22	16,04	7	0,8	16					21,85	23,10	26,63	30,87	38,57	50,23	61,61	84,79	98,29	116,10	155,52
16,5	22	16,54	7	0,8	16									44,53	59,89		100,19			
18	24	18,07	7	0,8	18								50,60	62,41	88,93	106,30	146,28	169,56		268,27
20	26	20,07	8	1,1	20					36,23	36,23	42,05	55,09	72,87	94,22	127,41	147,68	190,86	248,32	
20,5	26	20,57	8	1,1	20									77,97		136,37				
25	32	25,1	10	1,1	25								71,49	9,97	123,85	160,17	216,60	251,02		

PRICES PER PIECE IN EURO

EJECTOR PIN

WITH CYLINDRICAL HEAD AND DLC-COATING

similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6D21.

Hardness

Shaft: HRC 60 + 4/- 2
Head: HRC 45 + 10/- 5
Coating hardness: approx. 2.500 HV
Coating thickness: approx. 1,5 µm

Material
WS

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	63	80	100	125	160	200	250	315	400	500	630	800
0,8	2,5	0,83	1,2	0,2	5		17,37	17,37	17,91	18,72	20,65	26,86	30,70							
1	2,5	1,03	1,2	0,2	5		13,03	13,03	13,44	14,10	15,56	20,39	23,40	24,08	35,86					
1,1	2,5	1,13	1,2	0,2	5		13,10	13,10	13,59	14,26	15,72	20,63	23,61	24,29						
1,2	2,5	1,23	1,2	0,2	5		13,10	13,10	13,59	14,26	15,72	20,63	23,61	24,29						
1,3	3	1,33	1,5	0,2	5		13,10	13,10	13,59	14,26	15,72	20,63	23,61	24,29	36,66					
1,4	3	1,43	1,5	0,2	5		13,10	13,10	13,59	14,26	15,72	20,63	23,61	24,29						
1,5	3	1,53	1,5	0,2	5		10,24	10,24	10,24	10,24	10,38	11,93	13,26	16,43	21,92					
1,6	3	1,63	1,5	0,2	5		10,51		10,51	10,51	10,70	12,33	13,62	16,89	22,54					
1,7	3	1,73	1,5	0,2	5		14,41	14,41	15,00	15,68	16,65	20,63	22,70	25,53	27,92					
1,8	3	1,83	1,5	0,2	5		14,41	14,41	15,00	15,68	16,65	20,63	22,70	25,53	27,92					
1,9	3	1,93	1,5	0,2	5		8,56	8,56	9,05	9,48	9,89	10,95	12,63	15,36						
2	4	2,03	2	0,2	5		7,59		7,98	8,88	9,01	10,74	11,93	14,55	19,39	24,57	25,80			
2,1	4	2,13	2	0,2	5						9,89	10,95	12,65	15,36	20,43					
2,2	4	2,23	2	0,2	5						9,68	10,74	12,41	15,04	20,02	22,80				
2,3	4	2,33	2	0,2	5						6,33	11,03	12,80	15,53						
2,5	5	2,53	2	0,3	5		7,59		7,98	8,88	9,01	10,30	11,93	14,55	19,39	24,57	25,80			
2,7	5	2,73	2	0,3	5						10,02	11,03	12,80	15,53	20,73					
2,8	5	2,83	2	0,3	5						10,24	11,39	12,93	16,18						
2,9	5	2,93	2	0,3	5						10,24	11,39	12,93	16,18						
3	6	3,03	3	0,3	5		7,59		7,98	8,88	9,01	10,30	11,93	14,55	19,39	23,59	35,56	42,25		
3,2	6	3,23	3	0,3	5						10,06	11,11	12,59	15,85	21,72	27,55	41,86			
3,5	7	3,53	3	0,3	5						9,60	10,60	12,41	15,61	21,27	26,98	40,95			
3,7	7	3,73	3	0,3	5						10,24	11,39	12,93	16,19	22,13	28,09				
4	8	4,03	3	0,3	5		7,86		8,46	9,32	9,45	10,51	12,33	15,43	21,08	26,74	40,32	47,00		
4,2	8	4,23	3	0,3	5						10,85	12,41	13,89	16,82	22,70	27,84	42,29			
4,5	8	4,53	3	0,3	5						10,38	12,00	13,46	16,32	23,02	30,27	43,86	51,12		
4,7	8	4,73	3	0,3	5						11,03		14,14		23,14					
5	10	5,03	3	0,3	5		8,88		9,32	10,22	10,38	11,93	13,37	16,21	23,92	28,85	43,86	50,60	68,91	

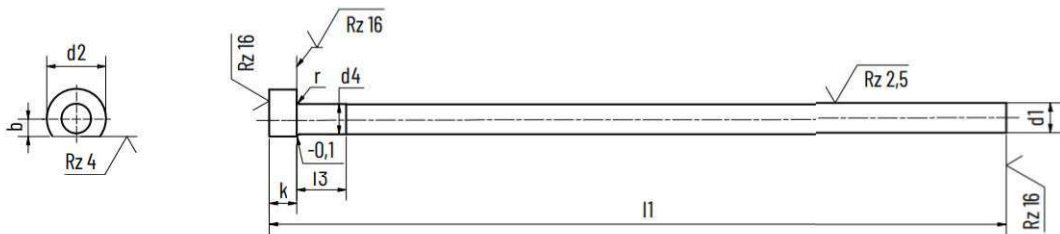
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	63	80	100	125	160	200	250	315	400	500	630	800
5,2	10	5,23	3	0,3	5						12,54	14,14	16,19	19,46	26,78	30,97	47,03	55,82		
5,5	10	5,53	3	0,3	5						12,21	13,74	15,71	18,89	26,06	31,65	48,88			
6	12	6,03	5	0,5	6		10,30		10,38	11,69	12,00	13,44	15,61	18,75	26,06	31,65	48,88	57,59	75,90	135,42
6,2	12	6,23	5	0,5	6						14,27	17,11	20,19	26,71	37,38	47,77	73,64	90,76		
6,5	12	6,53	5	0,5	6						13,83	16,63	19,62	24,98	36,29	46,44	71,55			
7	12	7,03	5	0,5	6						13,83	16,63	19,62	24,98	36,29	46,44	71,55	86,74		
7,5	12	7,53	5	0,5	6						13,83	16,63	19,62	24,98	36,29	46,43	71,55			
8	14	8,03	5	0,5	8			11,58	12,73		13,37	16,21	19,48	24,79	31,65	42,09	63,86	74,76	90,37	159,59
8,2	14	8,23	5	0,5	8						20,05	23,74	27,02	34,58	46,63	59,15				
8,5	14	8,53	5	0,5	8						19,48	23,10	26,24	33,59	45,33	57,49				
9	14	9,03	5	0,5	8				17,76		19,48	23,10	26,24	33,59	45,33	57,49	89,66	116,08	134,83	
10	16	10,04	5	0,5	10				17,76		19,46	22,89	26,41	33,88	43,02	48,51	75,71	87,40	106,23	142,29
10,2	16	10,24	5	0,5	10						25,62	30,25	36,07	44,68	60,07	75,10	118,64			
10,5	16	10,54	5	0,5	10						24,85	29,37	35,05	43,41	58,35	72,94	115,27	141,59		
12	18	12,04	7	0,8	12				22,68		24,57	29,18	34,35	43,41	51,83	59,72	94,37	109,40	125,20	228,31
12,2	18	12,24	7	0,8	12								40,13	50,64		78,70				
12,5	18	12,54	7	0,8	12								38,97	49,16	61,94	76,43				
13	18	13,04	7	0,8	13						30,46	37,20	45,11	54,48	69,60	82,93	125,05			
14	22	14,04	7	0,8	14						30,46	37,20	45,11	54,48	69,60	82,93	125,05	144,93		
14,5	22	14,54	7	0,8	14						30,46	37,20	45,11	54,48	69,60	82,93				
16	22	16,04	7	0,8	16						34,89	40,25	46,65	56,34	75,92	93,12	128,16	148,55	175,47	235,11
20	26	20,07	8	1,1	20						54,78	56,44	63,55	83,26	110,11	142,40	192,61	223,26	288,51	375,34
25	32	25,1	10	1,1	25								108,07	139,02	187,22	242,07				

PRICES PER PIECE IN EURO

EJECTOR PIN

WITH ONE-SIDED ANTI-TWIST LOCK

similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)



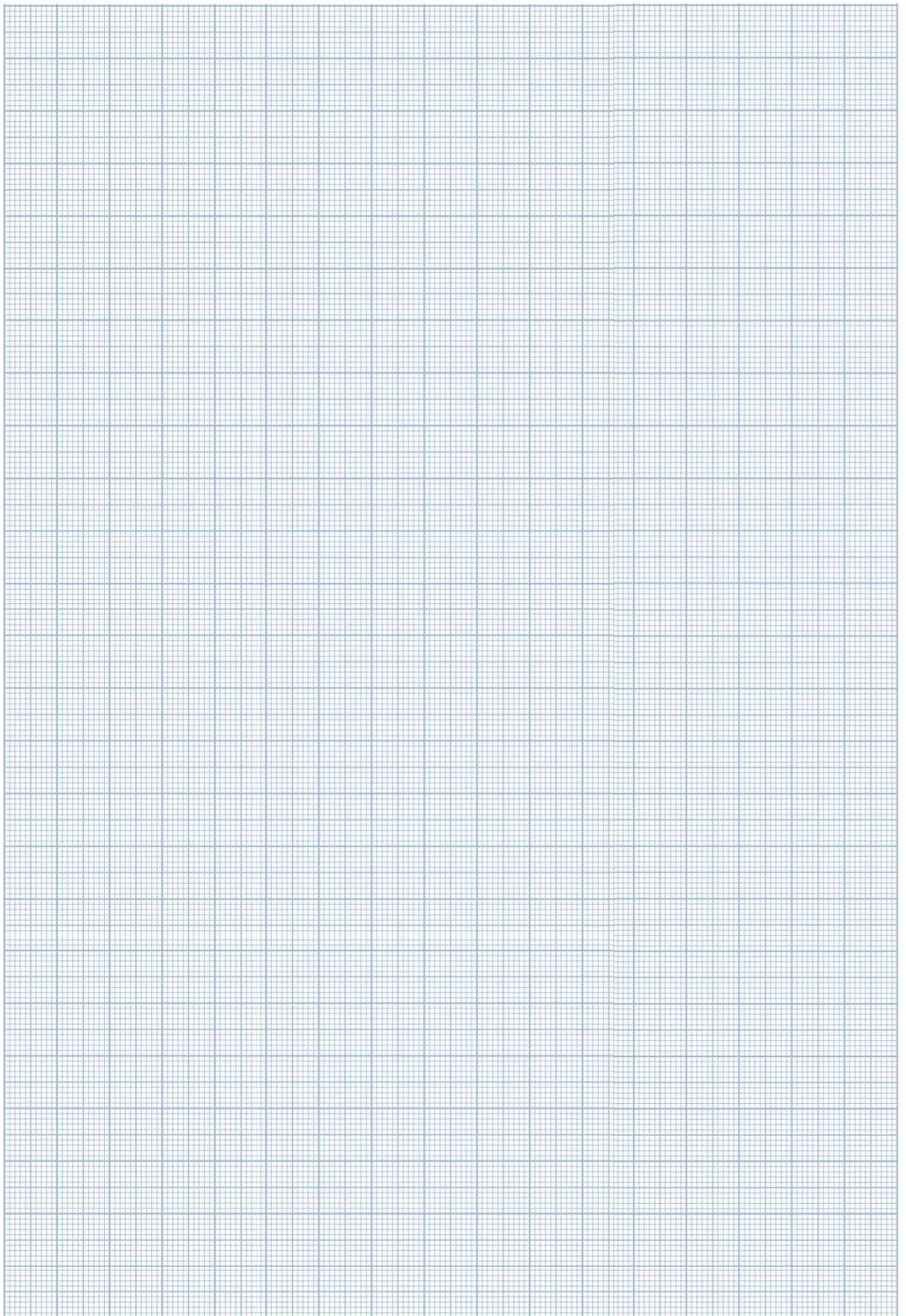
Item no.
6V21.

Hardness
Shaft: HRC 60 + 4/- 2
Head: HRC 45 +10/- 5

Material
WS

d_1 g6	d_2 0 -0,2	d_4 max.	k 0 -0,05	b 0 -0,015	r +0,2 0	l_3	l_1 +2 0	160	200	250
2	4	2,03	2	1,5	0,2	5		13,37		17,26
2,5	5	2,53	2	1,75	0,2	5		15,35		19,24
3	6	3,03	3	2	0,3	5		13,37	15,31	17,26
3,5	7	3,53	3	2,25	0,3	5		15,61		20,24
4	8	4,03	3	2,5	0,3	5		13,55		18,13
4,5	8	4,53	3	2,75	0,3	5		16,15		21,60
5	10	5,03	3	3,5	0,3	5		14,11		19,60
5,5	10	5,53	3	3,75	0,3	5		17,32		22,74
6	12	6,03	5	4	0,5	6		16,87	19,58	22,32
8	14	8,03	5	5	0,5	8		18,90	22,10	25,29
10	16	10,04	5	6	0,5	10		22,53		31,22
12	18	12,04	7	7	0,8	12		29,71		39,03

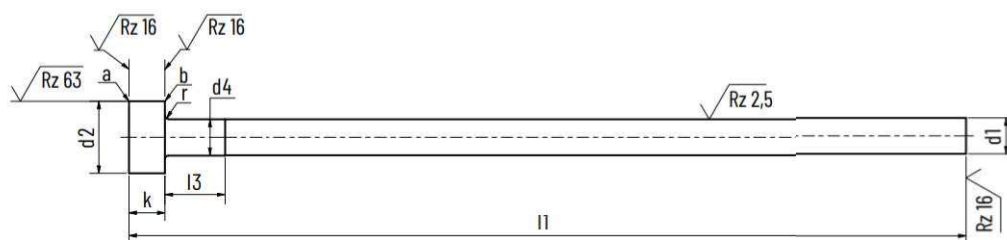
PRICES PER PIECE IN EURO



EJECTOR PIN

WITH CYLINDRICAL HEAD OF MATERIAL HSS

similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6123.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 50 ± 5

Material
HSS

Partly stocked in PM 23 and PM 10.
Prices upon request.

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	80	100	125	160	200	250	315	400	500	630
1	2,5	1,03	1,2	0,2	5		24,03			24,66			27,93					
1,1	2,5	1,13	1,2	0,2	5						25,03							
1,2	2,5	1,23	1,2	0,2	5		24,03			24,66		26,01	27,93					
1,3	3	1,33	1,5	0,2	5							26,01						
1,4	3	1,43	1,5	0,2	5								27,93					
1,5	3	1,53	1,5	0,2	5					7,63	8,62	9,57	11,49	14,30				
1,6	3	1,63	1,5	0,2	5						16,02	17,93	18,89		33,22			
1,7	3	1,73	1,5	0,2	5						16,02		18,88					
1,8	3	1,83	1,5	0,2	5						16,02	17,93	18,88					
1,9	3	1,93	1,5	0,2	5						16,02							
2	4	2,03	2	0,2	5					8,61	9,56	10,52	11,49	14,30	25,82			
2,1	4	2,13	2	0,2	5						16,75		19,62					
2,2	4	2,23	2	0,2	5						16,75	18,77	19,62					
2,3	4	2,33	2	0,2	5						16,75							
2,5	5	2,53	2	0,3	5			9,74		10,52	11,23	11,93	12,87	18,66	27,38			
3	6	3,03	3	0,3	5					10,96	11,70	12,43	13,84	19,58	23,09	35,44		
3,2	6	3,23	3	0,3	5						11,93	12,87	14,39		24,28			
3,5	7	3,53	3	0,3	5					10,96	11,93	12,87	14,39	20,04	24,28			
3,6	7	3,63	3	0,3	5							13,88						
3,7	7	3,73	3	0,3	5													
4	8	4,03	3	0,3	5									21,54	27,38			
4,2	8	4,23	3	0,3	5					11,49	12,43	13,38	14,39	20,04	24,28	36,63		
4,5	8	4,53	3	0,3	5					12,43	13,67	13,88	14,86	21,05	25,45			
5	10	5,03	3	0,3	5					12,43	13,40	14,39	14,86	21,05	25,45	38,73		60,09
5,2	10	5,23	3	0,3	5								15,30		25,82			
5,5	10	5,53	3	0,3	5					12,77	13,40	14,39	15,30	21,48	25,82			

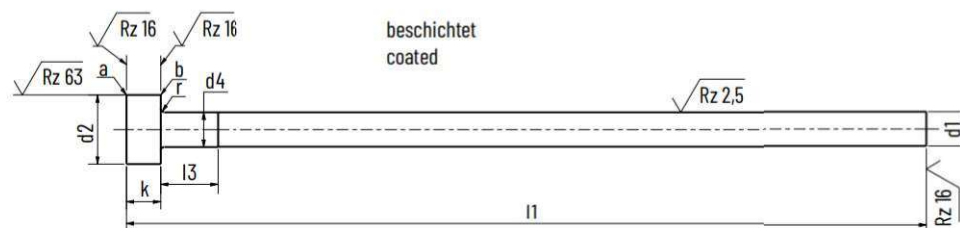
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	80	100	125	160	200	250	315	400	500	630
5,6	10	5,63	3	0,3	5								18,85					
6	12	6,03	5	0,5	6					12,77	13,80	14,80	15,30	21,70	25,82	39,09		61,92
6,5	12	6,53	5	0,5	6					15,71			17,61	25,05	28,08			
7	12	7,03	5	0,5	6							19,12	19,61	25,31		45,95		
7,5	12	7,53	5	0,5	6								34,39					
8	14	8,03	5	0,5	8								23,99	28,89	33,82	51,20		72,48
8,5	14	8,53	5	0,5	8								25,45		35,77	53,16		
9	14	9,03	5	0,5	8								26,96		37,75	55,13		
9,5	14	9,53	5	0,5	8					19,63			34,39					
10	16	10,04	5	0,5	10								30,30	36,36	42,42	59,81		92,98
11	16	11,04	5	0,5	10								43,94					
12	18	12,04	7	0,8	12				26,93			30,70	38,78	46,32		84,37		
14	22	14,04	7	0,8	14								48,69				146,55	
15	22	15,04	7	0,8	14								67,63					
16	22	16,04	7	0,8	16								67,63					
18	24	18,07	7	0,8	18							72,05						

Product laser marked with material specification, depending on availability. **PRICES PER PIECE IN EURO**

EJECTOR PIN

WITH CYLINDRICAL HEAD OF MATERIAL HSS AND DLC-COATING

similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6D23.

Hardness

Shaft: HRC 62 ± 2
Head: HRC 50 ± 5
Coating hardness: approx. 2.500 HV
Coating thickness: approx. 1,5 µm

Material
HSS

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	80	100	125	160	203	250	315	400	500	630
0,8	2,5	0,83	1,2	0,2	5					27,89								
1	2,5	1,03	1,2	0,2	5		26,38			27,46			32,24					
1,1	2,5	1,13	1,2	0,2	5						28,25							
1,2	2,5	1,23	1,2	0,2	5		26,09			27,14		29,66	31,70					
1,3	3	1,33	1,5	0,2	5							29,66						
1,4	3	1,43	1,5	0,2	5								31,70					
1,5	3	1,53	1,5	0,2	5					13,48	15,35	17,07	20,73					
1,6	3	1,63	1,5	0,2	5						22,85							
1,7	3	1,73	1,5	0,2	5						27,34		32,90					
1,8	3	1,83	1,5	0,2	5						27,34		32,90					
1,9	3	1,93	1,5	0,2	5						22,06							
2	4	2,03	2	0,2	5					13,68	15,95	17,23	19,71	25,24	39,67			
2,1	4	2,13	2	0,2	5						22,79		28,09					
2,2	4	2,23	2	0,2	5						22,67	25,62	27,89					
2,3	4	2,33	2	0,2	5						22,84							
2,5	5	2,53	2	0,3	5			14,81		15,58	17,02	18,65	21,09	29,59	41,23			
3	6	3,03	3	0,3	5					16,04	17,49	19,16	22,08	30,51	36,39			
3,2	6	3,23	3	0,3	5							19,76	23,0					
3,5	7	3,53	3	0,3	5					16,39	17,92	19,86	23,18	32,02	39,50			
3,6	7	3,63	3	0,3	5							21,49						
3,7	7	3,73	3	0,3	5									33,71	42,80			
4	8	4,03	3	0,3	5					16,86	18,38	20,37	23,0	31,97	39,39	59,40		
4,2	8	4,23	3	0,3	5					18,40	20,49	21,49	24,14	33,52				
4,5	8	4,53	3	0,3	5					18,30		21,97	24,11		42,52			
5	10	5,03	3	0,3	5					18,30	20,14	21,90	24,01	34,55	41,71	63,48		98,97
5,2	10	5,23	3	0,3	5								25,98		42,86			

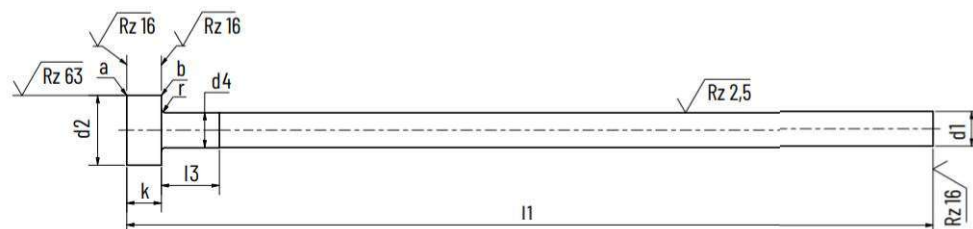
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	40	50	80	100	125	160	200	250	315	400	500	630
5,5	10	5,53	3	0,3	5					19,67			25,95	36,17	43,64			
5,6	10	5,63	3	0,3	5								32,87					
6	12	6,03	5	0,5	6					19,54	21,40	23,61	25,85	36,40	43,64			104,73
6,5	12	6,53	5	0,5	6								31,71	45,51	54,29			
7	12	7,03	5	0,5	6								33,70	45,76		86,28		
7,5	12	7,53	5	0,5	6								53,30					
8	14	8,03	5	0,5	8								37,97	46,73	57,54	87,22		123,42
8,5	14	8,53	5	0,5	8								44,36		68,15			
9	14	9,03	5	0,5	8								45,86		70,13			
9,5	14	9,53	5	0,5	8					28,09			53,30					
10	16	10,04	5	0,5	10								49,37	60,62	69,79			152,88
11	16	11,04	5	0,5	10								67,69					
12	18	12,04	7	0,8	12				39,34			49,47	62,51	74,61		135,95		
14	22	14,04	7	0,8	14								78,43				225,75	
15	22	15,04	7	0,8	14								93,07					
16	22	16,04	7	0,8	16								93,07					
18	24	18,07	7	0,8	18							97,48						

Product laser marked with material specification, depending on availability. **PRICES PER PIECE IN EURO**

EJECTOR PIN

STAINLESS AND ACID-RESISTANT

similar DIN 1530 part 1, type AH, hardened (similar DIN ISO 6751)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
612R.

Hardness
Shaft: HRC 56 + 2
Head: HRC 45 ± 5

Material
1.4112
Stainless and acid resistant steel

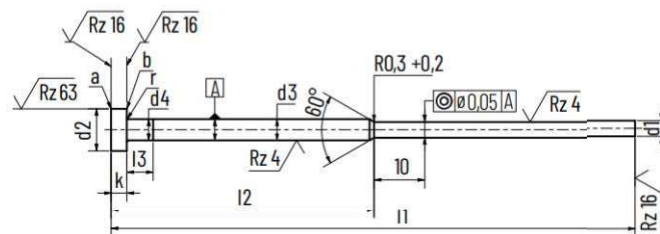
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2 0	100	125	160	200	250	315
1	2,5	1,03	1,2	0,2	5		34,30	45,01				
1,5	3	1,53	1,5	0,2	5						22,18	
2	4	2,03	2	0,2	5		14,17	15,09	16,26	17,84		
2,5	5	2,53	2	0,3	5		14,71	15,09	16,26	17,84	22,30	
2,7	5	2,73	2	0,3	5					19,69		
3	6	3,03	3	0,3	5		14,97	16,21	16,80	18,90	19,69	24,94
3,2	6	3,23	3	0,3	5			17,32				
3,5	7	3,53	3	0,3	5		16,80	17,06	17,32	19,03	20,09	
4	8	4,03	3	0,3	5		16,26	16,93	17,58	19,16	21,67	26,91
4,5	8	4,53	3	0,3	5		18,65	19,95	21,16	24,01	24,94	
5	10	5,03	3	0,3	5		16,26	17,58	18,38	21,27	25,85	31,10
5,5	10	5,53	3	0,3	5		18,65	19,95	21,16	24,01	29,66	
6	12	6,03	5	0,5	6		18,77	20,20	21,40	24,55	30,58	35,84
6,5	12	6,53	5	0,5	6						42,50	
7	12	7,03	5	0,5	6						42,63	
8	14	8,03	5	0,5	8		20,80	23,24	27,96	35,45	43,05	48,29
10	16	10,04	5	0,5	10		27,91	32,84	37,88	48,65	52,77	58,04
12	18	12,04	7	0,8	12		35,25	41,79	49,30	62,29	74,35	

PRICES PER PIECE IN EURO

EJECTOR PIN

WITH CYLINDRICAL HEAD

DIN 1530 part 2, type C, nitrided & oxidized (similar DIN ISO 8694)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6135.

Hardness

Shaft: min. 950 HV 0,3 on the surface. Core tensile strength approx. 1400 N/mm².
Head: HRC 45 +10/- 5

Material

Hot working tool steel

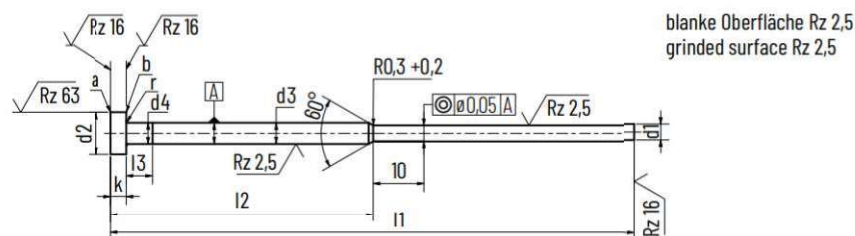
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	d ₃ 0 -0,1	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2/0 l ₂ -1/-2	80 32	80 35	100 50	125 50	160 63	160 75	200 75	200 80
0,6	4	2,03	2	2	0,2	5			35,65	35,92	36,97		38,27	40,16	
0,7	4	2,03	2	2	0,2	5			35,65	35,92	36,97		38,27	40,16	
0,8	4	2,03	2	2	0,2	5		23,15	23,15	23,38	24,92	25,69	25,69	28,20	28,20
0,9	4	2,03	2	2	0,2	5			23,15	23,38	24,92	25,69	25,69	28,20	28,20
1	4	2,03	2	2	0,2	5		22,17	22,17	22,41	23,27	24,06	24,06	25,45	25,45
1,1	4	2,03	2	2	0,2	5		20,93	20,93	21,12	22,01	22,65	22,65	24,92	24,92
1,2	4	2,03	2	2	0,2	5		20,93	20,93	21,12	22,01	22,65	22,65	24,92	24,92
1,3	4	2,03	2	2	0,2	5		20,93	20,93	21,12	22,01	22,65	22,65	24,92	24,92
1,4	4	2,03	2	2	0,2	5		20,93	20,93	21,12	22,01	22,65	22,65	24,92	24,92
1,5	6	3,03	3	3	0,3	5		18,54	18,54	18,94	19,99	21,01	21,01	23,27	23,27
1,6	6	3,03	3	3	0,3	5		18,54	18,54	18,94	19,99	21,01	21,01	23,27	23,27
1,7	6	3,03	3	3	0,3	5		18,54	18,54	18,94	19,99	21,01	21,01	23,27	23,27
1,8	6	3,03	3	3	0,3	5		18,54	18,54	18,94	19,99	21,01	21,01	23,27	23,27
1,9	6	3,03	3	3	0,3	5		18,54	18,54	18,94	19,99	21,01	21,01	23,27	23,27
2	6	3,03	3	3	0,3	5		16,79	16,79	16,95	17,96	19,14	19,14	21,01	21,01
2,1	6	3,03	3	3	0,3	5		16,79	16,79	16,95	17,96	19,14	19,14	21,01	21,01
2,2	6	3,03	3	3	0,3	5		16,79	16,79	16,95	17,96	19,14	19,14	21,01	21,01
2,3	6	3,03	3	3	0,3	5		16,79	16,79	16,95	17,96	19,14	19,14	21,01	21,01
2,4	6	3,03	3	3	0,3	5		16,79	16,79	16,95	17,96	19,14	19,14	21,01	21,01
2,5	6	3,03	3	3	0,3	5				15,20	16,23	17,44	17,44	19,27	19,27

In case of order please always specify l₁ and l₂ lengths. **PRICES PER PIECE IN EURO**

EJECTOR PIN

WITH CYLINDRICAL HEAD

DIN 1530 part 2, type C, bright nitrided (similar DIN ISO 8694)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6145.

Hardness

Shaft: min. 950 HV 0,3 on the surface. Core tensile strength approx. 1400 N/mm².
Head: HRC 45 +10/- 5

Material

Hot working tool steel

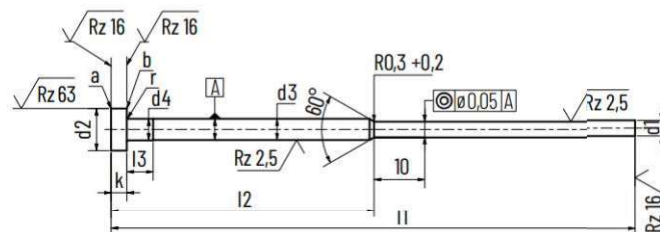
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	d ₃ 0 -0,1	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2/0 l ₂ -1/-2	80 32	80 35	100 50	125 50	160 63	160 75	200 75	200 80
0,6	4	2,03	2	2	0,2	5			36,09	36,38	37,43		38,75	40,65	
0,7	4	2,03	2	2	0,2	5			36,09	36,38	37,43		38,75	40,65	
0,8	4	2,03	2	2	0,2	5		23,44	23,44	23,67	25,23	26,01	26,01	28,56	28,56
0,9	4	2,03	2	2	0,2	5		23,44	23,44	23,67	25,23	26,01	26,01	28,56	28,56
1	4	2,03	2	2	0,2	5		22,45	22,45	22,69	23,56	24,36	24,36	25,76	25,76
1,1	4	2,03	2	2	0,2	5		21,19	21,19	21,38	22,28	22,93	22,93	25,23	25,23
1,2	4	2,03	2	2	0,2	5		21,19	21,19	21,38	22,28	22,93	22,93	25,23	25,23
1,3	4	2,03	2	2	0,2	5		21,19	21,19	21,38	22,28	22,93	22,93	25,23	25,23
1,4	4	2,03	2	2	0,2	5		21,19	21,19	21,38	22,28	22,93	22,93	25,23	25,23
1,5	6	3,03	3	3	0,3	5		18,76	18,76	19,18	20,23	21,28	21,28	23,56	23,56
1,6	6	3,03	3	3	0,3	5		18,76	18,76	19,18	20,23	21,28	21,28	23,56	23,56
1,7	6	3,03	3	3	0,3	5		18,76	18,76	19,18	20,23	21,28	21,28	23,56	23,56
1,8	6	3,03	3	3	0,3	5		18,76	18,76	19,18	20,23	21,28	21,28	23,56	23,56
1,9	6	3,03	3	3	0,3	5		18,76	18,76	19,18	20,23	21,28	21,28	23,56	23,56
2	6	3,03	3	3	0,3	5		16,99	16,99	17,16	18,17	19,38	19,38	21,28	21,28
2,1	6	3,03	3	3	0,3	5		16,99	16,99	17,16	18,17	19,38	19,38	21,28	21,28
2,2	6	3,03	3	3	0,3	5		16,99	16,99	17,16	18,17	19,38	19,38	21,28	21,28
2,3	6	3,03	3	3	0,3	5			16,99	17,16	18,17	19,38	19,38	21,28	21,28
2,4	6	3,03	3	3	0,3	5		16,99	16,99	17,16	18,17	19,38	19,38	21,28	21,28
2,5	6	3,03	3	3	0,3	5				15,40	16,43	17,65	17,65	19,51	19,51

In case of order please always specify l₁ and l₂ lengths. **PRICES PER PIECE IN EURO**

EJECTOR PIN

WITH CYLINDRICAL HEAD

DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6141.

Hardness
Shaft: HRC 60 + 4/- 2
Head: HRC 45 +10/- 5

Material
WS

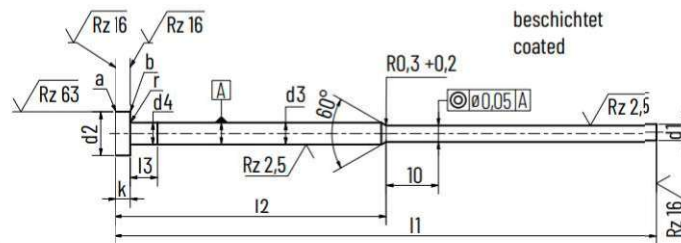
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	d ₃ 0 -0,1	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2/0 l ₂ -1/-2	63 25	80 32	80 35	100 50	125 50	160 63	160 75	200 75	200 80	250 100	315 160
0,5	4	2,03	2	2	0,2	5		22,01	22,01	22,01	22,28	23,19	24,98	24,98				
0,6	4	2,03	2	2	0,2	5		20,92	20,92	21,17	22,13	23,66	23,66	25,83	25,83			
0,7	4	2,03	2	2	0,2	5		20,92	20,92	21,17	22,13	23,66	23,66	25,83	25,83			
0,8	4	2,03	2	2	0,2	5		19,80	19,80	19,80	20,05	21,04	22,47	22,47	24,43	24,43	37,65	
0,85	4	2,03	2	2	0,2	5						21,04	23,66	23,66	25,83	25,83		
0,9	4	2,03	2	2	0,2	5		19,80	19,80	19,80	20,05	21,04	22,47	22,47	24,43	24,43		
0,95	4	2,03	2	2	0,2	5									25,83	25,83		
1	4	2,03	2	2	0,2	5		18,65	18,65	18,65	18,94	19,93	21,21	21,21	22,76	22,76	30,35	
1,1	4	2,03	2	2	0,2	5		18,65	18,65	18,65	18,94	19,93	21,21	21,21	22,76	22,76	30,35	
1,2	4	2,03	2	2	0,2	5		18,65	18,65	18,65	18,94	19,93	21,21	21,21	22,76	22,76	30,35	
1,25	4	2,03	2	2	0,2	5							21,21					
1,3	4	2,03	2	2	0,2	5		18,65	18,65	18,65	18,94	19,93	21,21	21,21	22,76	22,76	30,35	
1,4	4	2,03	2	2	0,2	5		18,65	18,65	18,65	18,94	19,93	21,21	21,21	22,76	22,76	30,35	
1,5	6	3,03	3	3	0,3	5		15,92	15,92	15,92	16,20	17,43	18,94	18,94	20,99	20,99	22,98	41,34
1,6	6	3,03	3	3	0,3	5			15,92	15,92	16,20	17,43	18,94	18,94	20,99	20,99	38,14	
1,7	6	3,03	3	3	0,3	5			15,92	15,92	16,20	17,43	18,94	18,94	20,99	20,99		
1,8	6	3,03	3	3	0,3	5			15,92	15,92	16,20	17,43	18,94	18,94	20,99	20,99		
1,9	6	3,03	3	3	0,3	5			15,92	15,92	16,20	17,43	18,94	18,94	20,99	20,99		
2	6	3,03	3	3	0,3	5			14,08	14,08	14,38	15,68	17,07	17,07	19,24	19,24	21,06	38,14
2,1	6	3,03	3	3	0,3	5			14,08	14,08	14,38	15,68	17,07	17,07	19,24	19,24		
2,2	6	3,03	3	3	0,3	5			14,08	14,08	14,38	15,68	17,07	17,07	19,24	19,24		
2,3	6	3,03	3	3	0,3	5			14,08	14,08	14,38	15,68	17,07	17,07	19,24	19,24		
2,4	6	3,03	3	3	0,3	5			14,08	14,08	14,38	15,68	17,07	17,07	19,24	19,24		
2,5	6	3,03	3	3	0,3	5					12,71	13,99	15,27	15,27	17,56	17,56	19,24	36,51

In case of order please always specify l₁ and l₂ lengths. **PRICES PER PIECE IN EURO**

EJECTOR PIN

WITH CYLINDRICAL HEAD AND DLC-COATING

similar DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6D41.

Hardness

Shaft: HRC 60 + 4/- 2
Head: HRC 45 + 10/- 5
Coating hardness: approx. 2.500 HV
Coating thickness: approx. 1,5 µm

Material
WS

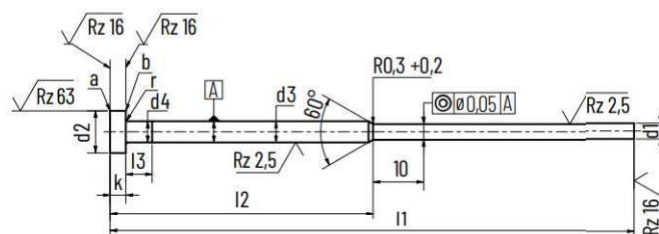
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	d ₃ 0 -0,1	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2/0 l ₂ -1/-2	63 25	80 35	100 50	125 50	160 75	200 75	250 100	315 160
0,5	4	2,03	2	2	0,2	5			29,47	29,84	31,07	33,48			
0,6	4	2,03	2	2	0,2	5			27,99	28,37	29,65	31,71	34,61		
0,7	4	2,03	2	2	0,2	5			27,99	28,37	29,65	31,71	34,61		
0,8	4	2,03	2	2	0,2	5		26,51	26,51	26,85	28,15	30,10	32,71	50,45	
0,9	4	2,03	2	2	0,2	5		26,51	26,51	26,85	28,15	30,10	32,71		
1	4	2,03	2	2	0,2	5		24,96	24,96	25,38	26,69	28,44	30,50	40,65	
1,1	4	2,03	2	2	0,2	5		24,96	24,96	25,38	26,69	28,44	30,50	40,65	
1,2	4	2,03	2	2	0,2	5		24,96	24,96	25,38	26,69	28,44	30,50	40,65	
1,3	4	2,03	2	2	0,2	5		24,96	24,96	25,38	26,69	28,44	30,50	40,65	
1,4	4	2,03	2	2	0,2	5		24,96	24,96	25,38	26,69	28,44	30,50	40,65	
1,5	6	3,03	3	3	0,3	5		21,30	21,30	21,72	23,34	25,38	28,09	30,80	55,36
1,6	6	3,03	3	3	0,3	5		21,30	21,30	21,72	23,34	25,38	28,09	51,09	
1,7	6	3,03	3	3	0,3	5		21,30	21,30	21,72	23,34	25,38	28,09		
1,8	6	3,03	3	3	0,3	5		21,30	21,30	21,72	23,34	25,38	28,09		
1,9	6	3,03	3	3	0,3	5		21,30	21,30	21,72	23,34	25,38	28,09		
2	6	3,03	3	3	0,3	5		18,84	19,28	20,99	22,86	25,75	28,19	51,09	
2,2	6	3,03	3	3	0,3	5			19,28	20,99	22,86	25,75			
2,5	6	3,03	3	3	0,3	5				17,02	18,72	20,43	23,53	25,75	48,89

PRICES PER PIECE IN EURO

EJECTOR PIN

WITH CYLINDRICAL HEAD OF MATERIAL HSS

similar DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6143.

Hardness
Shaft: HRC 62 ± 2
Head: HRC 50 ± 5

Material
HSS

d ₁ g6	d ₂ 0 -0,2	d ₄ max.	d ₃ 0 -0,1	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2/0 l ₂ -1/-2	63 25	80 35	100 50	125 50	160 63	160 75	200 75	200 80	250 100	315 160
0,5	4	2,03	2	2	0,2	5			25,88	26,20	27,26		29,38				
0,6	4	2,03	2	2	0,2	5			24,59	24,90	26,04	27,83	27,83	30,38			
0,7	4	2,03	2	2	0,2	5			24,59	24,90	26,04	27,83	27,83	30,38			
0,8	4	2,03	2	2	0,2	5		23,31	23,31	23,58	24,74	25,40	26,40	28,72	28,72	44,28	
0,9	4	2,03	2	2	0,2	5		23,31	23,31	23,58	24,74	25,40	26,40	28,72			
1	4	2,03	2	2	0,2	5		21,91	21,91	22,29	23,42	24,95	24,95	26,77	26,77	35,70	
1,1	4	2,03	2	2	0,2	5				22,29	23,42	24,95	24,95	26,77			
1,2	4	2,03	2	2	0,2	5		21,91	21,91	22,29	23,42	24,95	24,95	26,77	26,77	35,70	
1,3	4	2,03	2	2	0,2	5				22,29	23,42	24,95	24,95	26,77	26,77	35,70	
1,4	4	2,03	2	2	0,2	5			21,91	22,29	23,42	24,95	24,95	26,77	26,77	35,70	
1,5	6	3,03	3	3	0,3	5		18,72	18,72	19,05	20,48	22,29	22,29	24,66	24,66	27,00	48,59
1,6	6	3,03	3	3	0,3	5			18,72	19,05	20,48	22,29	22,29	24,66	24,66	35,70	
1,7	6	3,03	3	3	0,3	5				19,05	20,48	22,29	22,29	24,66			
1,8	6	3,03	3	3	0,3	5				19,05	20,48	22,29	22,29	24,66	24,66		
1,9	6	3,03	3	3	0,3	5				19,05							
2	6	3,03	3	3	0,3	5			16,54	16,93	18,41	20,08	20,08	22,59	22,59	24,76	44,84
2,2	6	3,03	3	3	0,3	5				16,93	18,41	20,08	20,08	22,59	22,59		
2,5	6	3,03	3	3	0,3	5				14,95	16,46	17,95	17,95	20,65	20,65	22,59	42,94

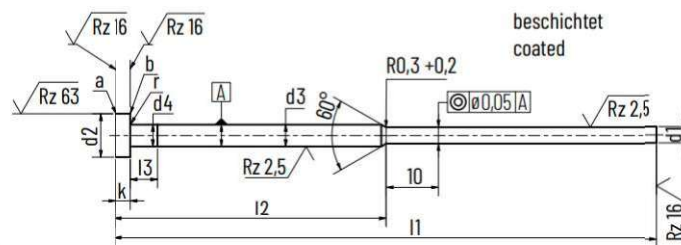
Product laser marked with material specification, depending on availability.

In case of order please always specify l₁ and l₂ lengths. **PRICES PER PIECE IN EURO**

EJECTOR PIN

WITH CYLINDRICAL HEAD OF MATERIAL HSS AND DLC-COATING

similar DIN 1530 part 2, type CH, hardened (similar DIN ISO 8694)



a = Kante gratfrei | b = Kante verrundet
a = edge free of burrs | b = rounded

Item no.
6D43.

Hardness

Shaft: HRC 62 ± 2
Head: HRC 50 ± 5
Coating hardness: approx. 2.500 HV
Coating thickness: approx. 1,5 µm

Material
HSS

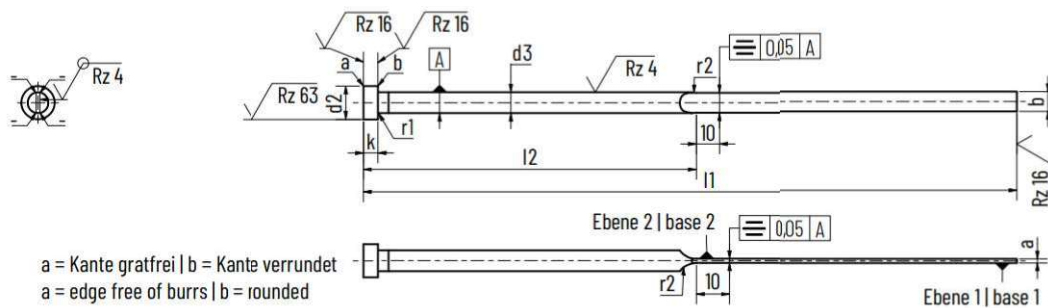
d ₁ g6	d ₂ 0 -0,2	d ₄ max.	d ₃ 0 -0,1	k 0 -0,05	r +0,2 0	l ₃	l ₁ +2/0 l ₂ -1/-2	63 25	80 35	100 50	125 50	160 75	200 75	250 100	315 160
0,5	4	2,03	2	2	0,2	5			35,50	35,95	37,39	40,33			
0,6	4	2,03	2	2	0,2	5			33,70	34,19	35,73	38,18	41,67		
0,7	4	2,03	2	2	0,2	5			33,70	34,19	35,73	38,18	41,67		
0,8	4	2,03	2	2	0,2	5		31,93	31,93	32,32	33,87	36,26	39,37	60,73	
0,9	4	2,03	2	2	0,2	5		31,93	31,93	32,32	33,87	36,26	39,37		
1	4	2,03	2	2	0,2	5		30,06	30,06	30,57	32,17	34,26	36,71	48,95	
1,1	4	2,03	2	2	0,2	5				30,57	32,17	34,26	36,71		
1,2	4	2,03	2	2	0,2	5		30,06	30,06	30,57	32,17	34,26	36,71	48,95	
1,3	4	2,03	2	2	0,2	5				30,57	32,17	34,26	36,71	48,95	
1,4	4	2,03	2	2	0,2	5			30,06	30,57	32,17	34,26	36,71	48,95	
1,5	6	3,03	3	3	0,3	5		25,66	25,66	26,16	28,09	30,57	33,81	37,08	66,65
1,6	6	3,03	3	3	0,3	5			25,66	26,16	28,09	30,57	33,81	52,32	
1,7	6	3,03	3	3	0,3	5				26,16	28,09	30,57	33,81		
1,8	6	3,03	3	3	0,3	5				26,16	28,09	30,57	33,81		
1,9	6	3,03	3	3	0,3	5				26,16					
2	6	3,03	3	3	0,3	5			22,68	23,24	25,24	27,52	30,97	33,94	61,50
2,2	6	3,03	3	3	0,3	5				23,24	25,24	27,52	30,97		
2,5	6	3,03	3	3	0,3	5				20,48	22,54	24,57	28,30	30,97	58,86

Product laser marked with material specification, depending on availability. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH CYLINDRICAL HEAD

DIN ISO 8693, nitrided & oxidized (DIN 1530 part 4, type FA)



Item no.

6315.
6335.

Hardness

Shaft: min. 950 HV 0,3 on the surface. Core tensile strength approx. 1400 N/mm².
Head: HRC 45 +10/- 5

Material

Hot working tool steel

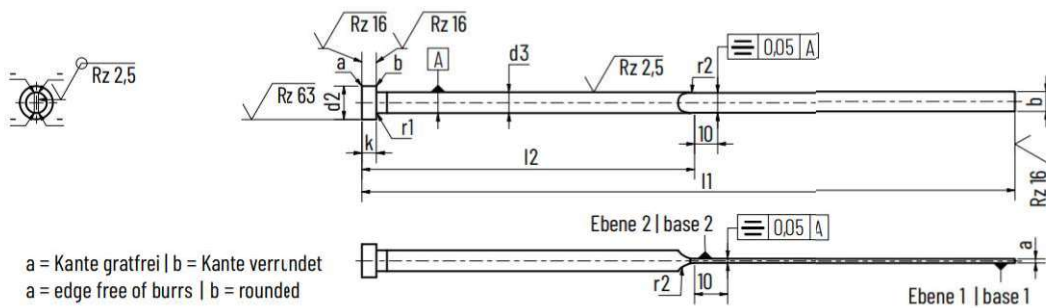
a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃		6315.	6315.	6315.	6335.	6315.	6315.	6315.	6315.	6315.	6315.
0	0	h11	0	0	+0,2	min.			63	80	100	125	125	160	200	250	315	400
-0,015	-0,015		-0,2	-0,05	0				32	40	50	60	63	80	100	125	160	200
0,8	3,5	4	8	3	0,3	10	5		40.75	45.21	52.92		55.69	62.42				
0,8	3,8	4,2	8	3	0,3	10	5			45.21	52.92	55.69		55.69	62.42	67.28		
0,8	4,5	5	10	3	0,3	10	5							89.99	102.34			
0,8	5,5	6	12	5	0,5	10	6							93.70	106.05			
1	3,5	4	8	3	0,3	10	5		35.89		43.75		47.98					
1	3,5	4,2	8	3	0,3	10	5			39.85	43.75		47.98	53.80				
1	3,8	4,2	8	3	0,3	10	5			39.85	43.75	47.98	47.98	51.47	55.55			
1	4,5	5	10	3	0,3	10	5			45.21	54.97	68.33	68.33	80.43	86.84			
1	5,5	6	12	5	0,5	10	6			46.62	59.31	72.05	72.05	84.66	91.44	98.19	106.68	
1,2	3,5	4	8	3	0,3	10	5		33.98				44.43					
1,2	3,8	4,2	8	3	0,3	10	5			37.72	41.59	44.43	44.43	49.80	53.74	57.73		
1,2	4,5	5	10	3	0,3	10	5			41.29	53.34	66.27	66.27	78.42	83.05			
1,2	5,5	6	12	5	0,5	10	6			43.84	56.30	68.85	68.85	80.28	86.73	93.15		
1,2	7,5	8	14	5	0,5	10	8				77.09	91.84	91.84	105.07	118.68	127.48	138.52	
1,5	4,5	5	10	3	0,3	10	5		39.68	51.55	63.30	63.30	75.70	81.35	87.39			
1,5	5,5	6	12	5	0,5	10	6				55.51	68.59	68.59	80.38	85.55		103.59	
1,5	7,5	8	14	5	0,5	10	8					91.45	91.45	104.54	115.63	124.17	134.97	
1,5	9,5	10	16	5	0,5	10	10							137.83	156.81	177.66	212.33	272.41
1,6	7,5	8	14	5	0,5	10	8							119.92				
2	5,5	6	12	5	0,5	10	6				52.92	65.33	65.33	77.71	82.31			
2	7,5	8	14	5	0,5	10	8						85.36	98.61	110.41	120.25	130.66	167.78
2	9,5	10	16	5	0,5	10	10							133.35	151.60	171.81	206.44	233.88
2	11,5	12	18	7	0,8	10	12								184.25	227.32	265.88	331.21
2	15,5	16	22	7	0,8	10	16								233.88	292.67	338.45	420.72
2,5	11,5	12	18	7	0,8	10	12								175.07	219.51	254.77	318.81
2,5	15,5	16	22	7	0,8	10	16								223.43	270.61	326.64	408.95

Measure a and b: These limit dimensions apply for 100 mm length (l₂). For length (l₂) > 100 the limit dimensions are to be multiplied by (l₁-l₂) 10⁻².
The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH CYLINDRICAL HEAD

DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6321.

6331.

Hardness

Shaft: HRC 60 + 4/- 2

Head: HRC 45 +10/- 5

Material

WS

a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃		6331.	6321.	6321.	6321.	6331.	6321.	6321.	6321.	6321.	6321.	6321.	
0	0	h11	0	0	+0,2	min.			63	63	80	100	125	125	160	200	250	315	400	
-0,015	-0,015		-0,2	-0,05	0			$l_1+2/0$ $l_2-1/2$	30	32	40	50	60	63	80	100	125	160	200	
0,5	2,8	3	6	3	0,3	10	5				65.87	73.84	75.86	75.86	76.92					
0,6	1,8	2	4	2	0,2	10	5				65.87	73.84	75.86	75.86	76.92					
0,6	2,5	3	6	3	0,3	10	5										84.45			
0,6	2,8	3	6	3	0,3	10	5				61.78	62.57	64.65	64.65	76.14		84.45			
0,6	3,8	4,2	8	3	0,3	10	5				61.78	62.08	64.65	64.65	80.41		84.45			
0,7	2,8	3	6	3	0,3	10	5										84.45			
0,8	1,8	2	4	2	0,2	10	5				65.87	73.84	75.86		76.92					
0,8	2,8	3	6	3	0,3	10	5				38.06	44.20	46.25	46.25	50.87	57.25				
0,8	3,5	4	8	3	0,3	10	5			34.24	38.06	44.20	46.25	46.25	50.87					
0,8	3,8	4,2	8	3	0,3	10	5		34.24	34.24	38.06	44.20	46.25	46.25	50.87	57.25	62.58			
1	2,8	3	6	3	0,3	10	5					42.51	44.53	44.53	45.75	51.47				
1	3,5	4	8	3	0,3	10	5				28.18	33.31	36.53		39.13	42.98				
1	3,5	4,2	8	3	0,3	10	5				28.18	33.31	36.53		39.13	42.98	47.03			
1	3,8	4,2	8	3	0,3	10	5		28.18	28.18	33.31	36.53	39.13	39.13	42.24	47.54	51.99			
1	4,5	5	10	3	0,3	10	5				37.81	44.89	56.40	56.40	67.30	69.84	76.39			
1	5,5	6	12	5	0,5	10	6				39.98	49.66	59.26	59.26	70.57	75.51	82.61	99.10		
1,2	3,5	4	8	3	0,3	10	5			26.67	31.98	35.26		38.06	42.98	47.03				
1,2	3,8	4,2	8	3	0,3	10	5				31.98	35.26	38.06	38.06	41.22	46.33	50.70			
1,2	4,5	5	10	3	0,3	10	5				33.31	44.27	54.62	54.62	65.34	70.87	77.48	93.06		
1,2	5,5	6	12	5	0,5	10	6				34.50	47.31	57.91	57.91	69.09	73.96	80.83	97.02		
1,2	7,5	8	14	5	0,5	10	8					65.15	76.79	76.79	88.74	98.04	107.23	128.63		
1,5	4,5	5	10	3	0,3	10	5				31.98	42.26	51.28	51.28	62.15	66.65	72.93			
1,5	5,5	6	12	5	0,5	10	6				32.54	44.89	56.40	56.40	67.30	71.13	77.80	93.37		
1,5	7,5	8	14	5	0,5	10	8					63.58	74.97	74.97	87.20	96.13	105.10	126.10	220.96	
1,5	9,5	10	16	5	0,5	10	10								114.73	130.08	148.06	178.19		
2	5,5	6	12	5	0,5	10	6				39.98	42.26	51.86	51.86	64.07	67.96	74.35	92.19		
2	7,5	8	14	5	0,5	10	8					61.42	72.43	72.43		84.60	92.93	101.92	122.32	180.72
2	9,5	10	16	5	0,5	10	10								112.45	127.55	144.18	174.33	196.96	
2	11,5	12	18	7	0,8	10	12									152.54	193.55	223.69	277.36	
2	15,5	16	22	7	0,8	10	16									193.63	249.19	284.74	352.32	

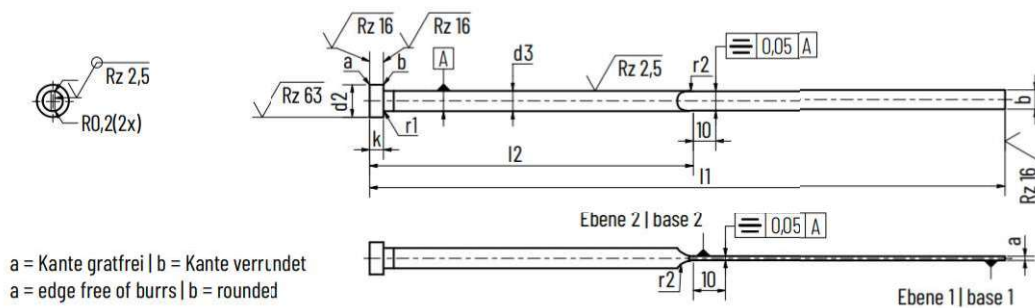
a	b	d ₃	d ₂	k	r ₁	r ₂	I3		6331.	6321.	6321.	6321.	6331.	6321.	6321.	6321.	6321.	6321.	6321.
0	0	h11	0	0	+0,2	min.		I ₁ +2/0	63	63	80	100	125	125	160	200	250	315	400
-0,015	-0,015		-0,2	-0,05	0			I ₂ -1/-2	30	32	40	50	60	63	80	100	125	160	200
2,5	11,5	12	18	7	0,8	10	12									150.01	190.37	220.49	273.37
2,5	15,5	16	22	7	0,8	10	16											290.97	342.45

Measure a and b: These limit dimensions apply for 100 mm length (I₂). For length (I₂) > 100 the limit dimensions are to be multiplied by (I₁-I₂) 10⁻².
The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH 2 CORNER RADII

similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6351.

Radii tolerance + 0,02

Hardness

Shaft: HRC 60 + 4/- 2

Head: HRC 45 +10/- 5

Material

WS

a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃	l ₁ +2/0	63	80	100	125	160	200	250	315	400
0	0	h11	0	0	+0,2	min.		l ₂ - l ₁ - 2	30	40	50	60	80	100	125	160	200
-0,015	-0,015		-0,2	-0,05	0												
0,5	2,8	3	6	3	0,3	10	5			71,87	78,68	90,90	96,44				
0,5	3,8	4,2	8	3	0,3	10	5			71,87	78,68	90,90	96,44				
0,6	2,8	3	6	3	0,3	10	5			59,94	65,63	75,84	87,63	100,71			
0,6	3,8	4,2	8	3	0,3	10	5			59,94	65,63	75,84	87,63	100,71	117,18		
0,8	1,8	2	4	2	0,2	10	5			65,63	75,84	87,63	100,71	117,18	140,76		
0,8	2,8	3	6	3	0,3	10	5			59,94	65,63	75,84	87,63	100,71	117,18	140,76	
0,8	3,5	4,2	8	3	0,3	10	5						87,63				
0,8	3,8	4,2	8	3	0,3	10	5		53,84	59,94	65,63	75,84	87,63	100,71	117,18	140,76	
1	2,8	3	6	3	0,3	10	5				65,63	75,84	87,63	100,71	117,18	140,76	
1	3,8	4,2	8	3	0,3	10	5		53,84	59,94	65,63	75,84	87,63	100,71	117,18	140,76	174,82
1	4,5	5	10	3	0,3	10	5			54,97	64,05	74,13	85,94	97,99	119,01	142,88	176,95
1	5,5	6	12	5	0,5	10	6			59,37	65,47	75,41	86,94	99,29	119,87	143,90	177,96
1,2	3,8	4,2	8	3	0,3	10	5			59,94	65,63	75,84	87,63	100,71	117,18	140,76	174,82
1,2	4,5	5	10	3	0,3	10	5			54,97	64,05	74,13	85,94	97,99	119,01	142,88	176,95
1,2	5,5	6	12	5	0,5	10	6				65,47	75,41	86,94	99,29	119,87	143,90	177,96
1,2	7,5	8	14	5	0,5	10	8			69,02	80,10	88,93	104,54	125,28	150,25	184,32	
1,5	4,5	5	10	3	0,3	10	5		54,97	64,05	74,13	85,94	97,99	119,01	142,88	176,95	
1,5	5,5	6	12	5	0,5	10	6				65,47	75,41	86,94	99,29	119,87	143,90	177,96
1,5	7,5	8	14	5	0,5	10	8				80,10	88,93	104,54	125,28	150,25	184,32	
1,5	9,5	10	16	5	0,5	10	10					114,91	130,79	157,36	188,74	222,81	
2	5,5	6	12	5	0,5	10	6			65,47	75,41	86,94	99,29	119,87	143,90	177,96	
2	7,5	8	14	5	0,5	10	8					88,93	104,54	125,28	150,25	184,32	
2	9,5	10	16	5	0,5	10	10						130,79	157,36	188,74	222,81	
2	11,5	12	18	7	0,8	10	12						163,49	196,30	235,90	269,97	
2,5	11,5	12	18	7	0,8	10	12							163,49	196,30	235,90	269,97

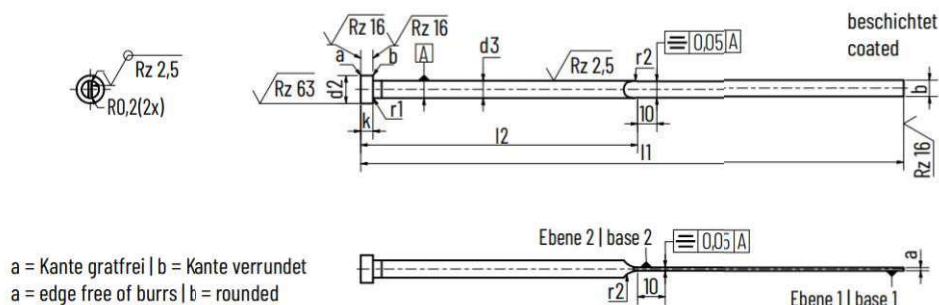
Measure a and b: These limit dimensions apply for 100 mm length (l₂). For length (l₂) > 100 the limit dimensions are to be multiplied by (l₁-l₂) 10⁻².

The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH 2 CORNER RADII AND DLC-COATING

similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6R51.

Radii tolerance + 0,02

Hardness

Shaft: HRC 60 + 4/- 2

Head: HRC 45 + 10/- 5

Coating hardness: approx. 2.500 HV

Coating thickness: approx. 1,5 µm

Material

WS

a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃	l ₁ +2/0	63	80	100	125	160	200	250	315
0	0	h11	0	0	+0,2	min.		l ₂ -1/-2	30	40	50	60	80	100	125	160
-0,015	-0,015		-0,2	-0,05	0											
0,5	2,8	3	6	3	0,3	10	5			85,14	93,18	107,67	114,22			
0,5	3,8	4,2	8	3	0,3	10	5			85,14	93,18	107,67	114,22			
0,6	2,8	3	6	3	0,3	10	5			70,95	77,69	89,84	103,74			
0,6	3,8	4,2	8	3	0,3	10	5			70,95	77,69	89,84	103,74	119,38		
0,8	1,8	2	4	2	0,2	10	5			77,69	89,84	103,74	119,38	138,98	166,76	
0,8	2,8	3	6	3	0,3	10	5			70,95	77,69	89,84	103,74	119,38		
0,8	3,5	4	8	3	0,3	10	5									
0,8	3,8	4,2	8	3	0,3	10	5									
1	2,8	3	6	3	0,3	10	5		63,86	70,95	77,69	89,84	103,74	119,38	138,98	
1	3,8	4,2	8	3	0,3	10	5		63,86	70,95	77,69	89,84	103,74	119,38	138,98	166,76
1	4,5	5	10	3	0,3	10	5			65,11	75,93	87,77	101,90	116,08	141,03	169,27
1	5,5	6	12	5	0,5	10	6			70,38	77,54	89,23	102,97	117,61	142,04	170,28
1,2	3,8	4,2	8	3	0,3	10	5			70,95	77,69	89,84	103,74	119,38	138,98	166,76
1,2	4,5	5	10	3	0,3	10	5			65,11	75,93	87,77	101,90	116,08	141,03	169,27
1,2	5,5	6	12	5	0,5	10	6			70,38	77,54	89,23	102,97	117,61	142,04	170,28
1,2	7,5	8	14	5	0,5	10	8			81,77	94,79	105,33	123,92	148,34	178,04	
1,5	4,5	5	10	3	0,3	10	5			65,11	75,93	87,77	101,90	116,08	141,03	169,27
1,5	5,5	6	12	5	0,5	10	6				77,54	89,23	102,97	117,61	142,04	170,28
1,5	7,5	8	14	5	0,5	10	8				94,79	105,33	123,92	148,34	178,04	
1,5	9,5	10	16	5	0,5	10	10					136,06	154,93	186,38	223,52	
2	5,5	6	12	5	0,5	10	6				77,54	89,23	102,97	117,61	142,04	170,28
2	7,5	8	14	5	0,5	10	8					105,33	123,92	148,34	178,04	
2	9,5	10	16	5	0,5	10	10						154,93	186,38	223,52	
2	11,5	12	18	7	0,8	10	12							193,69	232,61	279,43
2,5	11,5	12	18	7	0,8	10	12							193,69	232,61	279,43

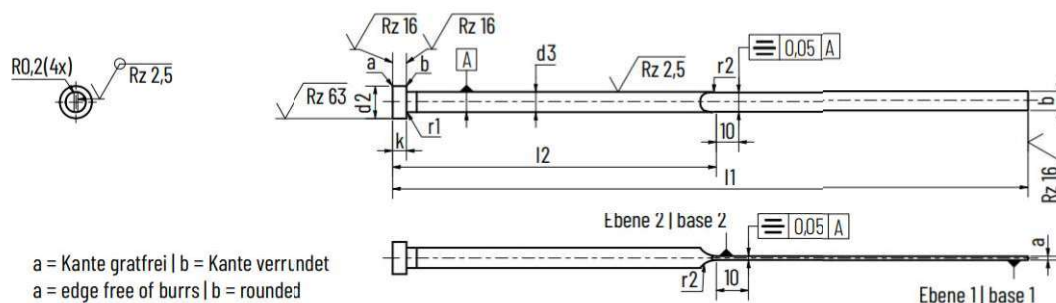
Measure a and b: These limit dimensions apply for 100 mm length (l₂). For length (l₂) > 100 the limit dimensions are to be multiplied by (l₁-l₂) 10⁻².

The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH 4 CORNER RADII

similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6341.

Radii tolerance + 0,02

Hardness

Shaft: HRC 60 + 4/- 2

Head: HRC 45 + 10/- 5

Material

WS

a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃	l ₁ +2/0	63	80	100	125	160	200	250	315	400
0	0	h11	0	0	+0,2	min.		l ₂ -1/-2	30	40	50	60	80	100	125	160	200
-0,015	-0,015		-0,2	-0,05	0												
0,5	2,8	3	6	3	0,3	10	5			74,13	81,09	93,74	99,42				
0,5	3,8	4,2	8	3	0,3	10	5			74,13	81,09	93,74	99,42				
0,6	2,8	3	6	3	0,3	10	5			61,78	67,62	78,13	90,33	103,81			
0,6	3,8	4,2	8	3	0,3	10	5			61,78	67,62	78,13	90,33	103,81	120,87		
0,8	1,8	2	4	2	0,2	10	5				67,62	78,16	90,33	103,81	120,87	146,51	
0,8	2,8	3	6	3	0,3	10	5				61,78	67,62	78,13	90,33	103,81	120,87	146,51
0,8	3,5	4	8	3	0,3	10	5					78,13	90,33				
0,8	3,8	4,2	8	3	0,3	10	5		58,33	61,78	67,62	78,13	90,33	103,81	120,87	146,51	180,58
0,9	3,8	4,2	8	3	0,3	10	5						135,07				
1	2,8	3	6	3	0,3	10	5				67,62	78,13	90,33	103,81	120,87	146,51	
1	3,5	4,2	8	3	0,3	10	5				84,64			135,07			
1	3,8	4,2	8	3	0,3	10	5		58,33	61,78	67,62	78,13	90,33	103,81	120,87	146,51	180,58
1	4,5	5	10	3	0,3	10	5			56,69	66,06	76,41	88,64	101,00	122,71	148,34	182,41
1	5,5	6	12	5	0,5	10	6			61,22	67,46	77,70	89,62	102,40	123,57	149,35	183,42
1,2	3,8	4,2	8	3	0,3	10	5			61,78	67,62	78,13	90,33	103,81	120,87	146,51	180,58
1,2	4,5	5	10	3	0,3	10	5			56,69	66,06	76,41	88,64	101,00	122,71	148,34	182,41
1,2	5,5	6	12	5	0,5	10	6			61,22	67,46	77,70	89,62	102,40	123,57	149,35	183,42
1,2	7,5	8	14	5	0,5	10	8				71,16	82,52	91,61	107,78	129,11	157,41	191,49
1,5	4,5	5	10	3	0,3	10	5			56,69	66,06	76,41	88,64	101,00	122,71	148,34	182,41
1,5	5,5	6	12	5	0,5	10	6			61,22	67,46	77,70	89,62	102,40	123,57	149,35	183,42
1,5	7,5	8	14	5	0,5	10	8				71,16	82,52	91,61	107,78	129,11	157,41	191,49
1,5	9,5	10	16	5	0,5	10	10						118,46	134,79	162,21	204,37	238,44
2	5,5	6	12	5	0,5	10	6			61,22	67,46	77,70	89,62	102,40	123,57	149,35	183,42
2	7,5	8	14	5	0,5	10	8				71,16	82,52	91,61	107,78	129,11	157,41	191,49
2	9,5	10	16	5	0,5	10	10							118,46	134,79	162,21	204,37
2	11,5	12	18	7	0,8	10	12								174,90	209,89	261,86
2,5	11,5	12	18	7	0,8	10	12									174,90	209,89

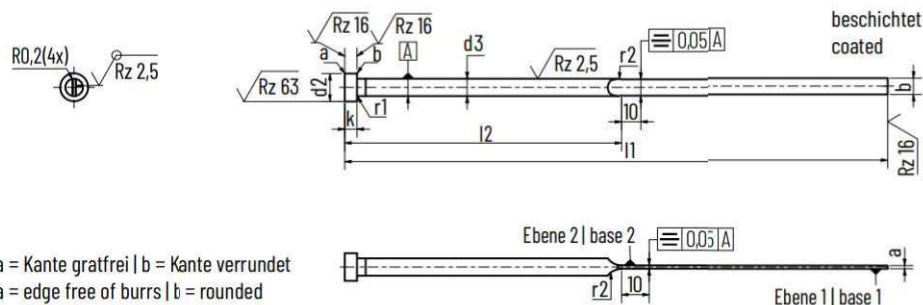
Measure a and b: These limit dimensions apply for 100 mm length (l₂). For length (l₂) > 100 the limit dimensions are to be multiplied by (l₁-l₂) 10⁻².

The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH 4 CORNER RADII AND DLC-COATING

similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6R41.

Radii tolerance + 0,02

Hardness

Shaft: HRC 60 + 4/- 2

Head: HRC 45 + 10/- 5

Coating hardness: approx. 2.500 HV

Coating thickness: approx. 1,5 µm

Material

WS

a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃	l ₁ +2/0 l ₂ -1/-2	63	80	100	125	160	200	250	315
0	0	h11	0	0	+0,2 0	min.			30	40	50	60	80	100	125	160
-0,015	-0,015		-0,2	-0,05												
0,5	2,8	3	6	3	0,3	10	5			87,77	96,12	111,05	117,78			
0,5	3,8	4,2	8	3	0,3	10	5			87,77	96,12	111,05	117,78			
0,6	1,8	2	4	2	0,2	10	5			73,15	80,03	92,60	106,95	123,03		
0,6	2,8	3	6	3	0,3	10	5			73,15	80,03	92,60	106,95			
0,6	3,8	4,2	8	3	0,3	10	5			73,15	80,03	92,60	106,95	123,03		
0,8	1,8	2	4	2	0,2	10	5			73,15	80,03	92,60	106,95	123,03	143,23	171,90
0,8	2,8	3	6	3	0,3	10	5			73,15	80,03	92,60	106,95	123,03		
0,8	3,5	4	8	3	0,3	10	5					92,60	106,95			
0,8	3,8	4,2	8	3	0,3	10	5		65,82	73,15	80,03	92,60	106,95	123,03	143,23	
0,9	3,8	4,2	8	3	0,3	10	5						151,67			
1	2,8	3	6	3	0,3	10	5				80,03	92,60	106,95	123,03		
1	3,5	4,2	8	3	0,3	10	5				100,43			151,67		
1	3,8	4,2	8	3	0,3	10	5		65,82	73,15	80,03	92,60	106,95	123,03	143,23	171,90
1	4,5	5	10	3	0,3	10	5			67,16	78,23	90,55	105,02	119,67	145,40	174,51
1	5,5	6	12	5	0,5	10	6			72,57	79,88	92,01	106,21	121,27	146,43	175,55
1,2	3,8	4,2	8	3	0,3	10	5			73,15	80,03	92,60	106,95	123,03	143,23	171,90
1,2	4,5	5	10	3	0,3	10	5			67,16	78,23	90,55	105,02	119,67	145,40	174,51
1,2	5,5	6	12	5	0,5	10	6			72,57	79,88	92,01	106,21	121,27	146,43	175,55
1,2	7,5	8	14	5	0,5	10	8			84,27	97,71	108,56	127,71	152,87	183,60	
1,5	4,5	5	10	3	0,3	10	5			67,16	78,23	90,55	105,02	119,67	145,40	174,51
1,5	5,5	6	12	5	0,5	10	6			72,57	79,88	92,01	106,21	121,27	146,43	175,55
1,5	7,5	8	14	5	0,5	10	8			84,27	97,71	108,56	127,71	152,87	183,60	
1,5	9,5	10	16	5	0,5	10	10						140,30	159,61	192,08	230,56
2	5,5	6	12	5	0,5	10	6			72,57	79,88	92,01	106,21	121,27	146,43	175,55
2	7,5	8	14	5	0,5	10	8				84,27	97,71	108,56	127,71	152,87	183,60
2	9,5	10	16	5	0,5	10	10						140,30	159,61	192,08	230,56
2	11,5	12	18	7	0,8	10	12							199,69	239,78	288,03
2,5	11,5	12	18	7	0,8	10	12							199,69	239,78	288,03

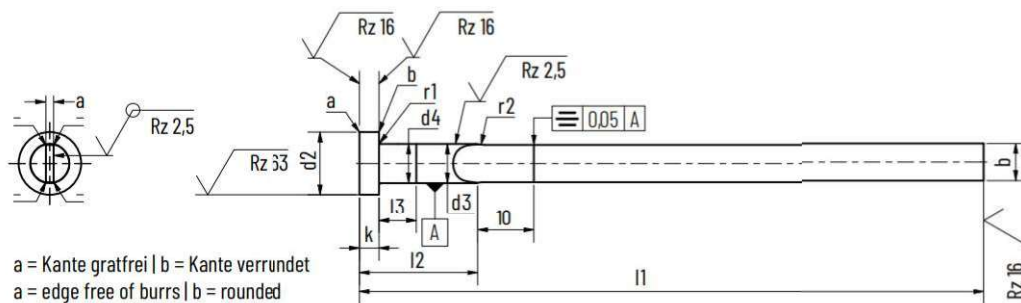
Measure a and b: These limit dimensions apply for 100 mm length (l₂). For length (l₂) > 100 the limit dimensions are to be multiplied by (l₁-l₂) 10⁻².

The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH EXTRA LONG SHEET

similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6041.

6051.

6061.

6071.

6081.

Hardness

Shaft: HRC 60 + 4/- 2

Head: HRC 45 +10/- 5

Material

WS

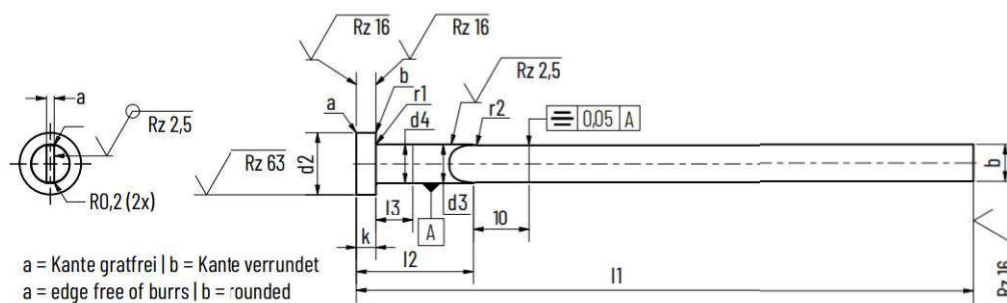
a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃		6071.	6071.	6061.	6041.	6051.	6061.	6081.
0	0	h11	0	0	+0,2	min.			125	160	130	200	200	250	315
-0,015	-0,015		-0,2	-0,05	0			$l_1 + 2/0$ $l_2 - 1/-2$	32	32	60	50	75	60	80
0,6	2,8	3	6	3	0,3	10	5		76.84	88.83	84.59				
0,6	3,8	4,2	8	3	0,3	10	5		76.84	88.83	84.59		94.33		
0,8	2,8	3	6	3	0,3	10	5		76.84	88.83	84.59	97.25	94.33	113.21	
0,8	3,8	4,2	8	3	0,3	10	5		76.84	88.83	84.59	97.25	94.33	113.21	122.50
1	2,8	3	6	3	0,3	10	5		76.84	88.83	84.59	97.25	94.33	113.21	
1	3,8	4,2	8	3	0,3	10	5		76.84	88.83	84.59	97.25	94.33	113.21	
1	4,5	5	10	3	0,3	10	5		75.14	87.16	82.99	94.56	91.73	114.93	123.86
1	5,5	6	12	5	0,5	10	6		76.39	88.13	83.95	95.90	93.04	115.75	155.66
1,2	3,8	4,2	8	3	0,3	10	5		76.84	88.83	84.59	97.25	94.33	113.21	122.50
1,2	4,5	5	10	3	0,3	10	5		75.14	87.16	82.99	94.56	91.73	114.93	123.86
1,2	5,5	6	12	5	0,5	10	6		76.39	88.13	83.95	95.90	93.04	115.75	155.66
1,2	7,5	8	14	5	0,5	10	8		81.13	90.10	85.81	101.00	97.95	120.91	162.65
1,5	4,5	5	10	3	0,3	10	5		75.14	87.16	82.99	94.56	91.73	114.93	123.86
1,5	5,5	6	12	5	0,5	10	6		76.39	88.13	83.95	95.90	93.04	115.75	155.66
1,5	7,5	8	14	5	0,5	10	8		81.13	90.10	85.81	101.00	97.95	120.91	162.65
1,5	9,5	10	16	5	0,5	10	10		107.52	116.49	110.94	126.24	122.45	151.91	204.38
2	5,5	6	12	5	0,5	10	6		76.39	88.13	83.95	95.90	93.04	115.75	155.66
2	7,5	8	14	5	0,5	10	8		81.13	90.10	85.81	101.00	97.95	120.91	162.65
2	9,5	10	16	5	0,5	10	10		116.49	110.94	126.24	122.45	122.45	151.91	204.38
2	11,5	12	18	7	0,8	10	12			163.20	157.65	172.09	166.95	206.52	259.01
2,5	11,5	12	18	7	0,8	10	12			163.20	157.65	172.09	166.95	206.52	259.01

Measure a and b: These limit dimensions apply for 100 mm length (l_2). For length (l_2) > 100 the limit dimensions are to be multiplied by $(l_1 - l_2) \cdot 10^{-2}$. The dimension tolerance value reaches its maximum at base 2. Please specify d_3 on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH 2 CORNER RADII AND EXTRA LONG SHEET

similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6261.

6271.

6281.

Radii tolerance + 0,02

Hardness

Shaft: HRC 60 + 4/- 2

Head: HRC 45 +10/- 5

Material

WS

a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃	l ₁ +2/0 l ₂ -1/-2	6271.	6271.	6261.	6261.	6261.	6281.
0	0	h11	0	0	+0,2 0	min.			125	160	160	200	250	315
-0,015	-0,015		-0,2	-0,05					32	32	60	60	60	80
0,8	2,8	3	6	3	0,3	10	5		93.15	107.71	102.58	117.90		
0,8	3,8	4,2	8	3	0,3	10	5		93.15	107.71	102.58	117.90	137.26	
1	2,8	3	6	3	0,3	10	5		93.15	107.71	102.58	117.90		
1	3,8	4,2	8	3	0,3	10	5		93.15	107.71	102.58	117.90	137.26	
1	4,5	5	10	3	0,3	10	5		91.10	105.67	100.64	114.67	139.37	
1	5,5	6	12	5	0,5	10	6		92.62	106.87	101.77	116.29	140.33	188.72
1,2	3,8	4,2	8	3	0,3	10	5		93.15	107.71	102.58	117.90	137.26	
1,2	4,5	5	10	3	0,3	10	5		91.10	105.67	100.64	114.67	139.37	
1,2	5,5	6	12	5	0,5	10	6		92.62	106.87	101.77	116.29	140.33	188.72
1,2	7,5	8	14	5	0,5	10	8		98.38	109.24	104.04	122.42	146.62	197.22
1,5	4,5	5	10	3	0,3	10	5		91.10	105.67	100.64	114.67	139.37	
1,5	5,5	6	12	5	0,5	10	6		92.62	106.87	101.77	116.29	140.33	188.72
1,5	7,5	8	14	5	0,5	10	8		98.38	109.24	104.04	122.42	146.62	197.22
1,5	9,5	10	16	5	0,5	10	10		141.25	134.51	153.07	184.19	247.80	
2	5,5	6	12	5	0,5	10	6		106.87	101.77	116.29	140.33	188.72	
2	7,5	8	14	5	0,5	10	8		109.24	104.04	122.42	146.62	197.22	
2	9,5	10	16	5	0,5	10	10		141.25		153.07	184.19	247.80	

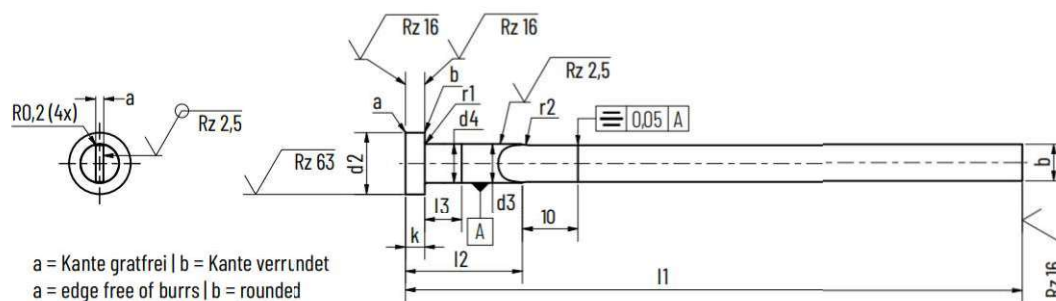
Measure a and b: These limit dimensions apply for 100 mm length (l₂). For length (l₂) > 100 the limit dimensions are to be multiplied by (l₁-l₂) 10⁻².

The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**

FLAT EJECTOR

WITH 4 CORNER RADII AND EXTRA LONG SHEET

similar DIN ISO 8693, hardened (DIN 1530 part 4, type FAH)



Item no.

6361.

6371.

6381.

Radii tolerance + 0,02

Hardness

Shaft: HRC 60 + 4/- 2

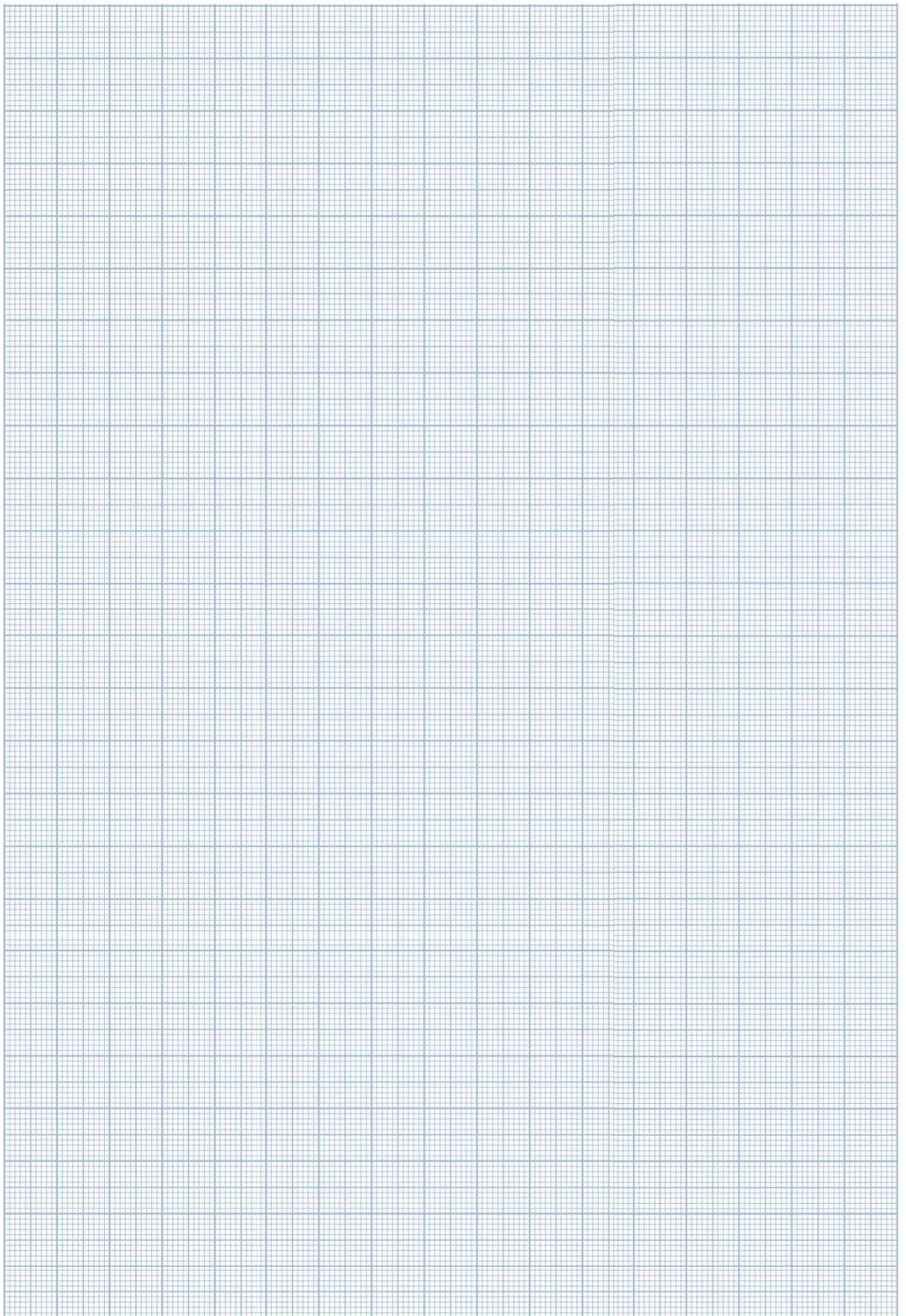
Head: HRC 45 +10/- 5

Material

WS

a	b	d ₃	d ₂	k	r ₁	r ₂	l ₃		6371.	6371.	6361.	6361.	6361.	6381.
0	0	h11	0	0	+0,2	min.			125	160	160	200	250	315
-0,015	-0,015		-0,2	-0,05	0			l ₁ +2/0 l ₂ -1/-2	32	32	60	60	60	80
0,8	2,8	3	6	3	0,3	10	5		96.03	111.06	105.77	121.55		
0,8	3,8	4,2	8	3	0,3	10	5		96.03	111.06	105.77	121.55	141.49	
0,8	5,5	6	12	5	0,5	10	6			110.18	104.93	119.88	144.66	
1	2,8	3	6	3	0,3	10	5		96.03	111.06	105.77	121.55		
1	3,8	4,2	8	3	0,3	10	5		96.03	111.06	105.77	121.55	141.49	
1	4,5	5	10	3	0,3	10	5		93.94	108.94	103.76	118.23	143.65	
1	5,5	6	12	5	0,5	10	6		95.48	110.18	104.93	119.88	144.66	194.58
1	7,5	8	14	5	0,5	10	8			112.62	107.25	126.23	151.13	
1,2	3,8	4,2	8	3	0,3	10	5		96.03	111.06	105.77	121.55	141.49	
1,2	4,5	5	10	3	0,3	10	5		93.94	108.94	103.76	118.23	143.65	
1,2	5,5	6	12	5	0,5	10	6		95.48	110.18	104.93	119.88	144.66	194.58
1,2	7,5	8	14	5	0,5	10	8		101.44	112.62	107.25	126.23	151.13	203.31
1,5	4,5	5	10	3	0,3	10	5		93.94	108.94	103.76	118.23	143.65	
1,5	5,5	6	12	5	0,5	10	6			110.18	104.93	119.88	144.66	194.58
1,5	7,5	8	14	5	0,5	10	8		101.44	112.62	107.25	126.23	151.13	203.31
1,5	9,5	10	16	5	0,5	10	10			145.61	138.69	157.82	189.89	255.48
2	5,5	6	12	5	0,5	10	6			110.18	104.93	119.88	144.66	194.58
2	7,5	8	14	5	0,5	10	8			112.62	107.25	126.23	151.13	203.31
2	9,5	10	16	5	0,5	10	10			145.61		157.82	189.89	255.48

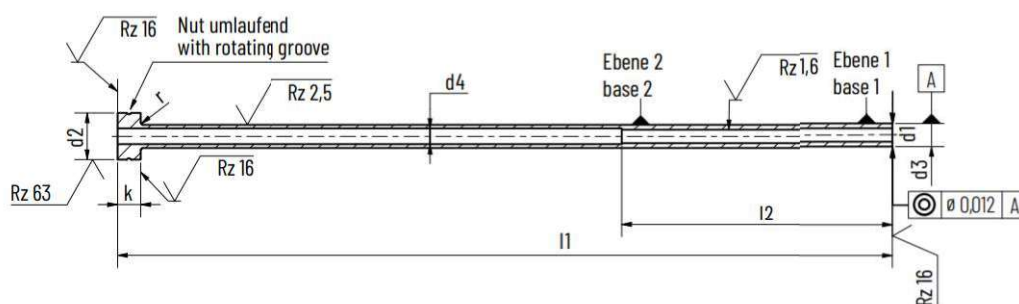
Measure a and b: These limit dimensions apply for 100 mm length (l₂). For length (l₂) > 100 the limit dimensions are to be multiplied by (l₁-l₂)/10⁻².
The dimension tolerance value reaches its maximum at base 2. Please specify d₃ on the orders. **PRICES PER PIECE IN EURO**



EJECTOR SLEEVES

WITH CYLINDRICAL HEAD

DIN ISO 8405, bright nitrided (similar DIN 16756)



Item no.

6615.

At level 1 the coaxiality tolerance to A is max. 0,012 mm. At level 2 this value is max. 0,012 ($l_2 \cdot 10^{-1}$).

Hardness

Shaft: min. 950 HV 0,3 on the surface. Core tensile strength approx. 1400 N/mm².

Head: HRC 45 + 10/- 5

Material

Hot working tool steel

d ₁ H5	d ₃ g6	d ₄	d ₂ n -0,2	k n -0,05	r +0,2 0	l ₂ +2 0	l ₁ +1 0	50	60	75	100	125	150	175	200	225	250	275	300	325	400
1,5	3	1,8 ± 0,1	6	3	0,3	35		109,60	116,29	126,28	147,99	161,57	192,58								
1,6	3	2 + 0,2/- 0,1	6	3	0,3	35		120,53	130,93	151,86	172,83	192,58									
1,7	3	2 + 0,2/- 0,1	6	3	0,3	35				151,86	172,83										
2	4	2,5 + 0,2/- 0,1	8	3	0,3	35		96,71	105,21	118,53	131,87	146,46	173,13	192,50							
2,2	4	2,5 + 0,2/- 0,1	8	3	0,3	35			105,21	118,53	131,87	146,46	173,13	192,50	209,49						
2,5	5	3 + 0,2/- 0,1	10	3	0,3	35		94,86	103,18	116,30	129,36	143,70	169,84	188,86	205,49						
2,7	5	3 + 0,2/- 0,1	10	3	0,3	35			103,18	116,30	129,36	143,70	169,84	188,86	205,49						
3	5	3,5 + 0,2/- 0,1	10	3	0,3	45		89,65	99,35	113,65	126,74	141,11	154,14	168,68	188,86	205,49					
3,2	5	3,5 + 0,2/- 0,1	10	3	0,3	45			99,35	113,65	126,74	141,11	154,14	168,68	188,86	205,49					
3,5	5	3,8 + 0,2/- 0,1	10	3	0,3	45				148,16	161,88	177,13	216,69								
3,5	6	4 + 0,2/- 0,1	12	5	0,5	45		89,65	99,35	113,65	126,74	141,11	154,14	168,68	188,86	205,49	222,08	238,73	255,40		
3,7	6	4 + 0,2/- 0,1	12	5	0,5	45		89,65	99,35	113,65	126,74	141,11	154,14	168,68			222,08	238,73	255,40		
4	6	4,5 + 0,2/- 0,1	12	5	0,5	45		101,24	109,79	122,83	137,15	150,24	163,36	177,72	193,62	210,23	226,88	243,63	260,12		
4	8	4,5 + 0,2/- 0,1	14	5	0,5	45												319,57			
4,2	8	4,5 + 0,2/- 0,1	14	5	0,5	45		101,24	109,79	122,83	137,15	150,24	163,36	177,72	193,62	210,23	226,88	243,63	260,12		
4,5	8	5 + 0,3/- 0,1	14	5	0,5	45			109,79	122,83	137,15	150,24	163,36	177,72	193,62	210,23	226,88	243,63	260,12		
5	7	5,5 + 0,3/- 0,1	12	5	0,5	45				240,91											
5	8	5,5 + 0,3/- 0,1	14	5	0,5	45		103,98	112,38	125,40	139,80	152,86	165,93	180,32	196,43	213,33	230,22	247,17	264,11	319,68	
5,2	8	5,5 + 0,3/- 0,1	14	5	0,5	45			112,38	125,40	139,80	152,86	165,93	180,32	196,43	213,33	230,22	247,17	264,11		
5,5	8	5,8 + 0,3/- 0,1	14	5	0,5	45			112,38	125,40	139,80	152,86	165,93	180,32	196,43	213,33	230,22				
6	9	6,5 + 0,3/- 0,1	14	5	0,5	45									217,10	231,29					
6	10	6,5 + 0,3/- 0,1	16	5	0,5	45		109,80	119,90	133,23	147,83	161,14	175,81	189,12	202,45	217,10	231,29	248,26	265,19	319,68	

d ₁	d ₃	d ₄	d ₂	k	r	l ₂	l ₁	50	60	75	100	125	150	175	200	225	250	275	300	325	400
H5	g 6		0 -0,2	0 -0,05	+0,2 0	+2 0	+1 0														
6,2	10	6.5 +0,3/-0,1	16	5	0,5	45			109,80	119,90	133,23		161,14	175,81	189,12	202,45	217,10	231,29	248,26	265,19	319,68
7	10	7.5 +0,3/-0,1	16	5	0,5	45									189,12	202,45	217,10				
8	12	8.5 +0,3/-0,1	20	7	0,8	45			115,79	125,21	139,82	153,16	166,47	181,14	194,46	209,10	222,41	235,73	253,95	272,16	327,09
8,2	12	8.5 +0,3/-0,1	20	7	0,8	45			115,79	125,21	139,82	153,16	166,47	181,14	194,46		222,41	235,73	253,95		327,09
9	12	9.3 +0,3/-0,1	20	7	0,8	45					139,82	153,16	166,47		194,46	219,05					
10	14	10.5 +0,3/-0,1	22	7	0,8	45			125,17	142,48	155,78	169,15	183,83	197,14	211,78	225,10	238,41	255,40			
10,5	14	11 +0,3/-0,1	22	7	0,8	45			125,17	142,48	155,78	169,15	183,83	197,14	211,78	225,10	238,41	255,40			
12	16	12.5 +0,3/-0,1	22	7	0,8	45			134,85	153,38	167,31	182,66	196,62	210,57	225,93	239,85	255,19	273,21	291,34	349,64	
12,5	16	13 +0,3/-0,1	22	7	0,8	45			134,85	153,38	167,31		196,62	210,57	225,93				273,21		
16	20	16.5 +0,3/-0,1	26	7	1	50				174,74	190,64			239,85	255,19	272,86					

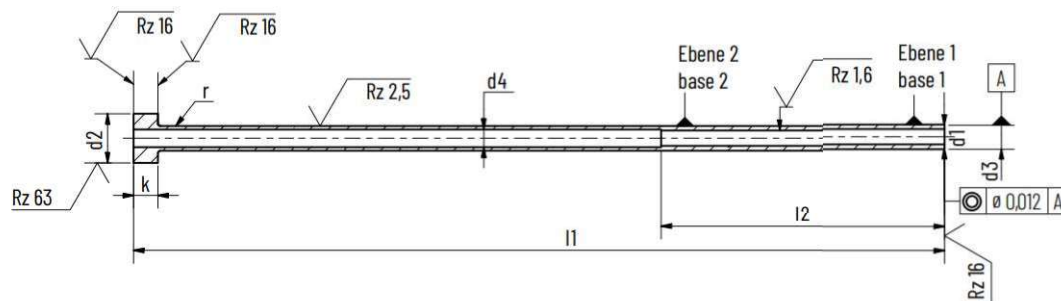
Please specify necessarily d₃ on the orders. Special dimensions can be delivered at short notice.

PRICES PER PIECE IN EURO

EJECTOR SLEEVES

WITH CYLINDRICAL HEAD

DIN ISO 8405, hardened (similar DIN 16756)



Item no.
6621.

Hardness
Shaft: HRC 60 ± 2
Head: HRC 45 +10/- 5

Material
WS

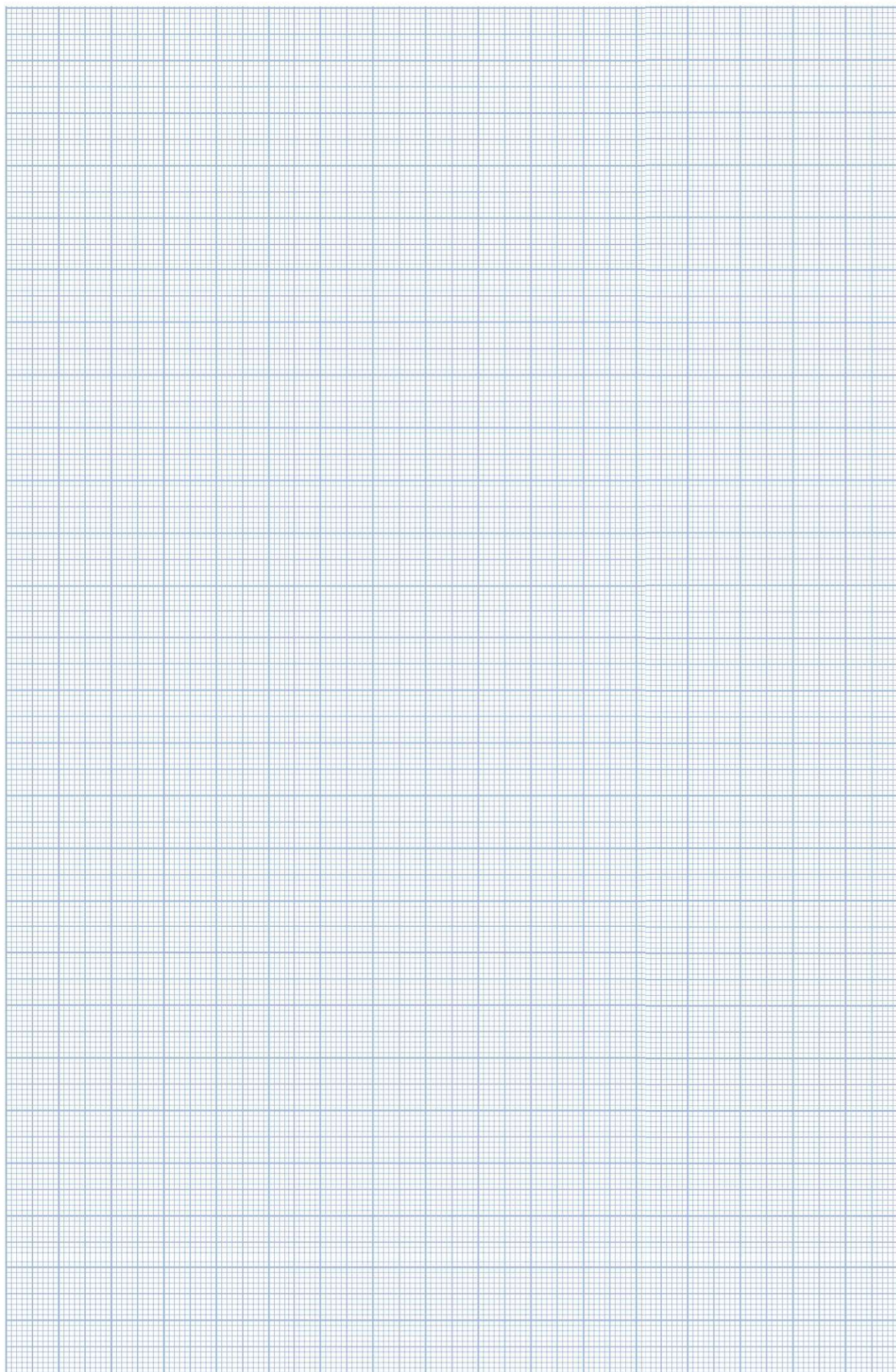
At level 1 the coaxiality tolerance to A is max. 0,012 mm. At level 2 this value is max. 0,012 (l2 • 10⁻¹)

d ₁ H5	d ₃ g6	d ₄	d ₂ n -0,2	k n -0,05	r +0,2 0	l ₂ +2 0	l ₁ +1 0	50	60	75	100	125	150	175	200	225	250	275	300	325	400
1,5	3	1.8 ± 0,1	6	3	0,3	35		103,99	111,71	120,28	141,88	155,43	172,48	189,80							
1,6	3	2 + 0,2/- 0,1	6	3	0,3	35		103,99	111,71	120,28	141,88	155,43	172,48	189,80	207,82						
1,8	3	2.1 + 0,2/- 0,1	6	3	0,3	35					141,88	155,43									
1,9	3	2.2 + 0,2/- 0,1	6	3	0,3	35					141,88	155,43									
2	4	2.5 + 0,2/- 0,1	8	3	0,3	35		79,62	90,54	98,08	112,70	125,94	140,54	168,37	192,24	220,10	238,52				
2,2	4	2.5 + 0,2/- 0,1	8	3	0,3	35		78,12	88,84	96,20	110,57	123,58	137,88	165,18	188,58	215,90	232,45				
2,5	4	2.8 + 0,2/- 0,1	8	3	0,3	35					123,58	137,88	165,18	188,58	215,90	243,19					
2,5	5	3 + 0,2/- 0,1	10	3	0,3	35		78,12	88,84	96,20	110,57	123,58	137,88	165,18	188,58	215,90	243,19				
2,7	5	3 + 0,2/- 0,1	10	3	0,3	35		78,12	88,84	96,20	110,57	123,58	137,88	165,18	188,58	215,90					
3	5	3.5 + 0,2/- 0,1	10	3	0,3	45		81,40	87,15	93,61	107,96	120,98	135,25	149,57	182,98	209,39	236,70	253,41	274,19		
3	6	3.5 + 0,2/- 0,1	12	5	0,5	45					107,96	120,98	135,25	149,57	182,13	209,39	236,70	253,41			
3,2	5	3.5 + 0,2/- 0,1	10	3	0,3	45		81,40	87,15	93,61	107,96	120,98	135,25	149,57	182,98	209,39	236,70	253,41	274,19		
3,5	5	3.8 + 0,2/- 0,1	10	3	0,3	45					137,88	165,18	188,58	243,19							
3,5	6	4 + 0,2/- 0,1	12	5	0,5	45		81,40	87,15	93,61	107,96	120,98	135,25	149,57	182,13	209,39	236,70	253,41	274,19		
3,7	6	4 + 0,2/- 0,1	12	5	0,5	45		81,40	87,15	93,61	107,96	120,98	135,25	149,57	182,13	209,39					
4	5,5	4.5 + 0,2/- 0,1	10	3	0,5	45									243,19	243,19					
4	6	4.5 + 0,2/- 0,1	12	5	0,5	45		85,41	88,93	96,20	110,57	123,58	137,88	152,16	169,04	195,09	222,40	241,79	253,31	266,11	323,67
4	6,2	4.5 + 0,2/- 0,1	12	5	0,5	45						137,88									
4	8	4.5 + 0,2/- 0,1	14	5	0,5	45				96,20	110,57	123,58									
4,2	6	4.5 + 0,2/- 0,1	12	5	0,5	45										241,79	256,48	275,97	292,19		
4,2	8	4.5 + 0,2/- 0,1	14	5	0,5	45		85,41	88,93	96,20	110,57	123,58	137,88	152,16	169,04	195,09	222,40				
4,5	6	4.8 + 0,2/- 0,1	12	5	0,5	45					110,57	123,58	137,88	152,16	169,04	195,09					
4,5	7	5 + 0,3/- 0,1	12	5	0,5	45									243,19						
4,5	8	5 + 0,3/- 0,1	14	5	0,5	45		85,41	88,93	96,20	110,57	123,58	137,88	152,16	169,04	195,09	222,40				

d ₁ H5	d ₃ g6	d ₄	d ₂ 0 -0,2	k 0 -0,05	r +0,2 0	l ₂ +2 0	l ₁ +1 0	50	60	75	100	125	150	175	200	225	250	275	300	325	400
5	7	5.5 +0,3/-0,1	12	5	0,5	45								230,52	241,79	249,18	267,86				
5	8	5.5 +0,3/-0,1	14	5	0,5	45		92,74	97,86	104,01	117,07	130,08	144,38	157,35	171,64	202,88	228,88	241,79	254,77	266,36	324,57
5,2	8	5.5 +0,3/-0,1	14	5	0,5	45		92,74	97,86	104,01	117,07	130,08	144,38	157,35	171,64	202,88	228,88	241,79	254,77	266,36	324,57
5,5	8	5.8 +0,3/-0,1	14	5	0,5	45				104,01	117,07	130,08	144,38	157,35	171,64	202,88	228,88	241,79			
6	9	6.5 +0,3/-0,1	14	5	0,5	45								202,91		249,18	267,86	275,97	292,19		
6	10	6.5 +0,3/-0,1	16	5	0,5	45		96,93	101,90	108,74	121,94	135,18	149,81	163,05	177,64	192,24	213,44	238,57	250,14	266,36	321,98
6,2	10	6.5 +0,3/-0,1	16	5	0,5	45		96,93	101,90	108,74	121,94	135,18	149,81	163,05	177,64	192,24	213,44				
6,5	10	7 +0,3/-0,1	16	5	0,5	45				108,74	121,94	135,18									
7	10	7.5 +0,3/-0,1	16	5	0,5	45				108,74	121,94	135,18			177,64	192,24	213,44				
8	11	8.5 +0,3/-0,1	16	7	0,8	45								202,91	226,47	249,18	272,74		292,19		
8	12	8.5 +0,3/-0,1	20	7	0,8	45			103,11	111,37	124,68	139,19	152,47	165,70	180,32	198,90	220,10				
8,2	12	8.5 +0,3/-0,1	20	7	0,8	45			103,11	111,37	124,68	139,19	152,47	165,70	180,32	198,90	220,10	246,52			
8,5	12	9 +0,3/-0,1	20	7	0,8	45					124,68	139,19			180,32	198,90	220,10				
9	12	9.3 +0,3/-0,1	20	7	0,8	45					124,68	139,19									
10	14	10.5 +0,3/-0,1	22	7	0,8	45			106,78	115,55	128,61	143,21	156,46	169,70	184,29	206,84	226,73	253,38	269,42	280,09	340,12
10,2	14	10.5 +0,3/-0,1	22	7	0,8	45						178,58			207,82	219,15	236,70				
10,5	14	11 +0,3/-0,1	22	7	0,8	45					131,24	145,83	159,08	173,68	186,94	206,84	226,73			280,09	
11	14	11.5 +0,3/-0,1	22	7	0,8	45					128,61	143,21				206,84					
12	16	12.5 +0,3/-0,1	22	7	0,8	45				123,59	137,41	152,67	166,55	181,87	195,72	216,54	237,40	265,30			
12,5	16	13 +0,3/-0,1	22	7	0,8	45				125,62	139,49	154,74	168,66	183,91	197,20	218,62	239,42				
16	20	16.5 +0,3/-0,1	26	7	1	50					143,53	159,21			202,92						

Please specify necessarily d₃ on the orders. Special dimensions can be delivered at short notice.

PRICES PER PIECE IN EURO



FIXTURES

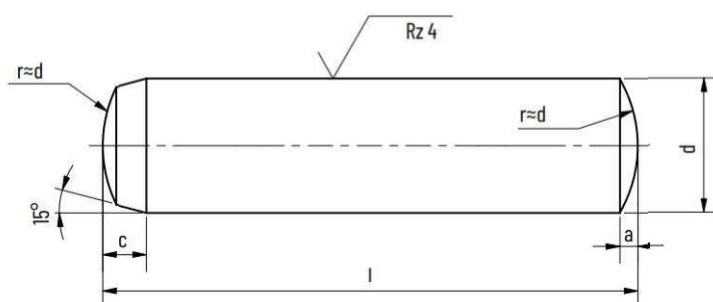
EBERHARD Precision Parts has been synonymous with highest precision and reliability since the company's beginning in 1933. We stand for extensive technical expertise, high vertical manufacturing range, production in the range of micron tolerances, on-time delivery as well as excellent service. We manufacture shafts, bolts and similar drawing parts with strict production requirements precisely and on time. Challenge us!

Our offer includes cylindrical pins and drill bushes for the construction and production of jigs and fixtures as well as for general use in tool, mould and machine construction.



DOWEL PINS

DIN 6325 (similar DIN EN ISO 8734, type A)



Item no.
7126.

Hardness
HRC 60 ± 2

Material
As chosen by manufacturer.

Permissible pin end at
manufacturer's choice.

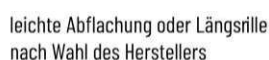
d m 6	1	1,5	2	2,5	3	4	5	6	8	10	12	13	14	16	20
a ≈	0,12	0,2	0,25	0,3	0,4	0,5	0,63	0,8	1	1,2	1,6	2	2	2	2,5
c	0,5	0,6	0,8	1	1,2	1,4	1,7	2,1	2,6	3	3,8	3,8	3,8	4,6	6
r ₁ min.	-	0,2	0,2	0,3	0,3	0,4	0,4	0,4	0,5	0,6	0,6	0,7	0,7	0,8	0,8
r ₁ max.	-	0,6	0,6	0,7	0,8	0,9	1	1,1	1,3	1,4	1,6	1,7	1,7	1,8	2
l (min./max.)															
4 (3,75/4,25)	26,28	24,61	25,61												
5 (4,75/5,25)	26,28	24,61	25,61	25,61	25,61										
6 (5,75/6,25)	25,45	22,19	23,05	23,05	23,05	23,05									
8 (7,75/8,25)	25,45	22,19	23,05	23,05	22,06	23,05	35,08	48,69							
10 (9,75/10,25)	25,45	22,19	23,05	23,05	22,06	23,05	35,08	48,69							
12 (11,50/12,50)	26,20	22,19	24,03	24,03	22,06	23,05	31,03	43,07							
14 (13,50/14,50)		22,19	24,03	24,03	23,05	25,05	31,03	43,07	57,78						
16 (15,50/16,50)		22,19	24,03	24,03	23,05	25,05	31,03	43,07	57,78	91,36					
18 (17,50/18,50)		24,03	24,03	24,03	24,03	26,06	34,06	47,06	63,09	99,73					
20 (19,50/20,50)		24,03	24,03	24,03	24,03	26,06	34,06	49,09	67,14	106,17	169,60				
24 (23,50/24,50)		29,04	29,04	25,05	23,06	28,07	39,07	49,09	69,12	115,34	155,30		195,59	266,31	
28 (27,50/28,50)			35,08	32,05	23,06	30,06	44,07	52,10	73,12	117,20	150,24		211,38	286,20	
32 (31,50/32,50)			37,07	35,08	23,07	34,06	47,06	63,09	76,16	119,95	160,26	215,36	225,49	305,30	
36 (34,50/35,50)					33,08	43,07	54,08	68,10	81,13	121,42	172,30		242,39	328,25	574,07
40 (39,50/40,50)			84,46		43,07	52,10	59,09	72,13	95,16	123,18	178,30		254,42	344,56	597,03
45 (44,50/45,50)					66,91	66,91	69,12	80,15	102,15	134,23	188,29	255,41	271,42	374,61	651,32
50 (49,50/50,50)					66,91	66,91	69,12	80,15	102,15	134,23	188,29	255,41	271,42	374,61	651,32
55 (54,25/55,75)							102,15	88,10	110,19	147,25	227,35		303,50	402,69	721,53
60 (59,25/60,75)					208,68	103,15	102,15	88,10	110,19	147,25	227,35	303,50		402,69	721,53
70 (69,25/70,75)						162,83	161,22	123,18	122,19	175,31	254,42		339,58	431,71	796,32
80 (79,25/80,75)							183,55	140,22	186,70	202,34	283,50		367,58	470,72	893,97
90 (89,25/90,75)								215,48	209,32	233,37	310,49		393,64	502,84	966,71
100 (99,25/100,75)								249,51	242,39	263,45	344,56	450,70	450,70	544,91	1.021,48
120 (119,25/120,75)									393,08	402,20	504,42		725,82	813,45	1.213,01

Please order a standard packaging unit. Minor quantities surcharges: 20%

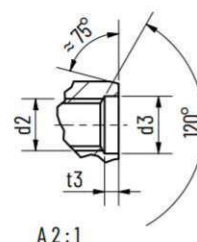
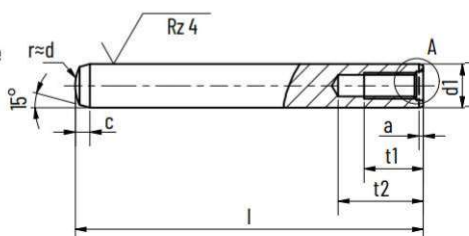
Packaging unit: 100 pieces Ø 1,0 - 3,0 / 50 pieces Ø 4,0 - 6,0 / 25 pieces Ø 8,0 - 13,0 / 10 pieces Ø 14,0 - 20,0.

PRICE PER 100 PIECES IN EURO.

DIN 7979 (similar DIN EN ISO 8735, type A)



slight air vent flat or longitudinal groove
at manufacturer's choice



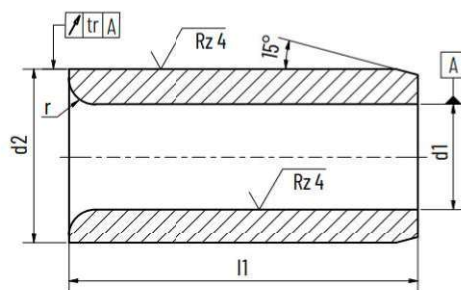
Material
As chosen by manufacturer.

Please order a standard packaging unit. Minor quantities surcharges: 20%

Packaging unit: 50 pieces Ø 4,0 - 6,0 / 25 pieces Ø 8,0 - 13,0 / 10 pieces Ø 14,0 - 20,0. PRICE PER 100 PIECES IN EURO.

DRILL BUSH WITHOUT COLLAR

DIN 179 (similar ISO 4247)
type A: Bore hole rounded at one end



$$\sqrt{Rz 25} \left(\sqrt{Rz 4} \right)$$

Item no.
7819.

Hardness
HRC 62 + 2

Material
Case-hardened steel as chosen by manufacturer.

Inside and outside grinded in tolerance, with insertion chamfer.

d ₁ F7	l ₁	d ₂ ¹⁾ n6	r	tr	7819
1	6	3	1	0,01	8,31
1	9	3	1	0,01	10,07
1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6 / 1.7 / 1.8	6	4	1	0,01	5,18
1.1 / 1.2 / 1.3 / 1.4 / 1.5 / 1.6 / 1.7 / 1.8	9	4	1	0,01	5,94
2 / 2.1 / 2.2 / 2.3 / 2.4 / 2.5 / 2.6	6	5	1	0,01	2,71
1.9 / 2 / 2.1 / 2.2 / 2.3 / 2.4 / 2.5 / 2.6	9	5	1	0,01	3,18
2.7 / 2.8 / 2.9 / 3 / 3.1 / 3.2 / 3.3	8	6	1	0,01	2,98
2.7 / 2.8 / 2.9 / 3 / 3.1 / 3.2 / 3.3	12	6	1	0,01	3,21
2.7 / 2.8 / 2.9 / 3 / 3.1 / 3.2 / 3.3	16	6	1	0,01	5,16
3.4 / 3.5 / 3.6 / 3.8 / 3.9 / 4	8	7	1	0,01	3,05
3.4 / 3.5 / 3.6 / 3.7 / 3.8 / 3.9 / 4	12	7	1	0,01	3,32
3.4 / 3.5 / 3.6 / 3.7 / 3.8 / 3.9 / 4	16	7	1	0,01	5,13
4.1 / 4.2 / 4.3 / 4.4 / 4.5 / 4.6 / 4.7 / 4.8 / 4.9 / 5	8	8	1	0,01	3,29
4.1 / 4.2 / 4.3 / 4.4 / 4.5 / 4.6 / 4.7 / 4.8 / 4.9 / 5	12	8	1	0,01	3,60
4.1 / 4.2 / 4.3 / 4.4 / 4.5 / 4.6 / 4.7 / 4.8 / 4.9 / 5	16	8	1	0,01	5,16
5.1 / 5.2 / 5.3 / 5.4 / 5.5 / 5.6 / 5.7 / 5.8 / 5.9 / 6	10	10	1,5	0,02	3,45
5.1 / 5.2 / 5.3 / 5.4 / 5.5 / 5.6 / 5.7 / 5.8 / 5.9 / 6	16	10	1,5	0,02	3,89
5.1 / 5.2 / 5.3 / 5.4 / 5.5 / 5.6 / 5.7 / 5.8 / 5.9 / 6	20	10	1,5	0,02	5,92
6.1 / 6.2 / 6.3 / 6.4 / 6.5 / 6.6 / 6.7 / 6.8 / 6.9 / 7 / 7.1 / 7.2 / 7.3 / 7.4 / 7.5 / 7.6 / 7.7 / 7.8 / 7.9 / 8	10	12	1,5	0,02	3,72
6.1 / 6.2 / 6.3 / 6.4 / 6.5 / 6.6 / 6.7 / 6.8 / 6.9 / 7 / 7.1 / 7.2 / 7.3 / 7.4 / 7.5 / 7.6 / 7.7 / 7.8 / 7.9 / 8	16	12	1,5	0,02	4,23
6.1 / 6.2 / 6.3 / 6.4 / 6.5 / 6.6 / 6.7 / 6.8 / 6.9 / 7 / 7.1 / 7.2 / 7.3 / 7.4 / 7.5 / 7.6 / 7.7 / 7.8 / 7.9 / 8	20	12	1,5	0,02	6,22
8.1 / 8.2 / 8.3 / 8.4 / 8.5 / 8.6 / 8.7 / 8.8 / 8.9 / 9 / 9.1 / 9.2 / 9.3 / 9.4 / 9.5 / 9.6 / 9.7 / 9.8 / 9.9 / 10	12	15	2	0,02	4,23
8.1 / 8.2 / 8.3 / 8.4 / 8.5 / 8.6 / 8.7 / 8.8 / 8.9 / 9 / 9.1 / 9.2 / 9.3 / 9.4 / 9.5 / 9.6 / 9.7 / 9.8 / 9.9 / 10	20	15	2	0,02	4,80
8.1 / 8.2 / 8.3 / 8.4 / 8.5 / 8.6 / 8.7 / 8.8 / 8.9 / 9 / 9.1 / 9.2 / 9.3 / 9.4 / 9.5 / 9.6 / 9.7 / 9.8 / 9.9 / 10	25	15	2	0,02	7,13
10.1 / 10.2 / 10.3 / 10.4 / 10.5 / 10.6 / 10.7 / 10.8 / 10.9 / 11 / 11.1 / 11.2 / 11.3 / 11.4 / 11.5 / 11.6 / 11.7 / 11.8 / 11.9 / 12	12	18	2	0,02	4,80
10.1 / 10.2 / 10.3 / 10.4 / 10.5 / 10.6 / 10.7 / 10.8 / 10.9 / 11 / 11.1 / 11.2 / 11.3 / 11.4 / 11.5 / 11.6 / 11.7 / 11.8 / 11.9 / 12	20	18	2	0,02	5,55
10.1 / 10.2 / 10.3 / 10.4 / 10.5 / 10.6 / 10.7 / 10.8 / 10.9 / 11 / 11.1 / 11.2 / 11.3 / 11.4 / 11.5 / 11.6 / 11.7 / 11.8 / 11.9 / 12	25	18	2	0,02	7,61
12.1 / 12.2 / 12.3 / 12.4 / 12.5 / 12.6 / 12.7 / 12.8 / 12.9 / 13 / 13.1 / 13.2 / 13.3 / 13.4 / 13.5 / 13.6 / 13.7 / 13.8 / 13.9 / 14	16	22	2	0,02	5,15
12.1 / 12.2 / 12.3 / 12.4 / 12.5 / 12.6 / 12.7 / 12.8 / 12.9 / 13 / 13.1 / 13.2 / 13.3 / 13.4 / 13.5 / 13.6 / 13.7 / 13.8 / 13.9 / 14	28	22	2	0,02	6,91
12.1 / 12.2 / 12.3 / 12.4 / 12.5 / 12.6 / 12.7 / 12.8 / 12.9 / 13 / 13.1 / 13.2 / 13.3 / 13.4 / 13.5 / 13.6 / 13.7 / 13.8 / 13.9 / 14	36	22	2	0,02	9,86

d ₁ F7	l1	d ₂ ¹⁾ n6	r	tr	7819
15.5 / 15.9 / 16 / 16.5 / 17 / 17.5 / 18	16	26	2	0,02	6,52
15.5 / 16 / 16.5 / 17 / 17.5 / 18	28	26	2	0,02	8,52
15.5 / 16 / 16.5 / 17 / 17.5 / 18	36	26	2	0,02	11,36
18.5 / 19 / 19.5 / 20 / 20.5 / 21 / 22	20	30	3	0,02	8,52
18.5 / 19 / 19.5 / 20 / 20.5 / 21 / 22	36	30	3	0,02	10,70
19 / 19.5 / 20 / 20.5 / 22	45	30	3	0,02	17,95
23 / 24 / 25 / 25.5 / 26	20	35	3	0,02	9,94
22.5 / 23 / 24 / 24.5 / 25 / 25.5 / 26	36	35	3	0,02	12,56
22.5 / 24 / 25 / 25.5 / 26	45	35	3	0,02	19,26
26.5 / 27 / 28 / 28.5 / 30	25	42	3	0,02	13,70
26.5 / 27 / 27.5 / 28 / 28.5 / 29 / 29.5 / 30	45	42	3	0,02	16,87
26.5 / 27 / 28 / 28.5 / 30	56	42	3	0,02	22,08
30.5 / 31 / 31.5 / 32 / 33 / 34 / 35	25	48	3	0,02	15,36
30.5 / 32 / 32.5 / 33 / 35	45	48	3	0,02	20,07
30.5 / 31 / 32 / 32.5 / 34 / 35	56	48	3	0,02	44,94

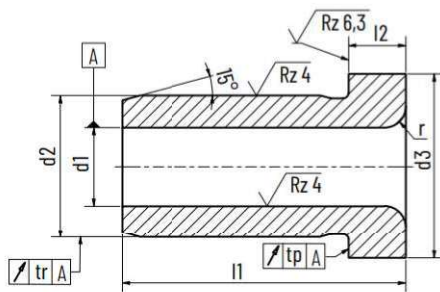
1) For drilling with tolerance range H 6 or H 7 in jig/fixture.

Type B: Item no. 7829. (Bore hole rounded at boths ends)= on request

PRICES PER PIECE IN EURO

DRILL BUSH WITH COLLAR

DIN 172 (similar ISO 4247)
type A: Bore hole rounded at one end



$$\sqrt{Rz\ 25} \left(\sqrt{Rz\ 4} \sqrt{Rz\ 6,3} \right)$$

Item no.
7619.

Hardness
HRC 62 + 2

Material
Case-hardened steel as chosen by manufacturer.

Inside and outside grinded in tolerance, with insertion chamfer.

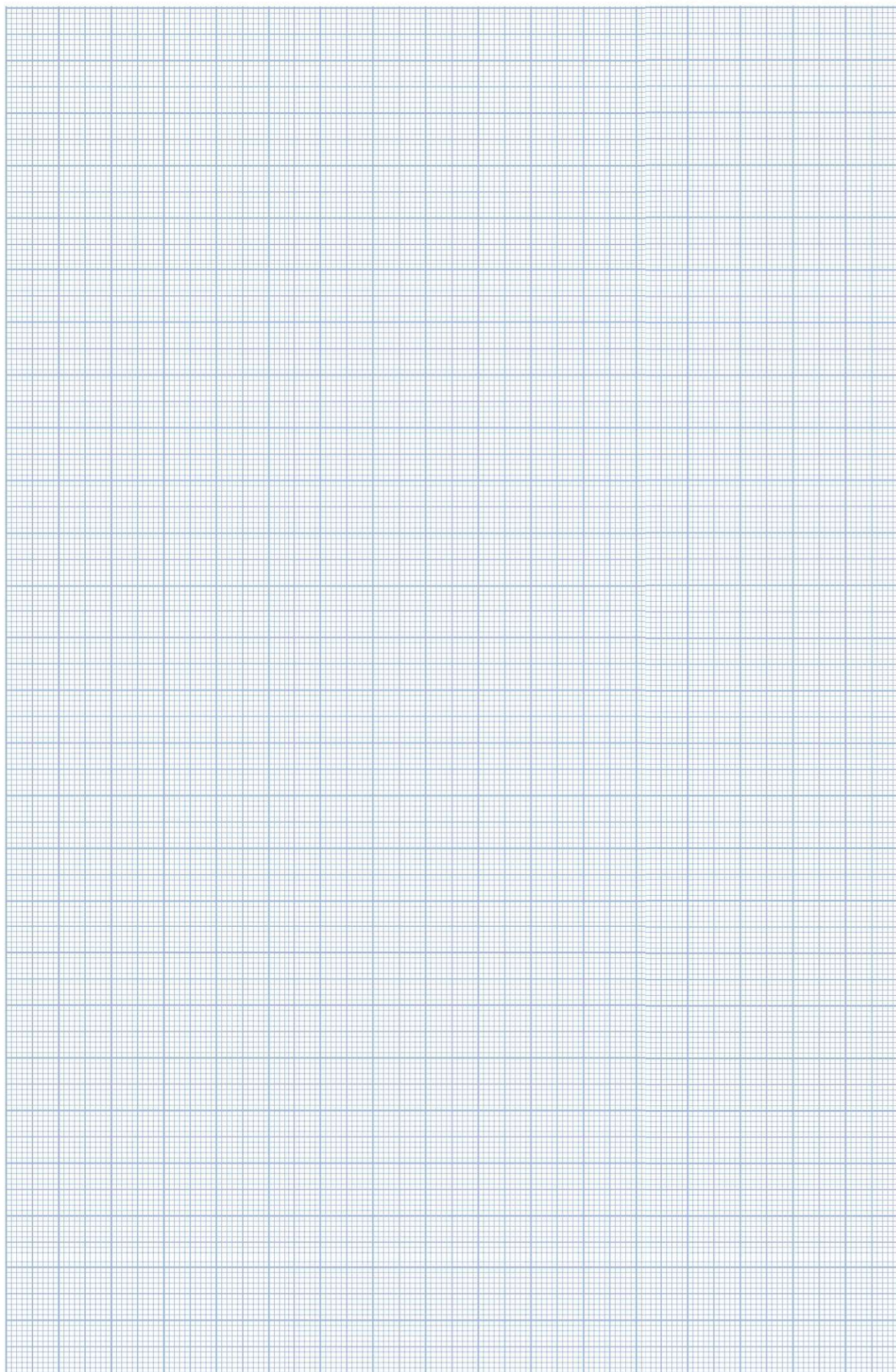
d ₁ F7	l1	d ₂ ¹⁾ n6	d3	l2	r	tr	tp	7619
1	6	3	6	2	1	0,01	0,03	11,46
1	9	3	6	2	1	0,01	0,03	12,80
1.1/1.2/1.3/1.4/1.5/1.6/1.7/1.8	6	4	7	2	1	0,01	0,03	7,29
1.1/1.2/1.3/1.4/1.5/1.6/1.7/1.8	9	4	7	2	1	0,01	0,03	8,28
1.9/2/2.1/2.2/2.3/2.4/2.5/2.6	6	5	8	2	1	0,01	0,03	3,93
1.9/2/2.1/2.2/2.3/2.4/2.5/2.6	9	5	8	2	1	0,01	0,03	4,23
2.7/2.8/3/3.1/3.2/3.3	8	6	9	2,5	1	0,01	0,03	4,05
2.7/2.8/2.9/3/3.1/3.2/3.3	12	6	9	2,5	1	0,01	0,03	4,30
2.7/2.8/2.9/3/3.1/3.2/3.3	16	6	9	2,5	1	0,01	0,03	7,78
3.4/3.5/3.6/3.7/3.8/3.9/4	8	7	10	2,5	1	0,01	0,03	4,23
3.4/3.5/3.6/3.7/3.8/3.9/4	12	7	10	2,5	1	0,01	0,03	4,47
3.4/3.5/3.6/3.7/3.8/3.9/4	16	7	10	2,5	1	0,01	0,03	7,40
4.1/4.2/4.3/4.4/4.5/4.6/4.7/4.8/4.9/5	8	8	11	2,5	1	0,01	0,03	4,30
4.1/4.2/4.3/4.4/4.5/4.6/4.8/4.9/5	12	8	11	2,5	1	0,01	0,03	4,60
4.1/4.2/4.3/4.4/4.5/4.6/4.7/4.8/4.9/5	16	8	11	2,5	1	0,01	0,03	7,86
5.1/5.2/5.3/5.4/5.5/5.6/5.7/5.8/5.9/6	10	10	13	3	1,5	0,02	0,03	4,43
5.1/5.2/5.3/5.5/5.6/5.7/5.8/6	16	10	13	3	1,5	0,02	0,03	4,96
5.1/5.2/5.3/5.4/5.5/5.6/5.7/5.8/5.9/6	20	10	13	3	1,5	0,02	0,03	8,45
6.1/6.2/6.3/6.4/6.5/6.6/6.7/6.8/6.9/7/7.1/7.2/7.3/7.5/7.6/7.7/7.8/7.9/8	10	12	15	3	1,5	0,02	0,03	5,02
6.1/6.2/6.3/6.4/6.5/6.6/6.7/6.8/6.9/7/7.1/7.2/7.3/7.4/7.5/7.7/7.8/7.9/8	16	12	15	3	1,5	0,02	0,03	5,55
6.1/6.2/6.3/6.4/6.5/6.6/6.7/6.8/6.9/7/7.1/7.2/7.3/7.5/7.6/7.7/7.8/7.9/8	20	12	15	3	1,5	0,02	0,03	8,87
8.1/8.2/8.3/8.4/8.5/8.6/8.7/8.8/8.9/9/9.1/9.2/9.3/9.5/9.6/9.9/10	12	15	18	3	2	0,02	0,03	5,55
8.1/8.2/8.3/8.4/8.5/8.6/8.7/8.8/9/9.1/9.2/9.4/9.5/9.7/9.8/9.9/10	20	15	18	3	2	0,02	0,03	6,19
8.1/8.2/8.3/8.4/8.5/8.6/8.7/8.8/9/9.1/9.2/9.3/9.5/9.7/9.8/10	25	15	18	3	2	0,02	0,03	9,97
10.1/10.2/10.3/10.4/10.5/10.6/10.7/10.8/11/11.1/11.3/11.4/11.5/11.6/11.8/12	12	18	22	4	2	0,02	0,03	6,19
10.1/10.2/10.3/10.4/10.5/10.7/10.8/10.9/11/11.1/11.3/11.5/12	20	18	22	4	2	0,02	0,03	6,77
10.1/10.2/10.3/10.5/10.8/11/11.1/11.2/11.3/11.5/12	25	18	22	4	2	0,02	0,03	11,05
12.1/12.2/12.3/12.4/12.5/12.6/12.7/12.8/12.9/13/13.1	16	22	26	4	2	0,02	0,03	7,15
13.2/13.3/13.4/13.5/13.9/14/14.1/14.2/14.3/14.7/14.8/15								

d ₁ F7	l1	d ₂ ¹⁾ n6	d3	l2	r	tr	tp	7619
12.1 / 12.2 / 12.4 / 12.5 / 12.7 / 13 / 13.1 / 13.2 / 13.3 / 13.4 / 13.5	28	22	26	4	2	0,02	0,03	9,51
13.6 / 14 / 14.1 / 14.2 / 14.3 / 14.5 / 14.7 / 14.8 / 15								
12.1 / 12.2 / 12.6 / 12.7 / 12.9 / 13 / 13.3 / 13.5 / 13.6 / 13.9 / 14 / 14.3 / 14.5 / 15	36	22	26	4	2	0,02	0,03	14,65
15.5 / 16 / 16.5 / 17 / 17.5 / 18	16	26	30	4	2	0,02	0,03	8,52
15.5 / 16 / 16.5 / 17 / 17.5 / 18	28	26	30	4	2	0,02	0,03	11,40
16 / 16.5 / 17 / 17.5 / 18	36	26	30	4	2	0,02	0,03	15,72
18.5 / 19 / 20 / 20.5 / 21 / 21.5 / 22	20	30	34	5	3	0,02	0,03	11,40
18.5 / 19 / 19.5 / 20 / 20.5 / 21 / 21.5 / 22	36	30	34	5	3	0,02	0,03	15,09
18.5 / 19 / 19.5 / 20 / 20.5 / 21 / 21.5 / 22	45	30	34	5	3	0,02	0,03	21,27
22.5 / 23 / 24 / 24.5 / 25 / 25.5 / 26	20	35	39	5	3	0,02	0,05	14,35
23 / 24 / 24.5 / 25 / 25.5 / 26	36	35	39	5	3	0,02	0,05	18,34
23.5 / 24 / 25 / 26	45	35	39	5	3	0,02	0,05	25,40
26.5 / 27 / 28 / 28.5 / 29.5 / 30	25	42	46	5	3	0,02	0,05	20,08
26.5 / 27 / 27.5 / 28 / 28.5 / 29.5 / 30	45	42	46	5	3	0,02	0,05	23,39
26.5 / 29.5 / 30	56	42	46	5	3	0,02	0,05	43,53
30.5 / 31 / 32 / 33 / 34 / 34.5 / 35	25	48	52	5	3	0,04	0,05	22,66
30.5 / 31 / 31.5 / 32 / 34.5 / 35	45	48	52	5	3	0,04	0,05	28,48
31.5 / 32 / 32.5 / 34 / 35	56	48	52	5	3	0,04	0,05	55,34

1) For drilling with tolerance range H 6 or H 7 in jig/fixture.

type B: Item no. 7629. (Bore hole rounded at both ends) = on request

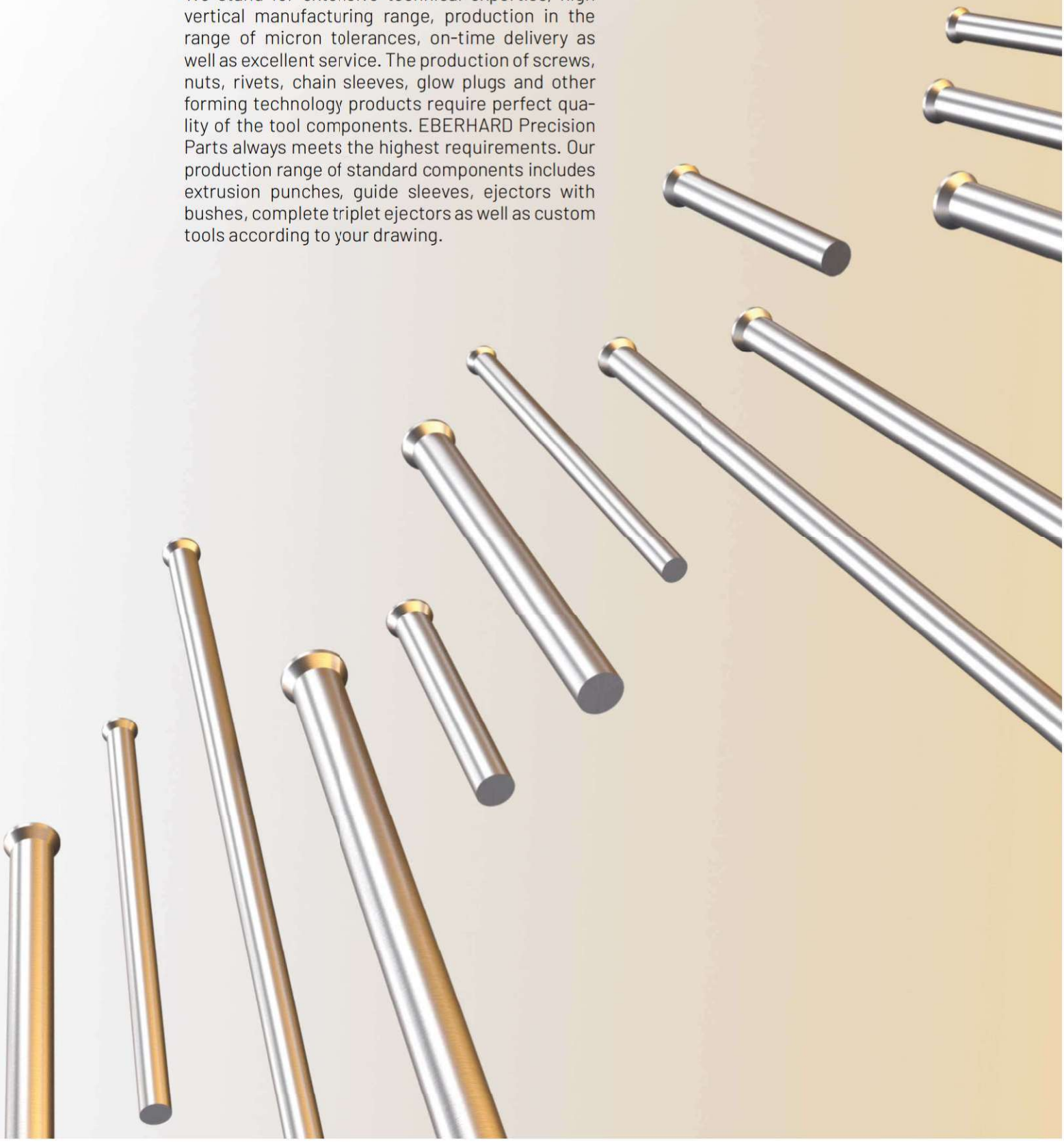
PRICES PER PIECE IN EURO



FORMING TOOLS

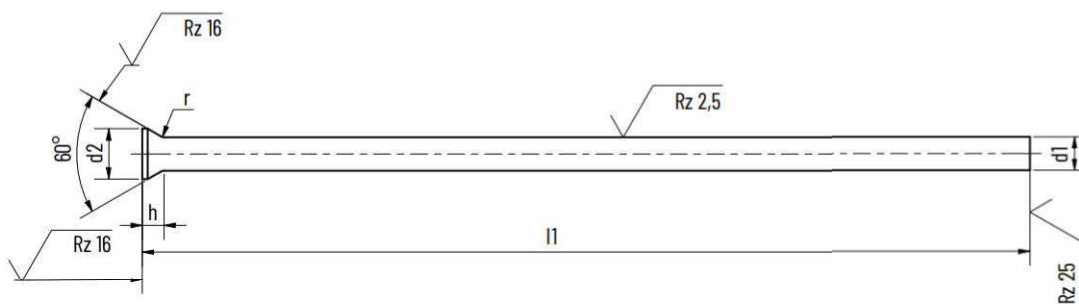
EBERHARD Precision Parts has been synonymous with highest precision and reliability since the company's beginning in 1933.

We stand for extensive technical expertise, high vertical manufacturing range, production in the range of micron tolerances, on-time delivery as well as excellent service. The production of screws, nuts, rivets, chain sleeves, glow plugs and other forming technology products require perfect quality of the tool components. EBERHARD Precision Parts always meets the highest requirements. Our production range of standard components includes extrusion punches, guide sleeves, ejectors with bushes, complete triplet ejectors as well as custom tools according to your drawing.



PREFORMING EJECTOR PIN

similar DIN 9861 part 1, type D, through hardened



Item no.
6753.

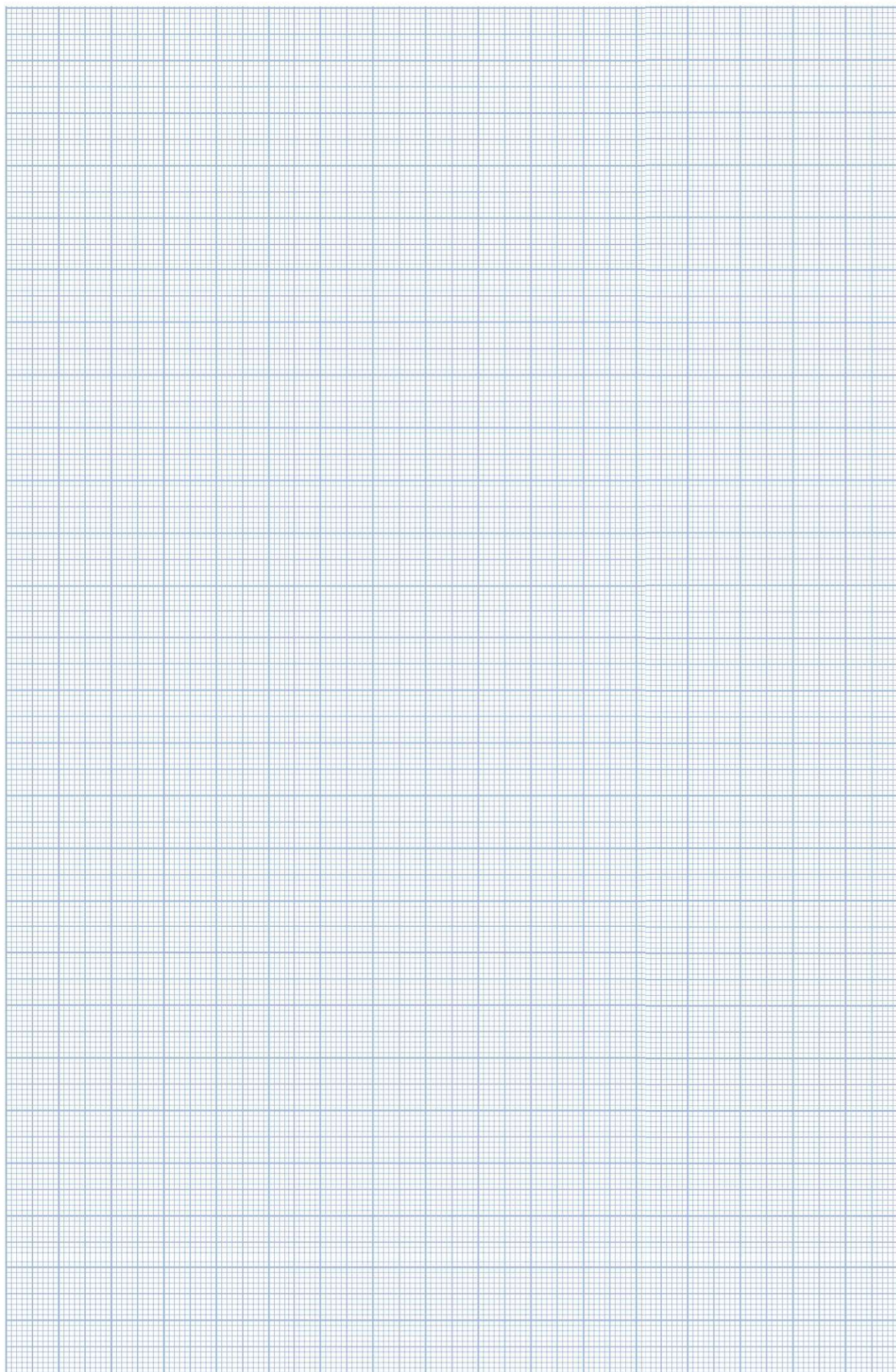
Hardness
HRC 64 + 2

Material
HSS

d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	60	70	71	80	90	100	120
1	1.8 ± 0,05	1,19	0,4 + 0,3				5,45				
1,1	1.8 ± 0,05	1,11	0,4 + 0,3				5,60				
1,2	2 ± 0,05	1,19	0,4 + 0,3							8,10	
1,3	2 ± 0,05	1,11	0,4 + 0,3				5,60				
1,4	2.2 ± 0,05	1,19	0,4 + 0,3				5,60				
1,5	2.2 ± 0,05	1,11	0,4 + 0,3				5,45		7,89		
1,55	2.2 ± 0,05	1,06	0,4 + 0,3				7,82				
1,6	2.5 ± 0,05	1,28	0,4 + 0,3				5,60		8,10		
1,65	2.5 ± 0,05	1,24	0,4 + 0,3				7,82				
1,7	2.5 ± 0,05	1,19	0,4 + 0,3				5,60		8,10		
1,8	2.8 ± 0,05	1,37	0,4 + 0,3				5,60		8,10		11,31
1,85	2.8 ± 0,05	1,32	0,4 + 0,3				11,44				
1,9	2.8 ± 0,05	1,28	0,4 + 0,3				5,60				11,31
1,95	2.8 ± 0,05	1,24	0,4 + 0,3				11,44				
2	3 ± 0,1	1,37	0,4 + 0,3				5,45		7,89		10,98
2,1	3.2 ± 0,1	1,45	0,4 + 0,3				5,60				11,31
2,15	3.2 ± 0,1	1,41	0,4 + 0,3				8,84				17,66
2,2	3.2 ± 0,1	1,37	0,4 + 0,3				5,60				11,31
2,25	3.2 ± 0,1	1,32	0,4 + 0,3				8,84				
2,3	3.5 ± 0,1	1,54	0,4 + 0,3		5,60		5,60	6,53	8,10	8,10	11,31
2,35	3.5 ± 0,1	1,5	0,4 + 0,3				5,60			8,10	
2,4	3.5 ± 0,1	1,45	0,4 + 0,3		5,60		5,60	6,53		8,10	11,31
2,45	3.5 ± 0,1	1,41	0,4 + 0,3				5,60			8,10	11,31
2,5	3.5 ± 0,1	1,37	0,4 + 0,3		5,45		5,45		7,89	7,89	10,98
2,55	3.5 ± 0,1	1,32	0,4 + 0,3				5,60	6,53			11,31
2,6	4 ± 0,1	1,71	0,4 + 0,3		5,60		5,60	6,53	8,10	8,10	
2,65	4 ± 0,1	1,67	0,4 + 0,3							8,10	
2,7	4 ± 0,1	1,63	0,4 + 0,3				5,60	6,53	8,10	8,10	11,31
2,75	4 ± 0,1	1,58	0,4 + 0,3				5,60			8,10	
2,8	4 ± 0,1	1,54	0,4 + 0,3		5,60		5,60	6,53	8,10	8,10	11,31
2,85	4 ± 0,1	1,5	0,4 + 0,3				5,60			8,10	11,31
2,9	4 ± 0,1	1,45	0,4 + 0,3				5,60		8,10	8,10	11,31
2,95	4 ± 0,1	1,41	0,4 + 0,3								11,31
3	4.5 ± 0,1	1,8	0,6 + 0,4		5,45		5,45	6,33	7,89	7,89	10,98

d ₁ h ₆	d ₂	h +0,2 0	r	l ₁ +0,5 0	60	70	71	80	90	100	120
3,05	4,5 ± 0,1	1,76	0,6 + 0,4						9,15		
3,1	4,5 ± 0,1	1,71	0,6 + 0,4		6,77		6,77			9,15	12,81
3,15	4,5 ± 0,1	1,67	0,6 + 0,4				6,77		9,15		12,81
3,2	4,5 ± 0,1	1,63	0,6 + 0,4		6,77		6,77			9,15	12,81
3,3	4,5 ± 0,1	1,54	0,6 + 0,4				6,77			9,15	12,81
3,35	4,5 ± 0,1	1,5	0,6 + 0,4				6,77			9,15	12,81
3,4	4,5 ± 0,1	1,45	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
3,45	4,5 ± 0,1	1,41	0,6 + 0,4							9,15	
3,5	5 ± 0,1	1,8	0,6 + 0,4		6,58		6,58		8,88	8,88	12,46
3,55	5 ± 0,1	1,76	0,6 + 0,4			6,77	6,77		9,15	9,15	
3,6	5 ± 0,1	1,71	0,6 + 0,4				6,77		9,15	9,15	12,81
3,7	5 ± 0,1	1,63	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
3,75	5 ± 0,1	1,58	0,6 + 0,4				6,77				12,81
3,8	5 ± 0,1	1,54	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
3,85	5 ± 0,1	1,5	0,6 + 0,4							9,15	12,81
3,9	5 ± 0,1	1,45	0,6 + 0,4				6,77		9,15		12,81
3,95	5 ± 0,1	1,41	0,6 + 0,4				6,77				12,81
4	5,5 ± 0,1	1,8	0,6 + 0,4		6,58		6,58	7,68	8,88	8,88	12,46
4,1	5,5 ± 0,1	1,71	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
4,15	5,5 ± 0,1	1,67	0,6 + 0,4						9,15	9,15	
4,2	5,5 ± 0,1	1,63	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
4,25	5,5 ± 0,1	1,58	0,6 + 0,4								12,81
4,3	5,5 ± 0,1	1,54	0,6 + 0,4				6,77			9,15	12,81
4,35	5,5 ± 0,1	1,5	0,6 + 0,4				6,77		9,15	9,15	12,81
4,4	5,5 ± 0,1	1,45	0,6 + 0,4		6,77		6,77		9,15	9,15	12,81
4,45	5,5 ± 0,1	1,41	0,6 + 0,4		6,77						
4,5	6 ± 0,1	1,8	0,6 + 0,4		6,58		6,58		8,88	8,88	12,46
4,6	6 ± 0,1	1,71	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
4,7	6 ± 0,1	1,63	0,6 + 0,4				6,77		9,15		12,81
4,75	6 ± 0,1	1,58	0,6 + 0,4								12,81
4,8	6 ± 0,1	1,54	0,6 + 0,4		6,77		6,77	7,91	9,15	9,15	12,81
4,85	6 ± 0,1	1,5	0,6 + 0,4				6,77				12,81
4,9	6 ± 0,1	1,45	0,6 + 0,4							9,15	12,81
4,95	6 ± 0,1	1,41	0,6 + 0,4						9,15		
5	6,5 ± 0,1	1,8	0,6 + 0,4		6,58		6,58	7,68	8,88	8,88	12,46
5,1	6,5 ± 0,1	1,71	0,6 + 0,4		6,77		6,77		9,15	9,15	12,81
5,15	6,5 ± 0,1	1,67	0,6 + 0,4						9,15	9,15	12,81
5,2	6,5 ± 0,1	1,63	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
5,3	6,5 ± 0,1	1,54	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
5,4	6,5 ± 0,1	1,45	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
5,5	7 ± 0,1	1,8	0,6 + 0,4				6,58	7,68	8,88	8,88	12,46
5,6	7 ± 0,1	1,71	0,6 + 0,4		6,77		6,77			9,15	12,81
5,65	7 ± 0,1	1,67	0,6 + 0,4				6,77				
5,7	7 ± 0,1	1,63	0,6 + 0,4				6,77	7,91	9,15	9,15	12,81
5,75	7 ± 0,1	1,58	0,6 + 0,4				6,77				12,81
5,8	7 ± 0,1	1,54	0,6 + 0,4				6,77		9,15	9,15	12,81
5,85	7 ± 0,1	1,5	0,6 + 0,4							9,15	12,81
5,9	7 ± 0,1	1,45	0,6 + 0,4				6,77	7,91		9,15	12,81
6	8 ± 0,2	2,23	1,0 + 0,5		6,58		6,58	7,68	8,88	8,88	12,46
6,1	8 ± 0,2	2,15	1,0 + 0,5				8,01				14,26
6,2	8 ± 0,2	2,06	1,0 + 0,5		8,01					10,17	14,26
6,3	8 ± 0,2	1,97	1,0 + 0,5				8,01	9,57			14,26
6,4	8 ± 0,2	1,89	1,0 + 0,5				8,01			10,17	14,26
6,5	9 ± 0,2	3,17	1,0 + 0,5				7,79		9,89	9,89	13,87
6,6	9 ± 0,2	3,08	1,0 + 0,5					9,57	10,17		14,26
6,7	9 ± 0,2	2,99	1,0 + 0,5		8,01						14,26
6,8	9 ± 0,2	2,91	1,0 + 0,5				8,01		10,17	10,17	14,26
6,9	9 ± 0,2	2,82	1,0 + 0,5		8,01			9,57	10,17	10,17	14,26
7	9 ± 0,2	2,73	1,0 + 0,5		7,79		7,79		9,89	9,89	13,87
7,1	9 ± 0,2	2,65	1,0 + 0,5						10,17	10,17	14,26
7,2	9 ± 0,2	2,56	1,0 + 0,5				8,01			10,17	14,26
7,3	9 ± 0,2	2,47	1,0 + 0,5				8,01		10,17	10,17	14,26
7,4	9 ± 0,2	2,39	1,0 + 0,5						10,17		14,26
7,5	10 ± 0,2	3,17	1,0 + 0,5				7,79	9,32		9,89	13,87
7,6	10 ± 0,2	3,08	1,0 + 0,5								14,26
7,7	10 ± 0,2	2,99	1,0 + 0,5				8,01		10,17	10,17	14,26
7,8	10 ± 0,2	2,91	1,0 + 0,5				8,01		10,17	10,17	14,26
7,9	10 ± 0,2	2,82	1,0 + 0,5							10,17	14,26
8	10 ± 0,2	2,73	1,0 + 0,5		7,79		7,79	9,32	9,89	9,89	13,87
8,2	10 ± 0,2	2,56	1,0 + 0,5								18,72
8,3	10 ± 0,2	2,47	1,0 + 0,5				9,77	12,07	13,33		18,72
8,5	11 ± 0,2	3,17	1,0 + 0,5				9,51		12,96	12,96	18,24
8,6	11 ± 0,2	3,08	1,0 + 0,5								18,72
8,7	11 ± 0,2	2,99	1,0 + 0,5							13,33	18,72
8,8	11 ± 0,2	2,91	1,0 + 0,5		9,77		9,77			13,33	18,72
8,9	11 ± 0,2	2,82	1,0 + 0,5							13,33	18,72
9	11 ± 0,2	2,73	1,0 + 0,5		9,51		9,51		12,96	12,96	18,24
9,1	11 ± 0,2	2,65	1,0 + 0,5							13,33	18,72
9,2	11 ± 0,2	2,56	1,0 + 0,5								18,72
9,3	11 ± 0,2	2,47	1,0 + 0,5				9,77	12,07	13,33	13,33	
9,4	11 ± 0,2	2,39	1,0 + 0,5							13,33	18,72
9,5	12 ± 0,2	3,17	1,0 + 0,5				9,51	11,73		12,96	18,24
9,6	12 ± 0,2	3,08	1,0 + 0,5								18,72
9,7	12 ± 0,2	2,99	1,0 + 0,5				9,77		13,33	13,33	18,72
9,8	12 ± 0,2	2,91	1,0 + 0,5						13,33	13,33	18,72
9,9	12 ± 0,2	2,82	1,0 + 0,5						13,33		18,72
10	12 ± 0,2	2,73	1,0 + 0,5				9,51	11,73	12,96	12,96	18,24

Larger diameters and other lengths on request. **PRICES PER PIECE IN EURO**





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DISPENSING
FLUID TECHNOLOGY

FOR A WIDE RANGE OF INDUSTRIES



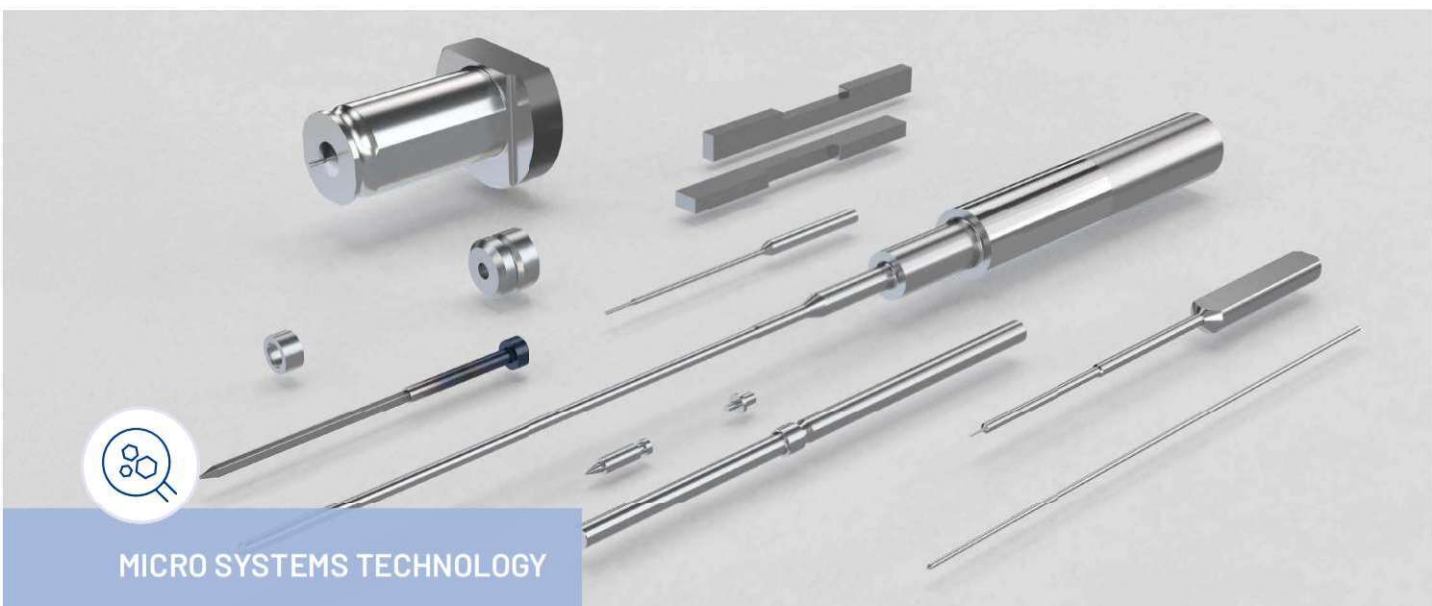
CUSTOM-MADE HIGH-TECH COMPONENTS



MEDICAL TECHNOLOGY
PHARMA INDUSTRY



MEASURING TECHNOLOGY
MECHANICAL ENGINEERING



MICRO SYSTEMS TECHNOLOGY

FOR A WIDE RANGE OF INDUSTRIES



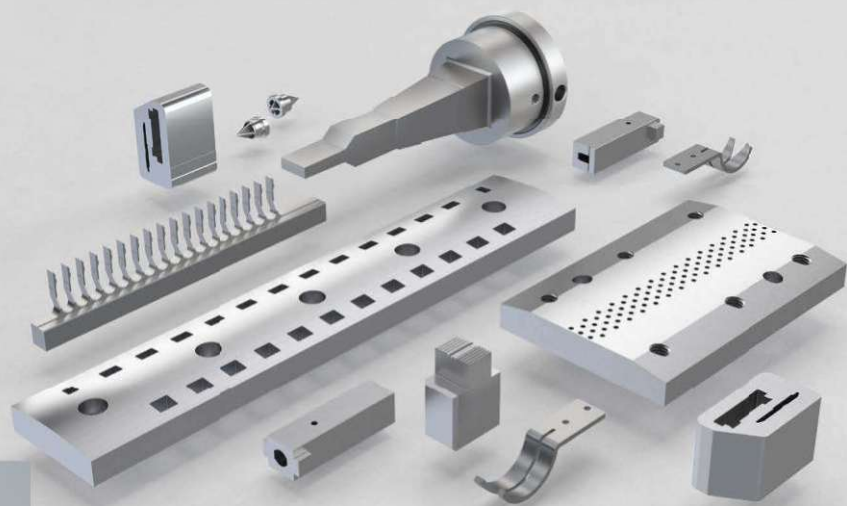
TECHNOLOGIES AT EBERHARD



TURNING | MILLING
TECHNOLOGY



EROSION
TECHNOLOGY



PROFILE GRINDING
TECHNOLOGY



TECHNICAL NOTES

Customer satisfaction is our benchmark for performance and success. We rely on our extraordinary level of quality and manufacturing know-how in order to achieve our performance criteria of tightest tolerances in dimension, shape, position and surface finishing.

Our qualified team has many years of experience in the professional use of our production technology, guaranteeing you the highest possible precision.

TOLERANCES FOR FORM AND POSITION

General notes on tolerances for form and position

A tolerance for a **form and position** of an element (area, axis, point or centre axis) defines the zone within which every point of this element has to lie. Depending on the quality to be tolerated and its typical dimensions the **tolerance zone** falls within one of the following

- the area within a circle
- the area between two concentric circles
- the area between two parallel straight lines
- the area between two equidistant lines
- the space between two parallel planes
- the space between two equidistant planes
- the space between a cylinder
- the space between two coaxial cylinders
- the space within a square

GENERAL TOLERANCES [mm] for tools produced in clamped position (DIN ISO 2768)

Tolerance class H

Range:	...10	> 10 ...30	> 30 ...100	> 100 ...300	> 300 ...1000	> 1000 ...3000
	0,02	0,05	0,1	0,2	0,3	0,4
	0,2	0,2	0,2	0,3	0,4	0,5
	0,5	0,5	0,5	0,5	0,5	0,5
	0,1	0,1	0,1	0,1	0,1	0,1

Tolerance class L

Range:	...10	> 10 ...30	> 30 ...100	> 100 ...300	> 300 ...1000	> 1000 ...3000
	0,1	0,2	0,4	0,8	1,2	1,6
	0,6	0,6	0,6	1	1,5	2
	0,6	0,6	0,6	1	1,5	2
	0,5	0,5	0,5	0,5	0,5	0,5

Tolerance class K

Range:	...10	> 10 ...30	> 30 ...100	> 100 ...300	> 300 ...1000	> 1000 ...3000
	0,05	0,1	0,2	0,4	0,6	0,8
	0,4	0,4	0,4	0,6	0,8	1
	0,6	0,6	0,6	0,6	0,8	1
	0,2	0,2	0,2	0,2	0,2	0,2

Circularity

The general tolerance for circularity is the minimum of the diameter tolerance and the general running tolerance.

Parallelism

The general tolerance for parallelism is the maximum of the measuring tolerance and the general tolerance for straightness and flatness.

STRAIGHTNESS DIN ISO 1101

Definition: The tolerance zone is limited by two parallel planes a distance t apart.

Example: Any line on the upper surface parallel to the plane of projection in which the indication is shown is to be contained between two parallel straight lines 0,1 apart.

Any section of length 200 of any generatrix of the tolerated cylindrical surface must lie between two parallel straight lines of distance 0,1.

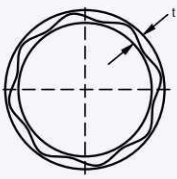
Note: Further information on straightness tolerances see DIN ISO 1101.

PROFIL OF ANY LINE DIN ISO 1101

Definition: The tolerance zone is limited by two lines enveloping circles of diameter t on the centres of which are situated on a line having the theoretically exact geometrical form.

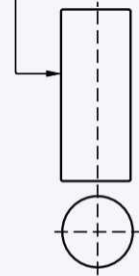
Example: In each section parallel to the plane of projection the considered profile is to be contained between two lines enveloping circles of diameter 0,04, the centres of which are situated on a line of theoretically exact geometrical profile.

CILINDRICITY DIN ISO 1101



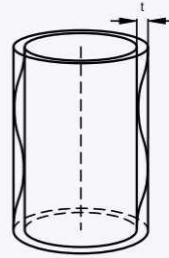
Definition: The tolerance zone in the considered plane is limited by two concentric circles at a distance t apart.

 0,1



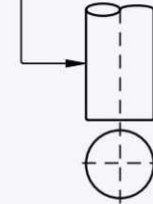
Example: The circumference of each crosssection is to be contained between two co-planar concentric circles 0,1 apart.

CILINDRICITY DIN ISO 1101



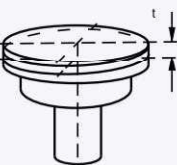
Definition: The tolerance zone is limited by two coaxial cylinders a distance t apart.

 0,1

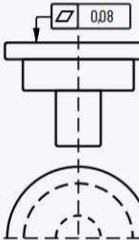


Example: The considered surface is to be contained between two coaxial cylinders 0,1 apart.

FLATNESS DIN ISO 1101

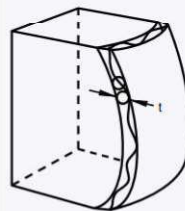


Definition: When projected on a plane the tolerance zone is limited by two parallel straight lines at a distance t apart.

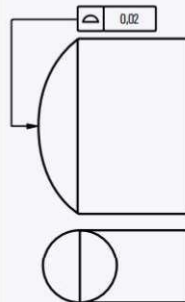


Example: The surface is to be contained between two parallel planes 0,08 apart.

PROFIL OF ANY SURFACE DIN ISO 1101

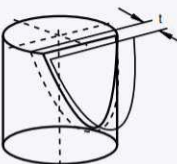


Definition: The tolerance zone is limited by two surfaces enveloping spheres of diameter t the centres of which are situated on a surface having the theoretically exact geometrical form.

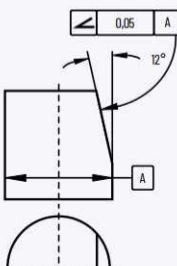


Example: The considered surface is to be contained between two surfaces enveloping spheres of diameter 0,02, the centres of which are situated on a surface of theoretically exact geometrical form.

ANGULARITY DIN ISO 1101



Definition: The tolerance zone, when projected on a plane is limited by two parallel straight lines a distance t apart and inclined at the specified angle to the surface.



Example: The inclined surface is to be contained between two parallel planes 0,05 apart which are inclined at 12° to datum axis A .

TOLERANCES FOR FORM AND POSITION

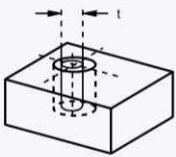
For **position tolerances** a **reference** point is required which gives the precise position of the tolerance zone. A reference point is a theoretically precise geometrical element (e.g. axis, plane straight line, etc). Reference points can be based on one or several **reference elements**.

Within a tolerance zone **the element to be tolerated** can be in any form, any position or direction, bar any additional limiting factors.

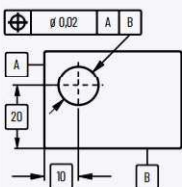
For the **tolerance value** "t" the identical value as for length measurements is applicable. If nothing else is specified the tolerance applies to the total length or area of the element to be tolerated.



POSITION DIN ISO 1101



Definition: When the tolerance value is preceded by the diameter symbol the tolerance zone is limited by a cylinder of diameter t the axis of which is in the theoretically exact position of the considered line.

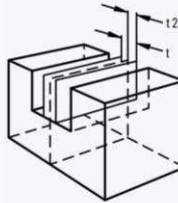


Example: The axis of the hole is to be contained within a cylindrical zone of diameter 0,02 the axis of which is in the theoretically exact position of the considered line with reference to the datum surface A and B.

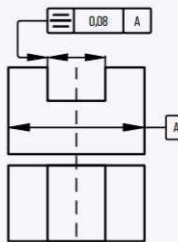
Note: For the positional tolerance of a point or a plane see DIN ISO 1101.



SYMMETRY DIN ISO 1101



Definition: The tolerance zone is limited by two parallel planes a distance t apart and disposed symmetrically about the datum axis or datum median plane.

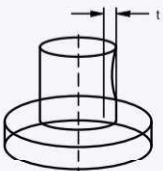


Example: The median plane of a slot is to be contained contained between two parallel planes which are 0,08 apart and symmetrically disposed about the median plane of the datum feature A.

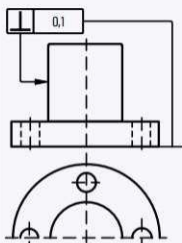
Note: For the symmetrical tolerance of a line or an axis see DIN ISO 1101.



PERPENDICULARITY DIN ISO 1101



Definition: The tolerance zone when projected on a plane is limited by two parallel straight lines a distance t apart and perpendicular to the datum line.

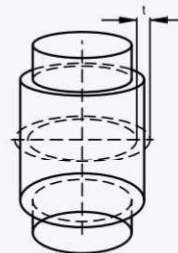


Example: The axis of the cylinder is to be contained between two parallel planes 0,1 apart, perpendicular to the datum surface.

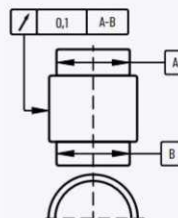
Note: For further perpendicular tolerancing see DIN ISO 1101.



PARALLELISM DIN ISO 1101



Definition: Within any plane of measurement perpendicular to the axis the tolerance zone is limited by two concentric circles a distance t apart, the centre of which coincides with the datum axis.

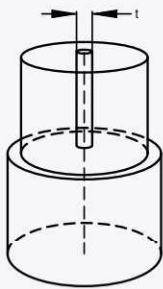


Example: The radial run-out is to be not greater than 0,1 in any plane of measurement during one revolution about the axis A-B.

Note: When checking the measurement the work piece has to be rotated on its reference axis. For the plane run-out and radial run-out tolerance in any direction or to specified direction see DIN ISO 1101.

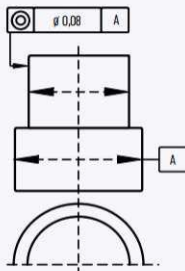


CONCENTRICITY | COAXIALITY DIN ISO 1101



Definition: When the tolerance value is preceded by the diameter symbol the tolerance zone is limited by a cylinder of diameter t , the axis of which coincides with the datum axis.

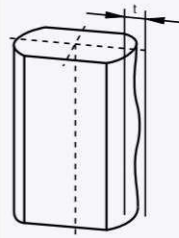
Example: The axis of the cylinder is to be contained within a cylindrical zone of diameter 0,08 coaxial with the datum axis A.



Note: Concentricity tolerance see DIN ISO 1101.

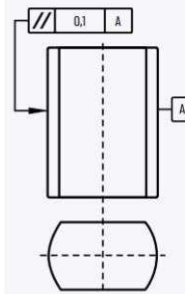


SYMMETRY DIN ISO 1101



Definition: When the tolerance is specified in one direction only, the tolerance zone when projected on a plane is limited by two parallel straight lines a distance t apart and parallel to the datum line.

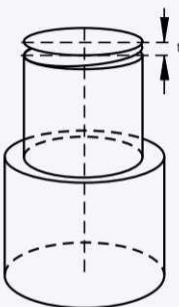
Example: The tolerance axis is to be contained between two straight lines 0,1 apart, which are parallel to the datum axis A and lie in the vertical directions.



Note: For further parallelistic tolerancing see DIN ISO 1101.

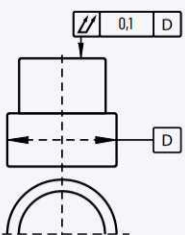


TOTAL RUN-OUT DIN ISO 1101



Definition: The tolerance zone is limited by two parallel planes a distance t apart and perpendicular to the datum axis.

Example: The total run-out is to be no greater than 0,1 at any point on the specified surface whilst revolving about the datum axis D and with relative radial movement between the measuring instrument and the work-piece. With relative movement the measuring instrument of the work-piece is to be guided along a line having the theoretically exact form of the contour and being in its correct position relative to the datum axis.



Note: When measuring the work-piece has to be turned several times on its reference axis. Work-piece and gauge have to move radially in relation to each other.

For total run-out tolerance see DIN ISO 1101.

CONVERSION TABLE

for Vickers- and Rockwellhardness

Very often we receive drawings giving hardness in HRC. If these values refer to round components the diameter of which is smaller than 6 mm, a hardness test on the diameter is no longer recommended. In such cases one would have to calculate with compensating values of more than 3 HRC which in general is no longer considered as being advisable (please see DIN EN ISO 6508-1 - Hardness test to Rockwell). A hardness test in such cases is very often only possible by destroying the test unit when taking a piece of the cross section of the diameter to be tested. This is, however, a labour-intensive and costly method and, in addition, it is doubtful whether the established value is truly representative of the sample.

This problem can, however, mostly be solved by converting the HRC value into another suitable scale such as HV-value.

This has to be treaded carefully, since there is no generally valid comparison table between Rockwell hardness and other hardness test methods (please see DIN EN ISO 18265).

The DIN 50150 which deals with the conversion of different hardness values cannot, however, be applied

to our high alloy materials (in the case of high alloy steels this would lead to considerable discrepancies as compared with the conversion table - DIN EN ISO 18265).

In order to produce, for practical purposes, a type of guideline, we have made up our own Conversion Table which is based on extensive tests and is only applicable to HWS steels with 12% Cr and HSS steels. Please take into consideration that these values serve only as a guide line.

We would prefer to receive from you the precise required value which is measurable.

Ideal for this purpose are the Vickers values which can be established directly on the component using low load, thus avoiding damage to the test piece.

Should you be interested in our assistance we would be very pleased to be at your disposal.

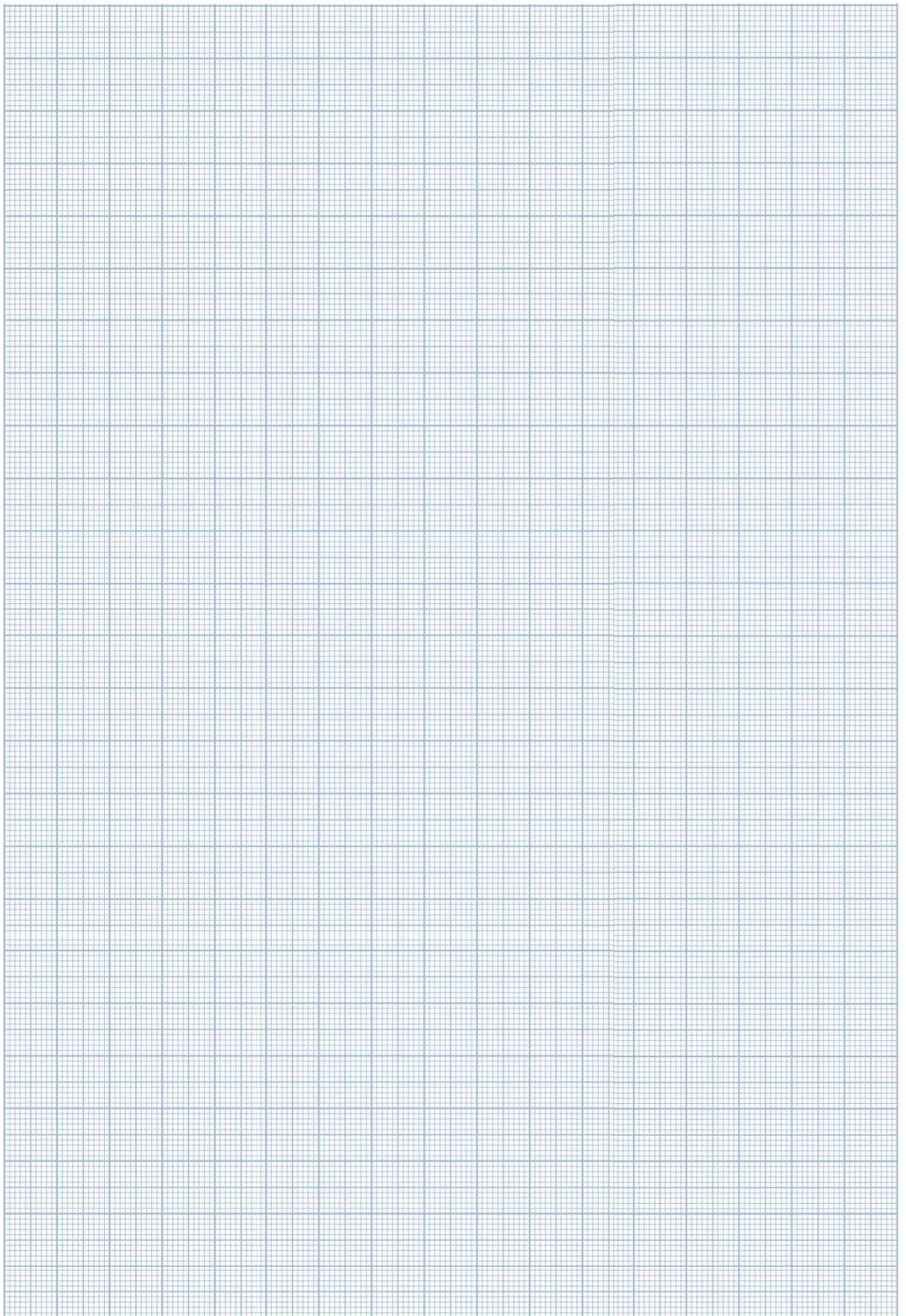
APPROXIMATE VALUES

HV	HRC Eberhard	HRC DIN	HV	HRC Eberhard	HRC DIN
574	52	53,8	742	60,5	61,9
584	52,5	54,3	758	61	62,4
592	53	54,8	770	61,5	62,9
602	53,5	55,3	783	62	63,4
612	54	55,8	797	62,5	63,9
620	54,5	56,3	810	63	64,3
630	55	56,8	823	63,5	64,8
636	55,5	57,1	840	64	65,3
642	56	57,6	856	64,5	65,8
656	56,5	58,1	872	65	66,2
666	57	58,6	892	65,5	66,7
673	57,5	59,1	908	66	67,2
687	58	59,6	924	66,5	67,6
698	58,5	60	946	67	68,1
708	59	60,5	978	67,5	68,6
720	59,5	61	1004	68	69
732	60	61,5			

# of test pieces	Load
> 3,2 ... 6	HV 10
> 1,0 ... 3,2	HV 5
> 0,5 ... 1	HV 1

Basic rule for selection of load for Vickers test:

The two diagonals of the Vickers impression must not depart by more than 5% from each other. Otherwise the load threshold must be changed.



MATERIAL TABLE

Selection of materials:

material no.	name	chemical composition analysis in %									
		C	Si	Mn	P+S	Cr	Mo	V	W	Co	Ni
Case hardened steel 1.7131	16MnCr5	0,16	≤ 0,40	1,15	0,035	0,95	-	-	-	-	-
Tool steel for cold working											
WS											
1.3505	100Cr6	1,00	0,25	0,35	0,030	1,50	-	-	-	-	-
1.2210	115CrV3	1,20	0,20	0,30	0,030	0,70	-	1,10	-	-	-
1.2516	120WV4	1,20	0,20	0,30	0,035	0,20	-	0,10	1,00	-	-
1.2550	60WCrV7	0,60	0,60	0,30	0,030	1,10	-	0,20	2,00	-	-
1.2842	90MnCrV8	0,90	0,30	2,00	0,030	0,40	-	0,10	-	-	-
HWS											
1.2080	X210Cr12	2,00	0,25	0,35	0,030	12,00	-	-	-	-	-
1.2379	X155CrVMo12-1	1,55	0,30	0,30	0,030	12,00	0,70	1,00	-	-	-
1.2436	X210CrW12	2,10	0,30	0,30	0,030	12,00	-	-	0,70	-	-
1.2767	X45NiCrMo4	0,50	0,30	0,30	0,030	1,40	0,25	-	-	-	4,00
Tool steel for hot working											
1.2343	X38CrMoV5-1	0,38	1,00	0,40	0,030	5,30	1,30	0,40	-	-	-
1.2344	X40CrMoV5-1	0,40	1,00	0,40	0,030	5,30	1,40	1,00	-	-	-
High speed steels											
1.3207	S 10-4-3-10	1,30	≤ 0,45	≤ 0,40	0,030	4,10	3,50	3,30	9,50	10,00	-
1.3247	S 2-10-1-8	1,08	≤ 0,45	≤ 0,40	0,030	4,10	9,50	1,20	1,50	8,00	-
1.3343	S 6-5-2	0,90	≤ 0,45	≤ 0,40	0,030	4,10	5,00	1,80	6,40	-	-
1.3344	S 6-5-3	1,22	≤ 0,45	≤ 0,40	0,030	4,10	5,00	2,80	6,40	-	-
Stainless and acid resistant steels											
1.4021	X20Cr13	0,20	1,00	1,50	0,035	13,00	-	-	-	-	-
1.4034	X46Cr13	0,45	1,00	1,00	0,030	13,50	-	-	-	-	-
1.4112	X90CrMoV18	0,90	1,00	1,00	0,035	18,00	1,10	0,10	-	-	-
1.4125	X105CrMo17	1,00	1,00	1,00	0,035	17,00	0,60	-	-	-	-
1.4301	X5CrNi18-10	≤ 0,07	1,00	2,00	0,030	18,00	-	-	-	-	9,50
1.4305	X8CrNiS18-9	≤ 0,10	1,00	2,00	0,040	18,00	-	-	-	-	9,00

material no.	name	chemical composition analysis in %									
		C	Si	Mn	P+S	Cr	Mo	V	W	Co	Ni
Powder steels and special steels											
	Vanadis 4 Extra	1,40	0,40	0,40	-	4,70	3,50	3,70	-	-	-
	PM 23	1,28	-	-	-	4,20	5,00	3,10	6,40	-	-
	PM 30	1,28	-	-	-	4,20	5,00	3,10	6,40	8,50	-
	PM 60	2,30	-	-	-	4,00	7,00	6,50	6,50	10,50	-
	ELMAX Superclean	1,70	0,80	0,30	-	18,0	1,00	3,00	-	-	-
	UHB CALMAX	0,60	0,35	0,80	-	4,50	0,50	0,20	-	-	-
	PM 05	1,50	-	-	-	4,00	2,50	4,00	2,50	-	-
	PM 53	2,45	-	-	-	4,20	3,10	8,00	4,20	-	-
	PM 9	1,90	0,90	0,50	-	5,25	1,30	9,00	-	-	-
	PM 10	2,45	0,90	0,50	-	5,25	1,30	9,75	-	-	-
	PM 15	3,40	0,90	0,50	-	5,25	1,30	14,50	-	-	-
	LC 200 N	0,30	-	1,00	-	15,00	0,95	-	-	-	0,50
	K 110	1,55	0,25	0,35	-	11,80	0,80	0,95	-	-	-
	K 340	1,10	0,90	0,40	-	8,30	2,10	0,50	-	-	-
	K 390	2,45	0,55	-	-	4,15	3,75	9,00	1,00	2,00	-
	M 333	0,28	0,30	0,30	-	13,50	-	-	-	-	-
	M 340	0,54	0,45	0,40	-	17,30	1,10	0,10	-	-	-
	M 390	1,90	0,70	0,30	-	20,00	1,00	4,00	0,60	-	-
	S 390	1,60	-	-	-	4,80	2,00	5,00	10,50	8,00	-
	S 590	1,30	0,50	0,30	-	4,20	5,00	3,00	6,30	8,40	-
	S 690	1,33	0,35	0,30	-	4,30	4,90	4,10	5,90	-	-
	S 790	1,30	0,50	0,30	-	4,20	5,00	3,00	6,30	-	-
	W 400	0,37	0,20	0,30	-	5,00	1,30	0,50	-	-	-
	X 235 HTM	2,30	-	-	0,040	20,00	1,00	4,20	-	-	-

other steels	name	Hardening Agent			Bonding Agent				
		TiC	C	Cr	Mo	Cu	Fe	Al	Ni
	Ferrotitanit C Spezial	33,00	0,65	3,00	3,00	1,50	Rest	-	-
	Ferrotitanit WFN	33,00	0,75	13,50	3,00	0,80	Rest	1,00	0,40

SELECTION OF OUR MANUFACTURING PROCESSES



Heat Treatment

- Vacuum furnace
- Plasma nitration
- Inductive heat treatment
- Oxidizing
- Annealing
- Refrigeration



Soft Machining

- Sawing / Cutting
- Drilling / Deep hole drilling
- **Turning**
 - Short lathes
 - Long lathes
- **Milling**
 - 3-axis simultaneous machining
 - 5-axis simultaneous machining
- Electric forging



Hard Machining

- Hard turning
- **Hard milling**
 - 3-axis simultaneous machining
 - 5-axis simultaneous machining
- **Cylindrical grinding**
 - External cylindrical grinding
 - Centreless
 - Plunge grinding
 - Throughfeed grinding
 - Peelgrinding
 - Between centres
 - Plunge grinding
 - Peelgrinding
 - Non-round / Profile grinding
 - Grinding machine with 5-axis
 - CNC flat profile grinding



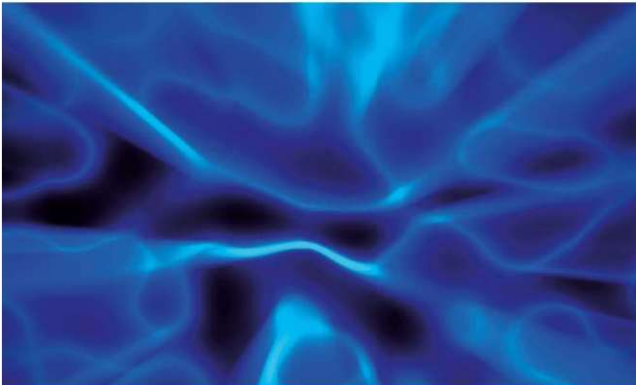
Eroding (EDM)

- **Start hole eroding**
 - $\varnothing$ 0,2–3,0 mm
- **Wire EDM**
 - Wire- $\varnothing$ 0,02–0,3 mm



Surface Finishing

- Bore honing
- Lapping
- Barrel finishing
- Polishing
- Sandblasting / glassblasting
- Straightening
- Engraving / laser marking



Surface Treatment

- Coatings
- **Hard coatings**
PVD, CVD
- Sliding layers
Oxide layer
- **Diffusion layers**
Nitriding
- Electroplated layers
- Chemical coating



Quality Management

- **Quality assurance**
Certification DIN ISO 9001
Recording/documentation
Management of measuring equipment
- **QM technology/measurement and testing technology**
Tactile measuring methods/multisensor technology
 - Length
 - Contour
 - Roundness
 - Parallelism
- Optical measuring methods
 - Measuring projectors
 - Laser
- Surface measurement
- Hardness test
 - Rockwell
 - Vickers
- Material laboratory
 - RFA
 - Material analyses
 - Microstructure investigations
- Test equipment construction

PREAMBLE

- These General Conditions shall apply when the parties agree thereto. Any modifications or deviations from them must be agreed in Writing.

DEFINITIONS

- In these General Conditions the following terms shall have the meanings hereunder assigned to them:

« Contract » : the agreement in Writing between the parties concerning supply of the Product and all appendices, including agreed amendments and additions in Writing to the said documents;

« Gross Negligence » : a deliberate or reckless failure to take such care as is obviously required in the circumstances to avoid serious consequences for the other party;

« In Writing » : communication by document signed by both parties or by letter, electronic mail, fax and by such other means as are agreed by the parties;

« the Product » : the object(s) to be supplied under the Contract, including software and documentation;

« Contract Price » : the agreed price, which shall be either a fixed price or, in case the parties have specifically agreed on a price revision clause, the revised price.

PRODUCT INFORMATION/INSTRUCTIONS

- All information and data contained in general product documentation and price lists, regardless of form, shall be binding only to the extent that they are by reference in Writing expressly included in the Contract.
- The Supplier shall, not later than at the date of delivery, provide free of charge information and drawings which are necessary to permit the Purchaser to install, commission, operate and maintain the Product. Such information and drawings shall be supplied as one paper copy of each and also electronically. The Supplier shall not be obliged to provide manufacturing drawings for the Product or for spare parts.

INTELLECTUAL PROPERTY AND CONFIDENTIALITY

- All intellectual property rights in the Product, including in any embedded software, and in any technical information relating to the Product, shall rest with the Supplier or, in the appropriate case, with a third party which has licensed the Supplier to sublicense these rights. Subject to any limitations that may have been agreed between the third party and the Supplier, the Purchaser shall acquire a non-exclusive, perpetual and transferable right to use these intellectual property rights, but limited to the extent required by the purpose of the Contract. The Supplier shall not be obliged to provide the Purchaser with the source code or with updates for any embedded software.

This clause shall also apply when the Product and/or software has been specifically developed for the Purchaser, unless otherwise agreed in Writing.

- Technical, commercial and financial information and information, which has been declared as confidential or which must by its very nature be deemed to be confidential, disclosed in Writing or orally by one party to the other, shall be treated confidentially. The information shall therefore not without the consent of the disclosing party in Writing be used for any other purpose than that for which it was provided. It may not, without the consent of the disclosing party in Writing, be transmitted, communicated or otherwise disclosed to a third party.

ACCEPTANCES TESTS

- Acceptance tests provided for in the Contract shall, unless otherwise agreed, be carried out at the place of manufacture during normal working hours. If the Contract does not specify the technical requirements, the tests shall be carried out in accordance with general practice in the appropriate branch of industry concerned in the country of manufacture.
- The Supplier shall notify the Purchaser in Writing of the acceptance tests in sufficient time to permit the Purchaser to be represented at the tests. If the Purchaser is not represented, the test report shall be sent to the Purchaser and shall be accepted as accurate.
- If the acceptance tests show the Product not to be in accordance with the Contract, the Supplier shall without delay remedy any deficiencies in order to ensure that the Product complies with the Contract. New tests shall then be carried out at the Purchaser's request, unless the deficiency was insignificant.
- The Supplier shall bear all costs for acceptance tests carried out at the place of manufacture. The Purchaser shall however bear all travelling and living expenses for his representatives in connection with such tests.

DELIVERY, PASSING OF RISK

- Any agreed trade term shall be construed in accordance with the INCOTERMS® in force at the formation of the Contract. If no trade term has been specifically agreed, the delivery shall be Free Carrier (FCA) at the place of manufacture of the Product.

If, in the case of delivery Free Carrier, the Supplier, at the request of the Purchaser, undertakes to send the Product to its destination, the risk will nevertheless pass to the Purchaser as soon as the Product is handed over to the first carrier.

Partial delivery shall not be permitted, unless otherwise agreed in Writing.

TIME FOR DELIVERY, DELAY

- If the parties, instead of specifying the date for delivery, have specified a period of time within which delivery shall take place, such period shall start to run as soon as the Contract is entered into and all agreed preconditions to be met by the Purchaser have been fulfilled, such as official formalities, payments due at the formation of the Contract and securities.
- If the Supplier anticipates that he will not be able to deliver the Product at the time for delivery, he shall forthwith notify the Purchaser thereof in Writing, stating the reason and, if possible, the time when delivery can be expected. If the Supplier fails to give such notice, the Purchaser shall be entitled to compensation for any additional costs which he incurs and which he could have avoided had he received such notice.
- If delay in delivery is caused by any of the circumstances mentioned in Clause 46, by an act or omission on the part of the Purchaser, including suspension under Clauses 22 and 48, or any other circumstances attributable to the Purchaser, the Supplier shall be entitled to extend the time for delivery by a period which is necessary having regard to all the circumstances of the case. This provision shall apply regardless of whether the reason for the delay occurs before or after the agreed time for delivery.
- If the Product is not delivered at the time for delivery, the Purchaser shall be entitled to liquidated damages from the date on which delivery should have taken place. The liquidated damages shall be payable at a rate of 0.5 per cent of the Contract Price for each commenced week of delay. The liquidated damages shall not exceed 7.5 per cent of the Contract Price. If only part of the Product is delayed, the liquidated damages shall be calculated on that part of the Contract Price which is attributable to such part of the Product as cannot in consequence of the delay be used as intended by the parties. The liquidated damages shall become due at the Purchaser's demand in Writing but not before delivery has been completed or the Contract is terminated under Clause 16.
- The Purchaser shall forfeit his right to liquidated damages if he has not lodged a claim in Writing for such damages within six months after the time when delivery should have taken place.
- If the delay in delivery is such that the Purchaser is entitled to maximum liquidated damages under Clause 15 and if the Product is still not delivered, the Purchaser may in Writing demand delivery within a final reasonable period which shall not be less than one week.
- If the Supplier does not deliver within such final period and this is not due to any circumstances which are attributable to the Purchaser, then the Purchaser may by notice in Writing to the Supplier terminate the Contract in respect of such part of the Product as cannot in consequence of the Supplier's failure to deliver be used as intended by the parties.
- If the Purchaser terminates the Contract he shall be entitled to compensation for the loss he suffers as a result of the Supplier's delay, including any consequential and indirect loss. The total compensation, including the liquidated damages which are payable under Clause 15, shall not exceed 15 per cent of that part of the Contract Price which is attributable to the part of the Product in respect of which the Contract is terminated.
- The Purchaser shall also have the right to terminate the Contract by notice in Writing to the Supplier, if it is clear from the circumstances that there will occur a delay in delivery which, under Clause 15, would entitle the Purchaser to maximum liquidated damages. In case of termination for this reason, the Purchaser shall be entitled to maximum liquidated damages and compensation under the third paragraph of this clause.

- Liquidated damages under Clause 15 and termination of the Contract with limited compensation under Clause 16 shall be the only remedies available to the Purchaser in case of delay on the part of the Supplier. All other claims against the Supplier based on such delay shall be excluded, except where the Supplier has been guilty of Gross Negligence.

- If the Purchaser anticipates that he will be unable to accept delivery of the Product at the time for delivery, he shall forthwith notify the Supplier in Writing thereof, stating the reason and, if possible, the time when he will be able to accept delivery. If the Purchaser fails to accept delivery at the time for delivery for a reason which is not attributable to the Supplier, he shall nevertheless pay any part of the Contract Price which becomes due at the time for delivery, as if delivery had taken place at the time for delivery. The Supplier shall arrange for storage of the Product at the risk and expense of the Purchaser. The Supplier shall also, if the Purchaser so requires, insure the Product at the Purchaser's expense.

- Unless the Purchaser's failure to accept delivery is due to any of the circumstances mentioned in Clause 46, the Supplier may by notice in Writing require the Purchaser to accept delivery within a final reasonable period. If, for a reason which is not attributable to the Supplier and not the result of any of the circumstances mentioned in Clause 46, the Purchaser fails to accept delivery within such period, the Supplier may by notice in Writing terminate the Contract in whole or in part. The Supplier shall then be entitled to compensation for the loss he suffers by reason of the Purchaser's default, including any consequential and indirect loss. The compensation shall not exceed that part of the Contract Price which is attributable to that part of the Product in respect of which the Contract is terminated.

PAYMENT

- Payment shall be made within thirty days after the date of invoice. Unless otherwise agreed, the Contract Price shall be invoiced with one third at the formation of the Contract and the remaining part when the Product is delivered.
- Whatever the means of payment used, payment shall not be deemed to have been effected before the Supplier's account has been irrevocably credited for the amount due.
- If the Purchaser fails to pay by the stipulated date, the Supplier shall be entitled to interest from the day on which payment was due and to compensation for recovery costs. The rate of interest shall be as agreed between the parties or otherwise 8 percentage points above the interest rate of the European Central Bank for the main refinancing operations (MRO). The compensation for recovery costs shall be 1 per cent of the amount for which interest for late payment becomes due.

In case of late payment or in case the Purchaser fails to give an agreed security by the stipulated date the Supplier may, after having notified the Purchaser in Writing, suspend his performance of the Contract until he receives payment or, where appropriate, until the Purchaser gives the agreed security.

If the Purchaser has not paid the amount due within three months the Supplier shall be entitled to terminate the Contract by notice in Writing to the Purchaser and, in addition to the interest and compensation for recovery costs according to this clause, to claim compensation for the costs and loss he incurs, including indirect and consequential loss.

RETENTION OF TITLE

- The Product shall remain the property of the Supplier until paid for in full to the extent that such retention of title is valid under the relevant law.

The Purchaser shall at the request of the Supplier assist him in taking any measures necessary to protect the Supplier's title to the Product.

The retention of title shall not affect the passing of risk under Clause 11.

LIABILITY FOR DEFECTS

- The Product shall be in conformity with the Contract. Pursuant to the provisions of this clause and Clauses 25-44, the Supplier shall remedy any defect in or nonconformity of the Product (hereinafter termed defect) resulting from faulty design, materials or workmanship.
- The Supplier shall not be liable for defects arising out of a design, materials or production methods provided, stipulated or specified by the Purchaser.
- The Supplier shall only be liable for defects which appear under the conditions of operation provided for in the Contract and under proper use of the Product.
- The Supplier shall not be liable for defects caused by circumstances which arise after the risk has passed to the Purchaser, e.g. defects due to faulty or incorrect installation, maintenance or repair, or to any alteration, carried out by the Purchaser or by a third party on behalf of the Purchaser. The Supplier shall neither be liable for normal wear and tear nor for deterioration.
- The Supplier's liability shall be limited to defects which appear within a period of one year from delivery. If the use of the Product exceeds that which is agreed, this period shall be reduced proportionately.
- When a defect in a part of the Product has been remedied, the Supplier shall be liable for defects in the repaired part or in the part in replacement under the same terms and conditions as those applicable to the original Product for a period of one year. For the remaining parts of the Product, the period mentioned in Clause 28 shall be extended only by a period equal to the period during which and to the extent that the Product could not be used as a result of the defect.

The Supplier shall not be liable for defects in any part of the Product for more than one year from the end of the liability period referred to in Clause 28 or from the end of any other liability period agreed upon by the parties.

- The Purchaser shall without undue delay notify the Supplier in Writing of any defect which appears. The notice shall contain a description of the defect. Such notice shall under no circumstances be given later than two weeks after the expiry of the period given in Clause 28 or the extended period(s) under Clause 29, where applicable.

If the Purchaser fails to notify the Supplier in Writing of a defect within the time limits set forth in the first paragraph of this clause, he shall lose his right to have the defect remedied and any other rights in respect of the defect.

Where the defect is such that it may cause damage, the Purchaser shall immediately notify the Supplier in Writing. The Purchaser shall bear the risk of damage to the Product resulting from his failure so to notify. The Purchaser shall take reasonable measures to minimise damage and shall in that respect comply with instructions of the Supplier.

- On receipt of the notice under Clause 30, the Supplier shall at his own cost remedy the defect without undue delay, as stipulated in Clauses 24-44. The time for remedial work shall be chosen in order not to interfere unnecessarily with the Purchaser's activities.

Remedial work shall be carried out at the place where the Product is located unless the Supplier deems it more appropriate that the Product is sent to him or a destination specified by him.

If the defect can be remedied by replacement or repair of a defective part and if dismantling and re-installation of the part do not require special knowledge, the Supplier may demand that the defective part is sent to him or a destination specified by him. In such case the Supplier shall have fulfilled his obligations in respect of the defect when he delivers a duly repaired part or a part in replacement to the Purchaser.

- The Purchaser shall at his own expense provide access to the Product and arrange for any intervention in equipment other than the Product, to the extent that this is necessary to remedy the defect.

- Unless otherwise agreed, necessary transport of the Product or parts thereof to and from the Supplier in connection with the remedying of defects for which the Supplier is liable shall be at the risk and expense of the Supplier. The Purchaser shall follow the Supplier's instructions regarding such transport.

- Unless otherwise agreed, the Purchaser shall bear any additional costs which the Supplier incurs for remedying the defect caused by the Product being located in a place other than the place specified in the Contract for putting the Product into service, or if not specified, the place of delivery.

- Defective parts which have been replaced shall be made available to the Supplier and shall be his property.

- If the Purchaser has given such notice as mentioned in Clause 30 and no defect is found for which the Supplier is liable, the Supplier shall be entitled to compensation for the costs he incurs as a result of the notice.

- If the Supplier does not fulfil his obligations under Clause 31 or 43, the Purchaser may by notice in Writing fix a final reasonable period for completion of the Supplier's obligations, which shall not be less than one week.

You can find our general terms and conditions on our internet page
www.eberhard-precision.de/en/agb/
We send them upon your request.

If the Supplier fails to fulfil his obligations within such final period, the Purchaser may himself undertake or employ a third party to undertake necessary remedial work at the risk and expense of the Supplier, provided the Purchaser or third party does so in a professional manner.

Where successful remedial work has been undertaken by the Purchaser or a third party, reimbursement by the Supplier of reasonable costs incurred by the Purchaser shall be in full settlement of the Supplier's liabilities for the said defect.

38. Where the defect has not been successfully remedied, as stipulated under Clause 37,

a) the Purchaser shall be entitled to a reduction of the Contract Price in proportion to the reduced value of the Product, provided that under no circumstances shall such reduction exceed 15 per cent of the Contract Price, or

b) where the defect is so substantial as to significantly deprive the Purchaser of the benefit of the Contract as regards the Product or a substantial part of it, the Purchaser may terminate the Contract by notice in Writing to the Supplier in respect of such part of the Product as cannot in consequence of the defect be used as intended by the parties. The Purchaser shall then be entitled to compensation for any loss, including any consequential and indirect loss, up to a maximum of 15 per cent of that part of the Contract Price which is attributable to the part of the Product in respect of which the Contract is terminated.

39. Save as stipulated in Clauses 24-38, the Supplier shall not be liable for defects. In consequence, the Supplier shall not be liable for any other loss the defect may cause, including loss of production, loss of profit and other indirect loss. This limitation of the Supplier's liability shall not apply if he has been guilty of Gross Negligence.

LIABILITY FOR INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS

40. Unless otherwise agreed, the Supplier shall, in accordance with this clause and Clauses 41 - 44, be liable towards the Purchaser for the Product infringing patents, copyrights or any other intellectual property rights of a third party in the Purchaser's country. The Supplier shall in such case indemnify the Purchaser and hold the Purchaser harmless against claims of third parties, provided that such claims are confirmed as valid by a final award or a settlement approved by the Supplier. The Supplier shall however not be liable for the Purchaser's loss of production, loss of profit, loss of use and loss of contracts, unless the Supplier has been guilty of Gross Negligence.

41. The Supplier shall have no liability for infringement of intellectual property rights arising out of:

- the Product being used elsewhere than in the Purchaser's country;
- the Product being used otherwise than agreed or in a way the Supplier could not have foreseen;
- the Product being used together with equipment or software not supplied by the Supplier, or
- a design or construction stipulated or specified by the Purchaser.

42. The Supplier shall only be liable if the Purchaser notifies the Supplier in Writing without delay of any claim as referred to in Clause 40 which he receives and allows the Supplier to decide how the claim shall be dealt with.

Defence against claims referred to in Clause 40 shall be for the Supplier's account. The Supplier shall compensate the Purchaser for any amounts the latter is obliged to pay under a final award or a settlement approved by the Supplier.

43. Infringement of intellectual property rights shall at the Supplier's discretion, be remedied by: providing the right for the Purchaser to use the Product, adjusting the Product so that the infringement ceases, or by replacing the Product with another product which can be used without infringing applicable intellectual property rights.

44. If the Supplier fails to remedy the infringement in accordance with Clause 43 without undue delay, Clauses 37, 38 and 39 shall apply.

ALLOCATION OF LIABILITY FOR DAMAGE CAUSED BY THE PRODUCT

45. The Supplier shall not be liable for any damage to property caused by the Product after it has been delivered and whilst it is in the possession of the Purchaser. Nor shall the Supplier be liable for any damage to products manufactured by the Purchaser or to products of which the Purchaser's products form a part.

If the Supplier incurs liability towards any third party for such damage to property as described in the preceding paragraph, the Purchaser shall indemnify, defend and hold the Supplier harmless.

If a claim for damage as described in this clause is lodged by a third party against one of the parties, the latter party shall forthwith inform the other party thereof in Writing.

The Supplier and the Purchaser shall be mutually obliged to let themselves be summoned to the court or arbitral tribunal examining claims for damages lodged against one of them on the basis of damage allegedly caused by the Product. The liability between the Supplier and the Purchaser shall however be settled in accordance with Clause 51.

The limitation of the Supplier's liability in the first paragraph of this clause shall not apply where the Supplier has been guilty of Gross Negligence.

FORCE MAJEURE

46. Either party shall be entitled to suspend performance of his obligations under the Contract to the extent that such performance is impeded or made unreasonably onerous by force majeure, meaning any of the following circumstances: industrial disputes and any circumstance beyond the control of the parties such as fire, war, extensive military mobilization, insurrection, requisition, seizure, embargo, restrictions in the use of power, currency and import or export restrictions, epidemics, natural disasters, extreme natural events, terrorist acts and defects or delays in deliveries by sub-contractors caused by any such circumstance referred to in this clause.

A circumstance referred to in this clause whether occurring prior to or after the formation of the Contract shall give a right to suspension only if its effect on the performance of the Contract could not be foreseen at the time of the formation of the Contract.

47. The party claiming to be affected by force majeure shall notify the other party in Writing without delay on the intervention and on the cessation of such circumstance. If a party fails to give such notice, the other party shall be entitled to compensation for any additional costs which he incurs and which he could have avoided had he received such notice.

If force majeure prevents the Purchaser from fulfilling his obligations, he shall compensate the Supplier for costs which the Supplier incurs in storing, securing and protecting the Product and avoiding unreasonable interference with his other activities.

48. Regardless of what might otherwise follow from these General Conditions, either party shall be entitled to terminate the Contract by notice in Writing to the other party if performance of the Contract is suspended under Clause 46 for more than six months.

ANTICIPATED NON-PERFORMANCE

49. Each party shall be entitled to suspend the performance of his obligations under the Contract, where it is clear from the circumstances that the other party is not going to perform his obligations. A party suspending his performance of the Contract shall forthwith notify the other party thereof in Writing.

CONSEQUENTIAL LOSSES

50. Save as otherwise stated in these General Conditions or in case of Gross Negligence there shall be no liability for either party towards the other party for loss of production, loss of profit, loss of use, loss of contracts and for any other consequential or indirect loss whatsoever, whether the loss was foreseeable or not.

DISPUTES AND APPLICABLE LAW

51. All disputes arising out of or in connection with the Contract shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said Rules.

52. The Contract shall be governed by the substantive law of the Supplier's country.

Appendix attached to the Orgalim General Conditions S 2022 regarding the application of German law (Annex Orgalim S 2022)
October 2022

Where the Contract is governed by German Law (cf. Clause 52 of the Orgalim Conditions S 2022) the present amendment shall apply jointly with the Orgalim Conditions to say due regard to the provisions of the German Civil Code BGB concerning standard business conditions.

Furthermore, it should be noted that the Orgalim Conditions S 2022 (cf. Clause 52) may lead to the application of the UN Convention on Contracts for the International Sale of Goods (CISG). If this is not the intention of the Parties, a stipulation to the contrary will have to be expressly mentioned and agreed upon.

regarding Clause 8 second sentence (to be replaced by the following): "If the Purchaser is not represented through his own fault, the test report shall be sent to the Purchaser and shall be accepted as accurate."

regarding Clause 15, para 5: is deleted

regarding Clause 17 second sentence (to be replaced by the following): "All other claims against the Supplier based on such delay shall be excluded, except where the Supplier has been guilty of a negligent breach of a fundamental condition of the contract ("wesentliche Vertragspflicht"), intent or Gross Negligence."

regarding Clause 28 (amendment): "Claims for reimbursement of expenses of the Purchaser pursuant to Sec. 445a BGB (recourse of the seller) also become statute-barred one year after the beginning of the statutory limitation period, provided that the last contract in the supply chain is not for sale of consumer goods. Suspension of the statute of limitations under Sec. 445b (2) BGB remains unaffected: it shall end, at the latest, five years after the point in time when the Supplier delivered the item to the Purchaser."

regarding Clause 31, para 3 second sentence: is deleted

regarding Clause 38 b (amendment): "The limitation of the Supplier's liability shall not apply if he has been guilty of intent, Gross Negligence or if the Supplier negligently causes damage to life, body or health. Furthermore, the limitation of liability shall not apply in cases of negligent breach of a fundamental condition of contract ("wesentliche Vertragspflicht"). In the case of a slightly negligent breach, the Supplier shall be liable only for reasonably foreseeable damage which is intrinsic to the contract. The said limitation of liability shall also be inapplicable in cases of strict liability under the Product Liability Act ("Produkthaftungsgesetz") for defects of the Product causing death or personal injury, or damage to items of property used privately. Furthermore, the said limitation of liability shall not apply in cases of defects the Supplier has fraudulently concealed or whose absence he has guaranteed."

regarding Clause 39 (to be replaced by the following): "Save as stipulated in Clauses 24-38, the Supplier shall not be liable for defects. This applies to any loss the defect may cause including loss of production, loss of profit and other indirect loss. The limitation of the Supplier's liability shall not apply if he has been guilty of intent, Gross Negligence or if the Supplier negligently causes damage to life, body or health. Furthermore, the limitation of liability shall not apply in cases of negligent breach of a fundamental condition of contract ("wesentliche Vertragspflicht"). In the case of a slightly negligent breach, the Supplier shall be liable only for reasonably foreseeable damage which is intrinsic to the contract. The said limitation of liability shall also be inapplicable in cases of strict liability under the Product Liability Act ("Produkthaftungsgesetz") for defects of the Product causing death or personal injury, or damage to items of property used privately. Furthermore, the said limitation of liability shall not apply in cases of defects the Supplier has fraudulently concealed or whose absence he has guaranteed."

regarding Clause 40, last sentence (to be replaced by the following): "The Supplier shall however not be liable for the Purchaser's loss of production, loss of profit, loss of use and loss of contract. The exclusion of the Supplier's liability shall not apply if he has been guilty of intent, Gross Negligence or if the Supplier negligently causes damage to life, body or health. Furthermore, it shall not apply in cases of negligent breach of a fundamental condition of contract ("wesentliche Vertragspflicht"). In the case of a slightly negligent breach of a fundamental condition of contract, the Supplier shall, however, be liable only for reasonably foreseeable damage which is intrinsic to the contract. The exclusion of liability shall also be inapplicable in cases of strict liability under the Product Liability Act ("Produkthaftungsgesetz") for defects of the Product causing death or personal injury, or damage to items of property used privately. Furthermore, it shall not apply in cases of damage attributable to fraudulent concealment or under a specific guarantee granted."

regarding Clause 45: is deleted

regarding Clause 50 (amendment): "The exclusion of the Supplier's liability shall not apply if he has been guilty of intent, Gross Negligence or if the Supplier negligently causes damage to life, body or health. Furthermore, it shall not apply in cases of negligent breach of a fundamental condition of contract ("wesentliche Vertragspflicht"). In the case of a slightly negligent breach of a fundamental condition of contract, the Supplier shall, however, be liable only for reasonably foreseeable damage which is intrinsic to the contract. The exclusion of liability shall also be inapplicable in cases of strict liability under the Product Liability Act ("Produkthaftungsgesetz") for defects of the Product causing death or personal injury, or damage to items of property used privately. Furthermore, it shall not apply in cases of damage attributable to fraudulent concealment or under a specific guarantee granted."

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