



KONRAD FRIEDRICHS
GERMAN CARBIDE

GERMAN CARBIDE
NEXT GENERATION

PRODUCTS



OUR COMPANY

We are aiming high! Are you? Then challenge us!

Konrad Friedrichs GmbH & Co. KG (KF) produces innovative, future-oriented solutions in cemented carbide for you, which will precisely match your individual requirements. We challenge you to look forward to the passion and pride, with which we work, to find solutions for extraordinary projects. Our goal is a result that will inspire you. With our years of experience and our striving for the highest perfection you will raise the bar when you reach for the stars with us.

Will you join our journey?

Wir wollen hoch hinaus! Sie auch? Dann fordern Sie uns heraus! Die Konrad Friedrichs GmbH & Co. KG (KF) produziert für Sie innovative, zukunftsfähige Hartmetall-Lösungen, die Ihre individuellen Anforderungen punktgenau erfüllen werden. Freuen Sie sich auf die Leidenschaft, mit der wir ans Werk gehen, um auch außergewöhnliche Projekte Realität werden zu lassen. Unser Ziel: ein Ergebnis, das Sie rundum begeistert – dank unserer jahrelangen Erfahrung und unserem Streben, für höchste Perfektion auch neue Wege einzuschlagen. Das alles und mehr werfen wir für Sie in die Waagschale, wenn Sie mit uns nach den Sternen greifen.

Begeben Sie sich mit auf unsere Reise?



NEXT
30
YEARS

2017 CHANGE OF MANAGEMENT
FULLY AUTOMATED HIGH-TECH MACHINING CENTRES FOR PREFORM-PRODUCTION

2016
AUTOMATION OF EXTRUSION DEPARTMENT

2013
K5UF: FOR CHALLENGING APPLICATIONS IN COMPOSITE MATERIALS

2012
PLANT 2: NEW LOGISTICS CENTER AND GRINDING DEPARTMENT
OPENING KF CARBIDE JAPAN

2011
OPENING KF CARBIDE ITALIA

2010
K40XF: OUR TOUGHEST CARBIDE FOR TITANIUM AND NICKEL ALLOYS

2009
K88UF: THE MILLING SPECIALIST FOR HARD MATERIALS

2008
THIRD PLANT EXPANSION

K6UF: BEST PERFORMANCE IN REAMING APPLICATIONS

2005 CHANGE OF MANAGEMENT

K55SF: SPECIAL GRADE FOR MACHINING ALUMINIUM

2000

SECOND PLANT EXPANSION

1998

FIRST PLANT EXPANSION
1996 PATENT FOR EXTRUSION OF COOLANT DUCT RODS

COMPANY FOUNDATION
1987

OUR JOURNEY

OUR VISION

Globalization, digitization, automation: To be successful in "industry 4.0", you have to actively face challenges such as these. We accomplish this – yet we remain firmly rooted in the Upper Franconian Kulmbach, as here lies the origin of our worldwide success. It is based on the qualification, perfectionism and team spirit of our staff, who are responsible for our products. In Kulmbach we enjoy an environment that is structural, yet scientific. Our interacting offers optimum conditions for healthy growth and development of new business while promoting personnel development and living conditions of our staff.

Globalisierung, Digitalisierung, Automatisierung: Um in der „Industrie 4.0“ erfolgreich zu sein, muss man Herausforderungen wie diesen aktiv begegnen. Das tun wir – und doch sind und bleiben wir im oberfränkischen Kulmbach fest verwurzelt, denn hier liegt der Ursprung unseres weltweiten Erfolgs. Dieser gründet sich auf der Qualifikation, Perfektionslust und Teamfreude unserer Mitarbeiter, die für die hohen Qualitätsstandards unserer Produkte verantwortlich sind. In Kulmbach genießen wir ein Umfeld, das strukturell, landschaftlich und auch in Sachen Netzwerk beste Voraussetzungen bietet für gesundes Wachstum, die Erschließung neuer Geschäftsfelder, personelle Entwicklung sowie für die Lebensbedingungen unserer Mitarbeiter.



OUR PROCESS



At the beginning WC, Co and doping elements are mixed according to our special recipes. This mixture is then ball-milled for several hours and afterwards sieved for an outstanding homogeneous distribution of carbide grains of the specific grade powder.

With the help of organic additives, the powder is plasticized in our kneaders into a clay like dough that can be extruded.

Through our patented production technology the plasticized mixture is then extruded. Thereby coolant ducts with different helical angles and geometries can be realized in our round rods.

Subsequently, part of the added liquids must be slowly removed from the product under strictly controlled conditions in our climate chamber and special drying-furnaces. The drying time depends on the outer diameter.

Main and counter spindle, two turrets, six linear and two round axes as well as a specially adapted bar loading and part removal system – with these prerequisites, preforms can be produced fast, economical and reliable to meet customer requirements.

At the beginning, the residual plasticizers evaporate during the dewaxing process. After further heating, the Co melts at about 1380 °C and flows into the free spaces between the WC grains. Through the hot-isostatic process, the remaining porosity is removed and the product subsequently cooled. The cemented carbide products lose up to 25% in volume during the whole Sinter-HIP process.

After passing a last rigorous inspection the rods are then either stocked in our warehouse or refined in our centerless-grinding department.

1 Zu Beginn werden WC, Co und die Dotierkarbide nach speziellen Rezepturen eingewogen. Diese Mischungen werden mehrere Stunden in Attritoren gemahlen und anschließend gesiebt, um eine besonders homogene Verteilung der verschiedenen Bestandteile zu erreichen.

2 Mittels Zugabe von organischen Additiven wird das Pulver in unseren Knetern zu einer extrusionsfähigen Masse weiterverarbeitet.

3 Durch den Einsatz der patentierten KF-Herstellertechnik wird das plastifizierte Material extrudiert. Dabei können Kühlkanäle mit unterschiedlichen Steigungen und Geometrien in den Rundstab eingebracht werden.

4 Anschließend muss ein Teil der zugegebenen Flüssigkeit unter streng kontrollierten Bedingungen in der Klimakammer und speziellen Trocknungsöfen langsam aus den Produkten entfernt werden. Die Trocknungsdauer ist abhängig vom Außendurchmesser.

S Haupt- und Gegenspindel, zwei Werkzeugrevolver, sechs Linear- und zwei Rundachsen sowie ein speziell angepasstes Stangenlade- und Teileabfuhrsystem – mit diesen Voraussetzungen können Preforms nach individuellen Kundenwünschen schnell, wirtschaftlich und prozesssicher gefertigt werden.

5 Zu Beginn verdampfen die verbliebenen Plastifizierungsmittel während dem Entwaxungsvorgang. Nach dem weiteren Aufheizen schmilzt das Co bei ca. 1380°C und fließt in die Leerräume zwischen den WC-Körnern. Durch den heißisostatischen Prozess wird verbliebene Porosität entfernt und das Produkt anschließend abgekühlt. Die Hartmetallprodukte verlieren während dem gesamten Sinter-HIP-Prozess bis zu 25% an Volumen.

6 Nach ausgiebigen Qualitätskontrollen werden die Stäbe entweder in das Logistikzentrum gebracht oder in der Centerless-Schleiferei veredelt.

OUR TOMORROW'S REALITY

NON-CONTACT OPTICAL WAVE TECHNOLOGY
EFFICIENT AND TRANSPARENT QUALITY ASSURANCE

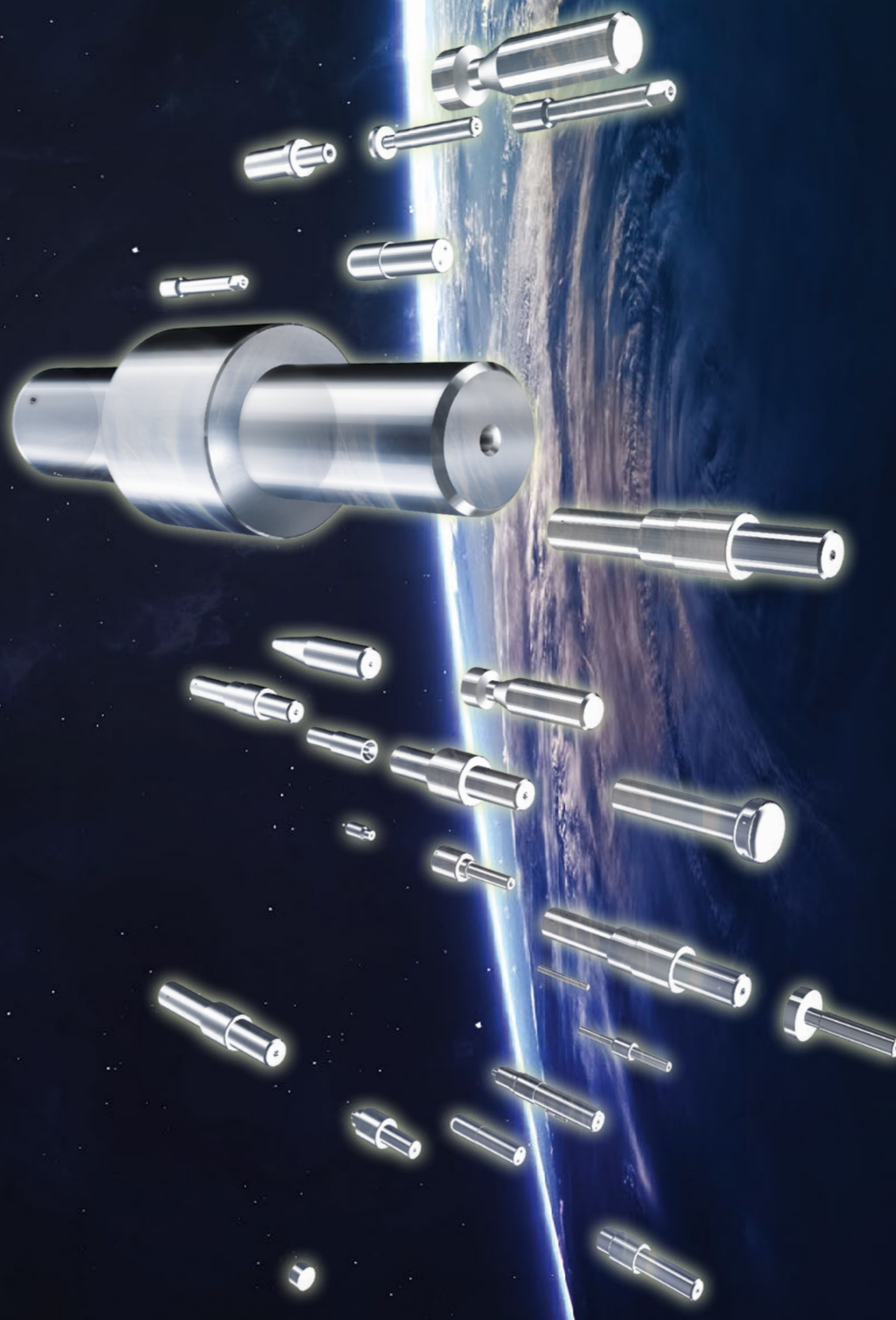
PRECISION | SYMMETRY | RELIABILITY

INNOVATIVE AUTOMATION SOLUTIONS | COMPLEX
WORKPIECES | CUSTOM-SPECIFIC SOLUTIONS
MODERN TURNING AND MILLING TECHNOLOGY

BERÜHRUNGSLOSE OPTISCHE WELLENMESSTECHNIK
EFFIZIENTE UND TRANSPARENTE QUALITÄTSSICHERUNG

PRÄZISION | SYMMETRIE | ZUVERLÄSSIGKEIT

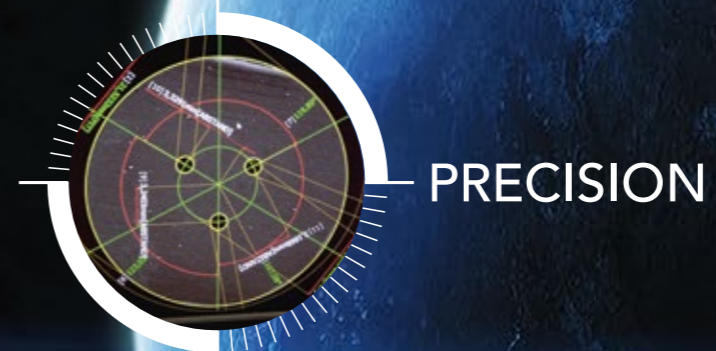
INNOVATIVE AUTOMATIONS-LÖSUNG | KOMPLEXE
WERKSTÜCKE | KUNDENSPEZIFISCHE LÖSUNGEN
MODERNE DREH- UND FRÄSTECHNOLOGIE



OUR MISSION

As KF we have high demands on ourselves, which can only be fulfilled if based on certain values. These not only serve ourselves, but especially our customers. Only the highest **PRECISION** allows for the accuracy that is necessary in the production of our rods. Our **PERFORMANCE** is defined by delivering the appropriate carbide grade, no matter your expectations. With our strong and tough carbide we offer you the **POWER** your tools deserve to break out into new spheres. Since 1987 we have produced our carbide with **PASSION** and constantly developed it to a new level in order to meet the challenges of the future.

Als KF haben wir hohe Ansprüche an uns selbst, die sich nur erfüllen lassen, wenn ihnen gewisse Werte zugrunde liegen. Diese dienen nicht nur uns selbst, sondern vor allem unseren Kunden. Nur höchste **PRÄZISION** ermöglicht die Genauigkeit, die bei der Fertigung unserer Stäbe mit verdrehten Kühlkanälen nötig ist. Unsere **LEISTUNG** definiert sich durch die Lieferung der passenden Hartmetallsorte, ganz egal wie hoch Sie hinaus wollen. Mit unserem starken Hartmetall bieten wir Ihnen die **KRAFT**, die Ihre Werkzeuge brauchen, um auch in neue Sphären aufzubrechen. Seit 1987 stellen wir, mit **LEIDENSCHAFT** unser Hartmetall her und entwickeln es ständig weiter, um auch den Herausforderungen der Zukunft gewachsen zu sein.



PRECISION



PERFORMANCE



POWER



PASSION

OUR QUALITY

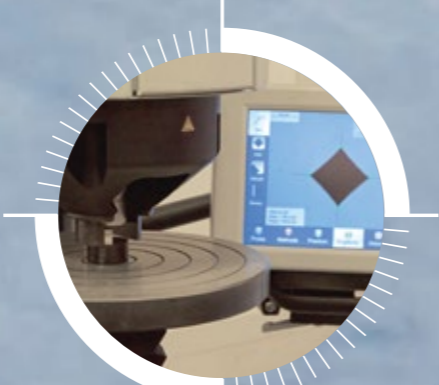
A product must be able to do many things, but above all: it must work reliably! Our quality assurance stands for inspection, process stability and precision right from the beginning.

Ein Produkt muss vieles können, aber vor allem muss es eines: Zuverlässig funktionieren! Unsere **Qualitätssicherung** steht für Kontrolle, Sicherheit und Präzision von Anfang an.

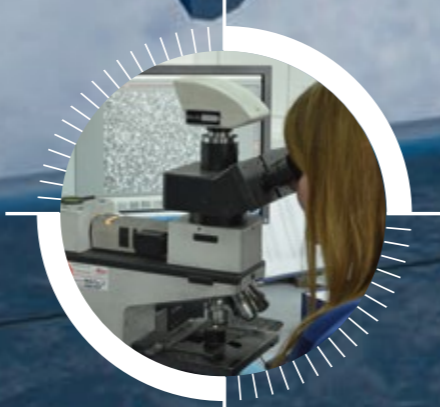
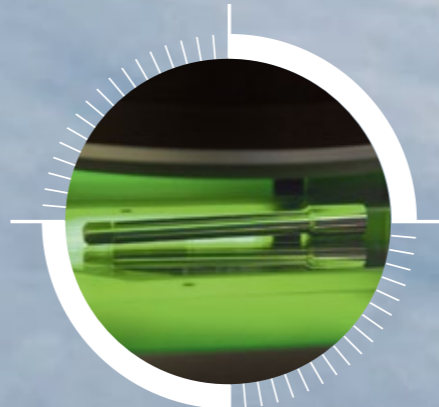
INCOMING
QUALITY CONTROL



METALLURGICAL
QUALITY CONTROL



GEOMETRICAL
QUALITY CONTROL



OUR CREW



WE HAVE THE RIGHT
PRODUCT
 FOR YOUR APPLICATION:
FIND IT!

RODS | RUNDSTÄBE

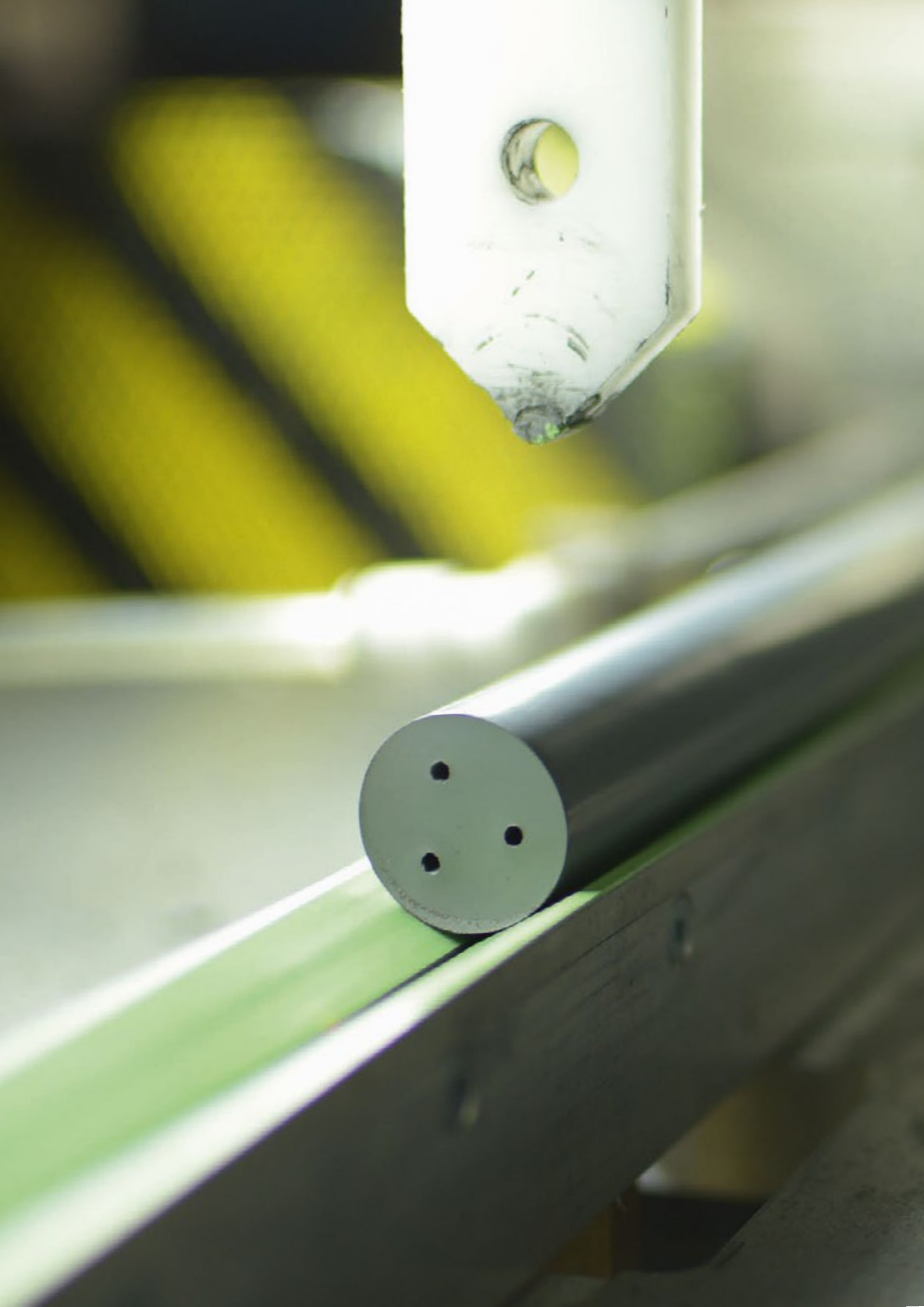
Solid Vollstäbe	29 – 31
Central coolant duct Zentralbohrung	32 – 33
2 parallel coolant ducts 2 parallele Kühlkanäle	34 – 37
2 coolant ducts, 30° helix 2 Kühlkanäle, 30° verdreht	38 – 41
2 coolant ducts, 40° helix 2 Kühlkanäle, 40° verdreht	42 – 43
3 coolant ducts, 30° helix 3 Kühlkanäle, 30° verdreht	44 – 45
3 coolant ducts, 40° helix 3 Kühlkanäle, 40° verdreht	46 – 47
Micro-twisted rods Kleinstverdrehte Rundstäbe	50

DRILL BLANKS | BOHRER-ROHLINGE

Ground (h6), with point, chamfer and coolant connection slit Geschliffen (h6), mit Spitze, Fase und Kühlmittleinlaufschlitz	51
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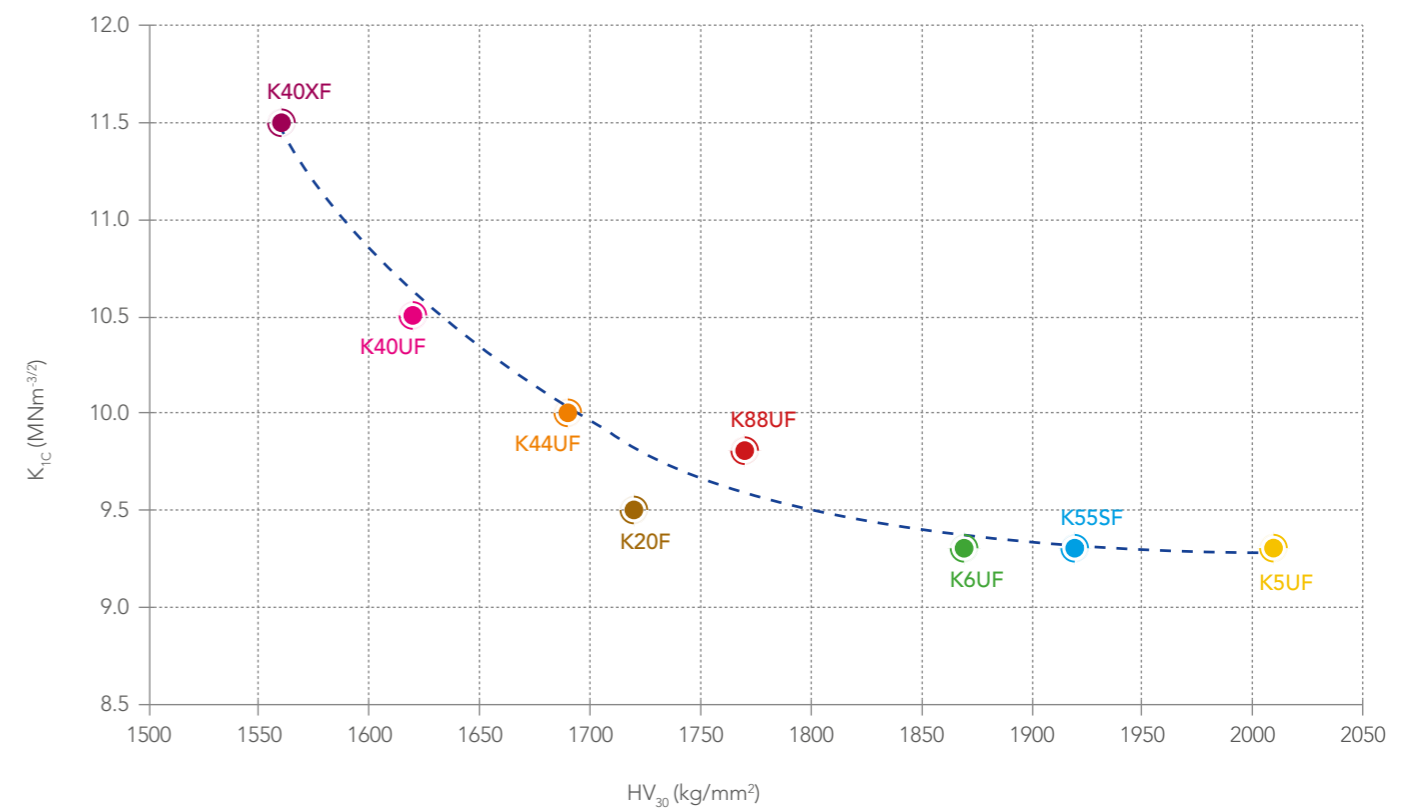
MILLING CUTTER BLANKS | FRÄSER-ROHLINGE

Ground (h6), solid, chamfered one end, for milling cutters DIN 6527 Geschliffen (h6), ohne Kühlkanal, mit einseitiger Fase, für Fräser nach DIN 6527	52 – 53
Ground (h6), with axial coolant duct and lateral exits Geschliffen (h6), mit zentralem Kühlkanal und radialen Austritten	54
Ground (h6), with axial coolant duct and y-exits Geschliffen (h6), mit zentralem Kühlkanal und Y-Austritt	55



GRADE SPECIFICATIONS

Grade Sorte		K40XF	K40UF	K44UF	K20F	K88UF	K6UF	K55SF	K5UF
ISO Classification ISO Bereich		K30–K40	K30–K40	K20–K30	K20–K30	K10–K20	K05–K10	K05–K10	K05–K10
Co	%	10.0	10.0	12.0	8.0	10.0	6.0	9.0	5.0
WC incl. doping	%	90.0	90.0	88.0	92.0	90.0	94.0	91.0	95.0
Density Dichte	g/cm ³	14.45	14.45	14.05	14.60	14.35	14.80	14.35	14.94
HV ₃₀	kg/mm ²	1560±50	1620±50	1690±50	1720±50	1770±50	1870±50	1920±50	2010±50
HRA	ISO3738	91.7	92.1	92.6	92.7	93.0	93.6	93.7	94.0
K _{IC}	MNm ^{-3/2}	11.5	10.5	10.0	9.5	9.8	9.3	9.3	9.3
TRS	N/mm ²	3700	4000	>4000	3200	>4000	3900	3800	3600
Porosity Porosität	A	<02	<02	<02	<02	<02	<02	<02	<02
	B	00	00	00	00	00	00	00	00
	C	00	00	00	00	00	00	00	00
WC grain size WC-Korngröße	µm	0.80	0.65	0.50	0.70	0.50	0.65	0.20	0.50



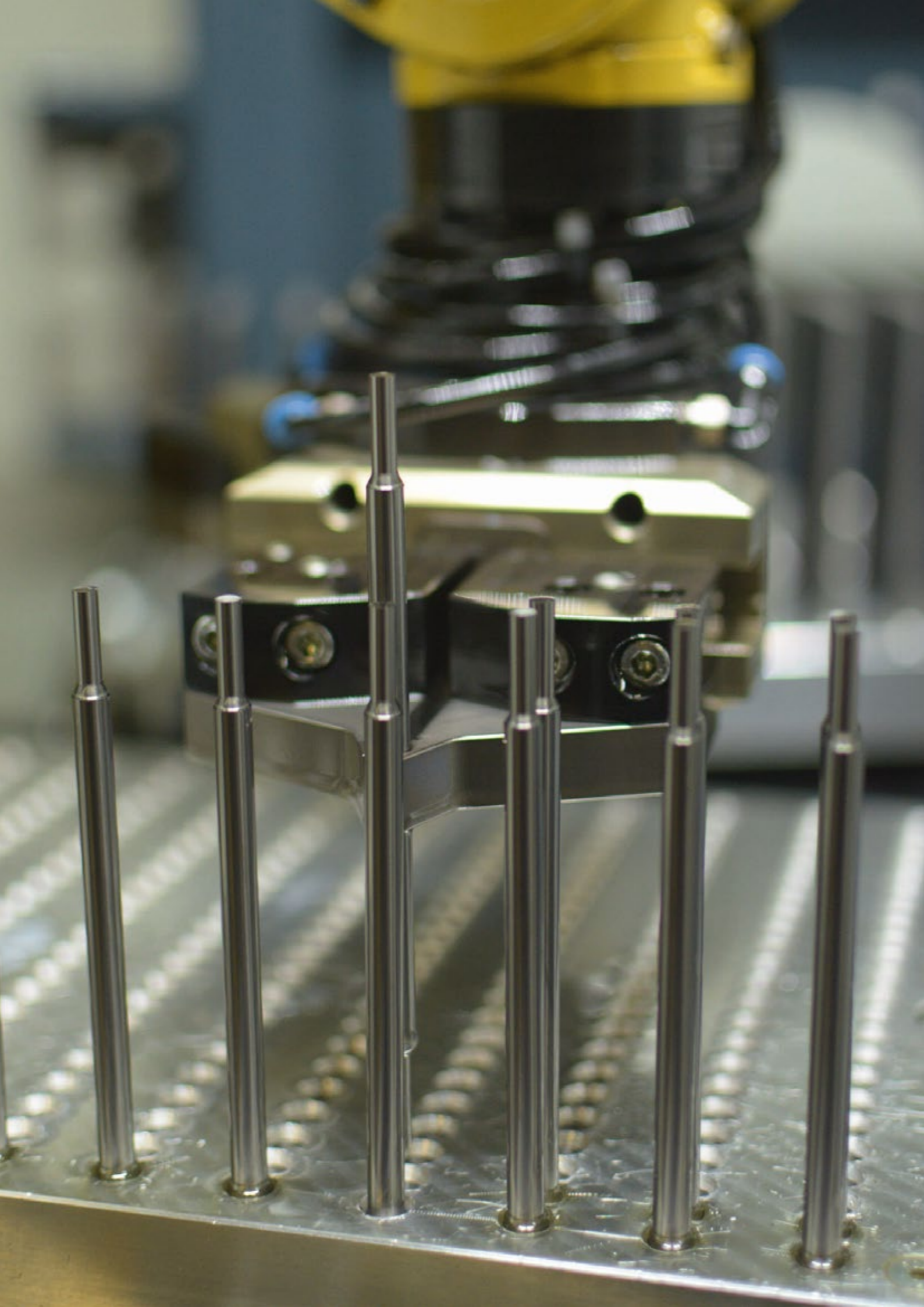
MATERIAL FOR INNOVATIVE TECHNOLOGIES

AEROSPACE | AUTOMOTIVE | CONSUMER ELECTRONICS | ENGINEERING



APPLICATIONS

Grade Sorte	K40XF	K40UF	K44UF	K20F	K88UF	K6UF	K55SF	K5UF
Drilling Bohren	•	•	•	•		•	•	•
End Milling Fräsen	•	•	•	•	•		•	
Reaming Reiben						•		
Tapping Gewindeschneiden			•					
Planing Hobeln							•	
Titanium alloys Titanlegierungen	•	•	•			•		
Nickel alloys Nickellegierungen	•		•					
Aluminium alloys Aluminiumlegierungen							•	
Heat resistant alloys Hitzebeständige Legierungen		•	•			•		
Stainless steels (<HRC 45) Rostfreie Stähle (<HRC 45)	•		•			•		
Austenitic stainless steel Warmfeste Legierungen		•						
Grey cast iron Stahl- und Gusswerkstoffe		•	•	•		•		
Carbon steel (<HRC 45) Unlegierte Stähle (<HRC 45)	•							
Tempered steel Getemperte Stähle			•		•			
Hardened steel Gehärtete Stähle				•	•	•	•	
Tool steel Werkzeugstahl					•			
Tempered alloys Vergütete Legierungen					•			
Hard cast materials Harte Gusswerkstoffe					•			
Composite materials Verbundwerkstoffe			•			•	•	•
CFRP CFK		•	•			•	•	•
Graphite Graphit						•	•	
Kevlar Kevlar							•	
Chilled cast iron Hartguss				•				

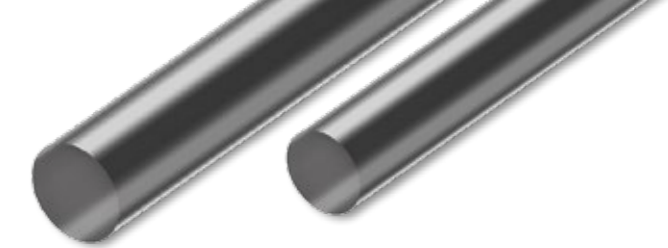


OUR PRODUCTS

Grade Sorte	K40XF	K40UF		K44UF		K20F		K88UF	K6UF	K55SF		K5UF
Length Länge (mm)	330	310	330	310	330	310	330	330	330	310	330	330
Solid Vollstab	7147	7180	7348	7175	7311	7172	7375	7146	7319	7186	7187	7144
Central Zentralbohrung		7043	7337	7041		7042			7150			
Parallel Parallel		7307	7326			7123						
Parallel (reduced bolt circle) Parallel (eingengter Teilkreis)		7308	7334			7130						
2x30°		7305	7325	7321								
2x40°		7306	7329									
3x30°		7303	7346									
3x40°		7304	7347									
Drill blanks Bohrer-Rohlinge	3xD		7157									
	5xD		7159									
	7xD		7161									
Milling cutter blanks Fräser-Rohlinge		7127	7126					7200	7125			

RODS

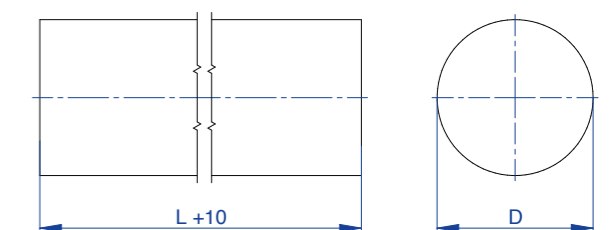
SOLID, LENGTH: 310mm



D mm	D h6 mm	K40UF 7180	K44UF 7175	K20F 7172	K55SF 7186
1.2	+0.20	□	□		
1.7	+0.20	□	□	□	
2.2	+0.20	□	□	□	□
2.7	+0.20	□	□	□	
3.2	+0.20	3.0	□ ●	□	□
3.7	+0.20	3.5	□ ●	□	
4.2	+0.20	4.0	□ ●	□ ●	□
4.7	+0.20	4.5	□ ●	□	
5.2	+0.20	5.0	□ ●	□ ●	□
5.7	+0.20	5.5	□ ●	□	
6.2	+0.20	6.0	□ ●	□ ●	□ ●
6.7	+0.20	6.5	□ ●	□	
7.2	+0.20	7.0	□ ●	□	□
7.7	+0.20				
8.2	+0.30	8.0	□ ●	□ ●	□ ●
8.7	+0.30		□		
9.2	+0.30	9.0	□ ●	□	□
9.7	+0.30		□	□	□
10.2	+0.30	10.0	□ ●	□ ●	□ ●
10.7	+0.30		□	□	
11.2	+0.30	11.0	□ ●	□	
11.7	+0.30		□	□	
12.2	+0.30	12.0	□ ●	□ ●	□ ●
12.7	+0.30		□	□	
13.2	+0.30	13.0	□ ●	□	□
13.7	+0.30		□	□	
14.2	+0.30	14.0	□ ●	□ ●	□
14.7	+0.30		□	□	
15.2	+0.30	15.0	□ ●	□	
15.7	+0.30		□		
16.2	+0.40	16.0	□ ●	□ ●	□ ●
16.7	+0.40		□		

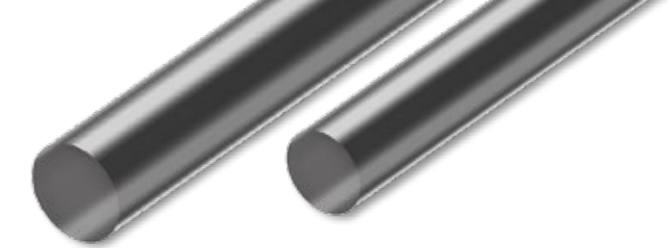
D mm	D h6 mm	K40UF 7180	K44UF 7175	K20F 7172	K55SF 7186
17.2	+0.40	17.0	□ ●	□	
17.7	+0.40		□		
18.2	+0.40	18.0	□ ●	□ ●	□ ●
18.7	+0.40		□		
19.2	+0.40	19.0	□ ●	□	
19.7	+0.40		□		
20.2	+0.50	20.0	□ ●	□ ●	□ ●
20.7	+0.50		□		
21.2	+0.50	21.0	□ ●		
21.7	+0.50		□		
22.2	+0.50	22.0	□ ●	□	□
22.7	+0.50		□		
23.2	+0.50	23.0	□ ●		
23.7	+0.50		□		
24.2	+0.50	24.0	□ ●	□	
25.2	+0.50	25.0	□ ●	□ ●	□ ●
25.7	+0.50		□		
26.2	+0.50	26.0	□ ●	□	
27.2	+0.50	27.0	□ ●		
28.2	+0.50	28.0	□ ●	□	
29.2	+0.50		□		
30.2	+0.50	30.0	□ ●	□	
31.2	+0.70		□		
32.2	+0.70	32.0	□ ●	□	□
33.2	+0.70		□		
34.2	+0.70		□		
35.2	+0.70		□		
36.2	+0.70		□		
38.2	+0.70		□		
40.2	+0.70		□	□	□

□ raw | ● ground



RODS

SOLID, LENGTH: 330mm

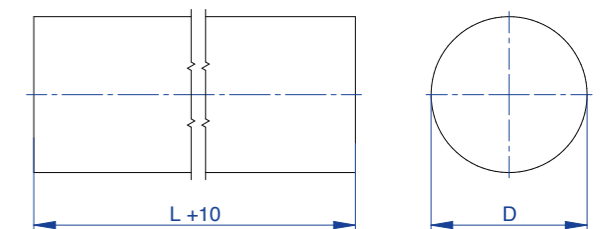


D mm	D h6 mm	K40XF 7147	K40UF 7348	K44UF 7311	K20F 7375	K88UF 7146	K6UF 7319	K55SF 7187	K5UF 7144
1.2 +0.20			□	□	□		□	□	
1.7 +0.20			□	□	□		□	□	
2.2 +0.20			□	□	□		□	□	
2.7 +0.20			□	□	□		□	□	
3.2 +0.20	3.0	□	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
Inch Size	3.175		●						
3.7 +0.20	3.5		□ ●	□	□		□	□	
4.2 +0.20	4.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
4.7 +0.20		□	□	□	□	□	□	□	
Inch Size	4.763		●						
5.2 +0.20	5.0	□	□ ●	□ ●	□ ●	□ ●	□	□ ●	□
5.7 +0.20	5.5		□ ●	□	□		□		
6.2 +0.20	6.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
Inch Size	6.350		●						
6.7 +0.20	6.5		□ ●	□	□		□	□	
7.2 +0.20	7.0	□	□ ●	□ ●	□ ●	□	□	□ ●	
7.7 +0.20	7.5		□ ●	□	□		□		
Inch Size	7.938		●						
8.2 +0.30	8.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
8.7 +0.30	8.5		□ ●	□	□		□		
9.2 +0.30	9.0		□ ●	□ ●	□ ●		□	□	
9.7 +0.30			□	□	□		□	□	
Inch Size	9.525		●						
10.2 +0.30	10.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
10.7 +0.30			□	□	□		□	□	
11.2 +0.30	11.0		□ ●	□ ●	□		□	□	
Inch Size	11.113		●						
11.7 +0.30			□		□		□		
12.2 +0.30	12.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
12.7 +0.30	12.5		□ ●	□			□		
Inch Size	12.700		●						
13.2 +0.30	13.0	□ ●	□ ●	□ ●	□		□	□	□
13.7 +0.30			□				□	□	
14.2 +0.30	14.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
Inch Size	14.288		●						
14.7 +0.30			□						
15.2 +0.30	15.0		□ ●	□	□		□	□	
15.7 +0.30			□						
Inch Size	15.875		●						
16.2 +0.40	16.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□

□ raw | ● ground

D mm	D h6 mm	K40XF 7147	K40UF 7348	K44UF 7311	K20F 7375	K88UF 7146	K6UF 7319	K55SF 7187	K5UF 7144
16.7 +0.40			□	□					
17.2 +0.40	17.0		□ ●	□	□ ●		□	□	
17.7 +0.40			□						
18.2 +0.40	18.0		□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	
18.7 +0.40			□	□					
19.2 +0.40	19.0	□	□ ●	□	□		□	□	
Inch Size	19.050		●						
19.7 +0.40			□						
20.2 +0.50	20.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□
20.7 +0.50			□	□			□		
21.2 +0.50	21.0		□ ●	□	□				
21.7 +0.50			□						
22.2 +0.50	22.0		□ ●	□ ●	□	□	□	□ ●	
Inch Size	22.225		●						
22.7 +0.50			□						
23.2 +0.50	23.0		□ ●	□					
23.7 +0.50			□						
24.2 +0.50	24.0		□ ●	□			□		
25.2 +0.50	25.0	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	□ ●	
Inch Size	25.400		●						
25.7 +0.50			□	□					
26.2 +0.50	26.0		□ ●	□			□		
27.2 +0.50	27.0		□ ●						
28.2 +0.50	28.0		□ ●	□	□		□		
29.2 +0.50	29.0		□ ●						
30.2 +0.50	30.0		□ ●	□ ●	□		□		
31.2 +0.70	31.0		□ ●						
32.2 +0.70	32.0		□ ●	□ ●	□		□ ●		
34.2 +0.70			□						
35.2 +0.70			□						
36.2 +0.70	36.0	□	□ ●	□					
38.2 +0.70			□						
40.2 +0.70	40.0		□ ●	□					

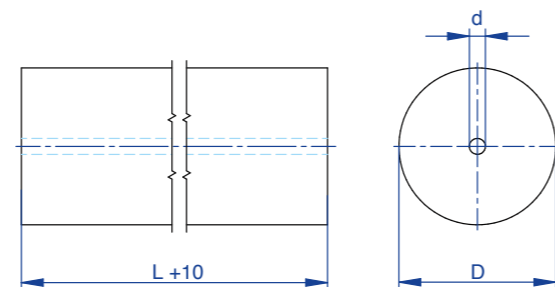
□ raw | ● ground



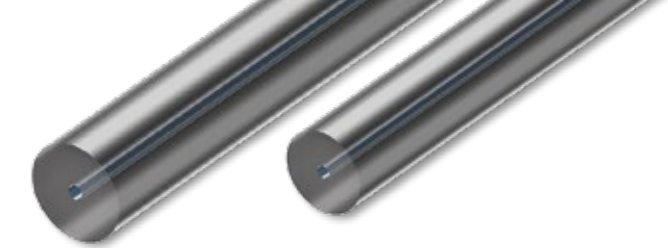
RODS

CENTRAL COOLANT DUCT, LENGTH: 310mm

D mm	D h6 mm	d mm	CO MVS mm	K40UF 7043	K44UF 7041	K20F 7042
4.5 +0.30		0.6 ±0.10	0.07	□	□	□
6.3 +0.30	6.0	1.0 ±0.15	0.07	□ ●	□	□
8.3 +0.30	8.0	1.3 ±0.15	0.07	□ ●	□	□
10.3 +0.40	10.0	2.0 ±0.20	0.10	□ ●	□	□
12.3 +0.40	12.0	2.0 ±0.20	0.10	□ ●	□	□
14.3 +0.40	14.0	2.0 ±0.20	0.12	□ ●	□	□
16.3 +0.50	16.0	2.0 ±0.20	0.12	□ ●	□	□
18.3 +0.50		3.0 ±0.25	0.15	□	□	□
20.3 +0.50	20.0	3.0 ±0.25	0.15	□ ●	□	□
22.3 +0.50	22.0	3.0 ±0.25	0.15	□ ●	□	□
24.3 +0.50		4.0 ±0.30	0.15	□		□
25.3 +0.50		4.0 ±0.30	0.15			□
26.3 +0.50	26.0	4.0 ±0.30	0.15	□ ●		□
28.3 +0.50		4.0 ±0.30	0.15	□		□
30.3 +0.50		5.0 ±0.35	0.15	□		□
32.3 +0.50		5.0 ±0.35	0.15	□		□



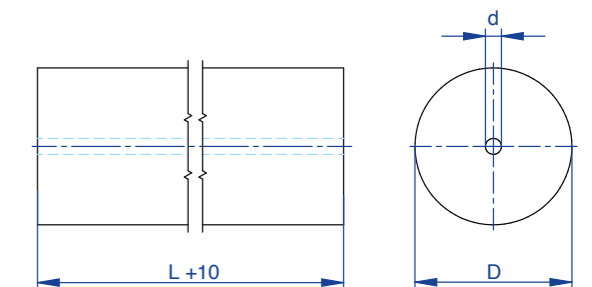
□ raw | ● ground
CO = centre offset | MVS = Mitterversatz



RODS

CENTRAL COOLANT DUCT, LENGTH: 330mm

D mm	D h6 mm	d mm	CO MVS mm	K40UF 7337	K6UF 7150
4.5 +0.30		0.60 ±0.10	0.07	□	□
4.501 +0.30		1.00 ±0.15	0.07		□
6.3 +0.30	6.0	1.00 ±0.15	0.07	□ ●	□
6.301 +0.30		1.80 ±0.15	0.07	□	□
8.3 +0.30	8.0	1.30 ±0.15	0.07	□ ●	□
8.301 +0.30		2.50 ±0.20	0.07	□	□
8.302 +0.30		1.80 ±0.15	0.07		□
10.3 +0.40	10.0	2.00 ±0.20	0.10	□ ●	□
10.301 +0.40		3.00 ±0.25	0.10	□	□
12.3 +0.40	12.0	2.00 ±0.20	0.10	□ ●	□
12.301 +0.40		3.00 ±0.25	0.10	□	□
14.3 +0.40	14.0	2.00 ±0.20	0.12	□ ●	□
14.301 +0.40		3.00 ±0.25	0.12	□	□
16.3 +0.50	16.0	2.00 ±0.20	0.12	□ ●	□
16.301 +0.50		2.50 ±0.20	0.12	□	□
16.302 +0.50		4.00 ±0.30	0.12	□	□
16.303 +0.50		3.00 ±0.25	0.12	□	
18.3 +0.50	18.0	3.00 ±0.25	0.15	□ ●	□
18.301 +0.50		4.00 ±0.30	0.15		□
20.3 +0.50	20.0	3.00 ±0.25	0.15	□ ●	□
20.301 +0.50		4.00 ±0.30	0.15		□
22.3 +0.50	22.0	3.00 ±0.25	0.15	□ ●	□
24.3 +0.50	24.0	4.00 ±0.30	0.15	□ ●	□
25.3 +0.50	25.0	4.00 ±0.30	0.15	□ ●	□
26.3 +0.50	26.0	4.00 ±0.30	0.15	□ ●	□
28.3 +0.50	28.0	4.00 ±0.30	0.15	□ ●	□
30.3 +0.50	30.0	5.00 ±0.35	0.15	□ ●	□
32.3 +0.50	32.0	5.00 ±0.35	0.15	□ ●	□

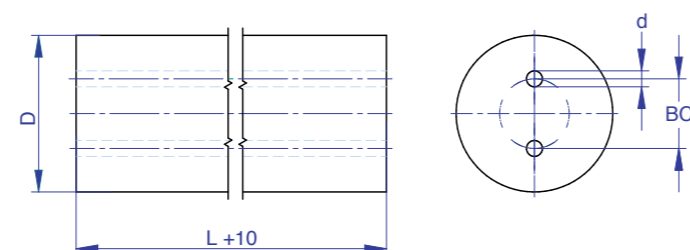


□ raw | ● ground
CO = centre offset | MVS = Mitterversatz

RODS

2 PARALLEL COOLANT DUCTS, LENGTH: 310mm

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	K40UF 7307	K20F 7123
4.2 +0.30		1.80 -0.15	0.80 ±0.10	0.10	□	
5.2 +0.30		2.00 -0.15	0.80 ±0.10	0.13	□	
6.3 +0.30	6.0	3.00 -0.20	1.00 ±0.10	0.15	□ ●	□
7.3 +0.30		3.50 -0.20	1.00 ±0.15	0.15	□	□
8.3 +0.30	8.0	4.00 -0.30	1.00 ±0.15	0.15	□ ●	□
9.3 +0.30		4.00 -0.30	1.40 ±0.15	0.20	□	□
10.3 +0.30	10.0	5.00 -0.30	1.40 ±0.15	0.20	□ ●	□
11.3 +0.40		5.00 -0.30	1.40 ±0.15	0.28	□	□
12.3 +0.40	12.0	6.00 -0.30	1.75 ±0.15	0.30	□ ●	□
13.3 +0.40		6.00 -0.30	1.75 ±0.15	0.34	□	□
14.3 +0.40	14.0	7.00 -0.30	1.75 ±0.15	0.37	□ ●	□
15.3 +0.40		7.00 -0.30	2.00 ±0.20	0.40	□	
16.3 +0.40	16.0	8.00 -0.30	2.00 ±0.20	0.40	□ ●	□
17.3 +0.50		8.00 -0.30	2.00 ±0.20	0.47	□	
18.3 +0.50	18.0	9.00 -0.30	2.00 ±0.20	0.50	□ ●	□
19.3 +0.50		9.00 -0.30	2.00 ±0.20	0.50	□	
20.4 +0.50	20.0	10.00 -0.40	2.50 ±0.25	0.50	□ ●	□
21.4 +0.50		10.00 -0.40	2.50 ±0.25	0.50	□	
22.4 +0.50	22.0	11.00 -0.40	2.50 ±0.25	0.50	□ ●	□
23.4 +0.50		11.00 -0.40	2.50 ±0.25	0.50	□	
24.4 +0.50		12.00 -0.50	3.00 ±0.25	0.50	□	
25.4 +0.50	25.0	12.00 -0.50	3.00 ±0.25	0.50	□ ●	□
26.4 +0.50		13.00 -0.50	3.00 ±0.25	0.50	□	
28.4 +0.50		14.00 -0.50	3.00 ±0.25	0.50	□	
30.4 +0.50		14.00 -0.50	3.00 ±0.25	0.50	□	
32.4 +0.50		14.00 -0.50	3.00 ±0.25	0.50	□	
34.4 +0.50		14.00 -0.50	3.00 ±0.25	0.50	□	

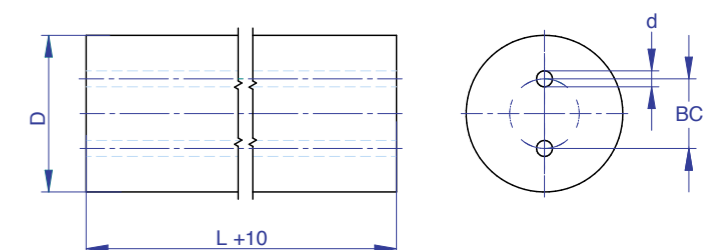


□ raw | ● ground
CO = centre offset | MVS = Mittenversatz

RODS

2 PARALLEL COOLANT DUCTS, LENGTH: 330mm

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	K40UF 7326
4.2 +0.30		1.80 -0.15	0.80 ±0.10	0.10	□
5.2 +0.30		2.00 -0.15	0.80 ±0.10	0.13	□
6.3 +0.30	6.0	3.00 -0.20	1.00 ±0.10	0.15	□ ●
7.3 +0.30		3.50 -0.20	1.00 ±0.15	0.15	□
8.3 +0.30	8.0	4.00 -0.30	1.00 ±0.15	0.15	□ ●
9.3 +0.30		4.00 -0.30	1.40 ±0.15	0.20	□
10.3 +0.30	10.0	5.00 -0.30	1.40 ±0.15	0.20	□ ●
11.3 +0.40		5.00 -0.30	1.40 ±0.15	0.28	□
12.3 +0.40	12.0	6.00 -0.30	1.75 ±0.15	0.30	□ ●
13.3 +0.40		6.00 -0.30	1.75 ±0.15	0.34	□
14.3 +0.40	14.0	7.00 -0.30	1.75 ±0.15	0.37	□ ●
15.3 +0.40		7.00 -0.30	2.00 ±0.20	0.40	□
16.3 +0.40	16.0	8.00 -0.30	2.00 ±0.20	0.40	□ ●
17.3 +0.50		8.00 -0.30	2.00 ±0.20	0.47	□
18.3 +0.50	18.0	9.00 -0.30	2.00 ±0.20	0.50	□ ●
19.3 +0.50		9.00 -0.30	2.00 ±0.20	0.50	□
20.4 +0.50	20.0	10.00 -0.40	2.50 ±0.25	0.50	□ ●
21.4 +0.50		10.00 -0.40	2.50 ±0.25	0.50	□
22.4 +0.50	22.0	11.00 -0.40	2.50 ±0.25	0.50	□
23.4 +0.50		11.00 -0.40	2.50 ±0.25	0.50	□
24.4 +0.50		12.00 -0.50	3.00 ±0.25	0.50	□
25.4 +0.50	25.0	12.00 -0.50	3.00 ±0.25	0.50	□ ●
26.4 +0.50		13.00 -0.50	3.00 ±0.25	0.50	□
30.4 +0.50		14.00 -0.50	3.00 ±0.25	0.50	□

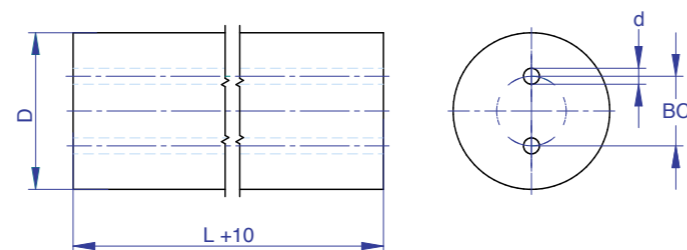


□ raw | ● ground
CO = centre offset | MVS = Mittenversatz

RODS

2 PARALLEL COOLANT DUCTS, LENGTH: 310mm (REDUCED BOLT CIRCLE)

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	K40UF 7308	K20F 7130
6.3 +0.30	6.0	1.50 -0.20	0.80 ±0.10	0.15	□ ● □	
7.3 +0.30		1.50 -0.20	0.80 ±0.10	0.15	□	
8.3 +0.30	8.0	2.60 -0.30	1.00 ±0.10	0.15	□ ● □	
8.315 +0.30		1.50 -0.20	0.80 ±0.10	0.15	□	
8.320 +0.30		2.00 -0.30	0.80 ±0.10	0.15	□	
9.3 +0.30		2.60 -0.30	1.00 ±0.10	0.20	□	□
10.3 +0.30	10.0	2.60 -0.30	1.00 ±0.10	0.20	□ ● □	
11.3 +0.40		3.50 -0.30	1.20 ±0.15	0.28	□	
12.3 +0.40	12.0	3.50 -0.30	1.20 ±0.15	0.30	□ ● □	
13.3 +0.40		3.50 -0.30	1.20 ±0.15	0.34	□	
14.3 +0.40	14.0	5.00 -0.30	1.50 ±0.15	0.37	□ ● □	
15.3 +0.40		5.00 -0.30	1.50 ±0.15	0.40	□	
16.3 +0.40	16.0	5.00 -0.30	1.50 ±0.15	0.40	□ ● □	
17.3 +0.50		6.20 -0.30	2.00 ±0.20	0.47	□	
18.3 +0.50	18.0	6.20 -0.30	2.00 ±0.20	0.50	□ ● □	
19.3 +0.50		6.20 -0.30	2.00 ±0.20	0.50	□	
20.4 +0.50	20.0	6.20 -0.40	2.00 ±0.20	0.50	□ ● □	
21.4 +0.50		6.20 -0.40	2.00 ±0.20	0.50	□	□
22.4 +0.50	22.0	6.20 -0.40	2.00 ±0.20	0.50	□ ● □	
23.4 +0.50		7.50 -0.40	2.00 ±0.20	0.50	□	
24.4 +0.50		7.50 -0.40	2.00 ±0.20	0.50	□	
25.4 +0.50		7.50 -0.40	2.00 ±0.20	0.50	□	
26.4 +0.50		7.50 -0.40	2.00 ±0.20	0.50	□	

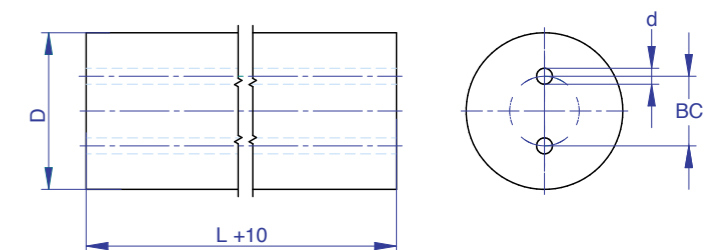


□ raw | ● ground
CO = centre offset | MVS = Mitterversatz

RODS

2 PARALLEL COOLANT DUCTS, LENGTH: 330mm (REDUCED BOLT CIRCLE)

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	K40UF 7334
6.3 +0.30	6.0	1.50 -0.20	0.80 ±0.10	0.15	□ ●
8.3 +0.30	8.0	2.60 -0.30	1.00 ±0.10	0.15	□ ●
8.315 +0.30		1.50 -0.20	0.80 ±0.10	0.15	□
8.320 +0.30		2.00 -0.30	0.80 ±0.10	0.15	□
9.3 +0.30		2.60 -0.30	1.00 ±0.10	0.20	□
10.3 +0.30	10.0	2.60 -0.30	1.00 ±0.10	0.20	□ ●
11.3 +0.40		3.50 -0.30	1.20 ±0.15	0.28	□
12.3 +0.40	12.0	3.50 -0.30	1.20 ±0.15	0.30	□ ●
13.3 +0.40		3.50 -0.30	1.20 ±0.15	0.34	□
14.3 +0.40	14.0	5.00 -0.30	1.50 ±0.15	0.37	□ ●
15.3 +0.40		5.00 -0.30	1.50 ±0.15	0.40	□
16.3 +0.40	16.0	5.00 -0.30	1.50 ±0.15	0.40	□ ●
17.3 +0.50		6.20 -0.30	2.00 ±0.20	0.47	□
18.3 +0.50	18.0	6.20 -0.30	2.00 ±0.20	0.50	□ ●
20.4 +0.50	20.0	6.20 -0.40	2.00 ±0.20	0.50	□ ●
21.4 +0.50		6.20 -0.40	2.00 ±0.20	0.50	□
22.4 +0.50	22.0	6.20 -0.40	2.00 ±0.20	0.50	□ ●
24.4 +0.50		7.50 -0.40	2.00 ±0.20	0.50	□
25.4 +0.50	25.0	7.50 -0.40	2.00 ±0.20	0.50	□ ●



□ raw | ● ground
CO = centre offset | MVS = Mitterversatz

RODS

2 COOLANT DUCTS, 30° HELIX, LENGTH: 310mm

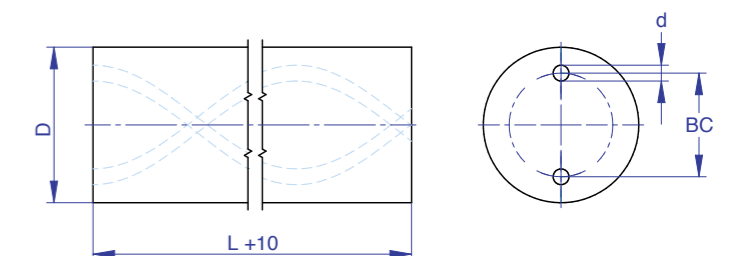


D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	30° ±0.5° mm	K40UF 7305	K44UF 7321
3.3 +0.30	3.0	1.60 -0.20	0.40 ±0.10	0.08	16.32 -0.32 / +0.33	□ ● □	
3.8 +0.30		1.90 -0.20	0.50 ±0.10	0.09	19.04 -0.38 / +0.39	□	
4.3 +0.30	4.0	2.20 -0.20	0.60 ±0.10	0.10	21.77 -0.43 / +0.45	□ ● □	
4.8 +0.30		2.40 -0.30	0.70 ±0.10	0.10	24.49 -0.49 / +0.50	□	
5.3 +0.30	5.0	2.60 -0.40	0.70 ±0.10	0.13	27.21 -0.54 / +0.56	□ ● □	
5.8 +0.30		2.60 -0.40	0.70 ±0.10	0.14	29.93 -0.59 / +0.61	□	
6.3 +0.30	6.0	2.60 -0.40	0.70 ±0.10	0.15	32.65 -0.65 / +0.67	□ ● □	
6.8 +0.30		3.50 -0.40	1.00 ±0.15	0.15	35.37 -0.70 / +0.72	□	
7.3 +0.30		3.70 -0.40	1.00 ±0.15	0.15	38.09 -0.76 / +0.78	□	□
7.8 +0.30		4.00 -0.40	1.00 ±0.15	0.15	40.81 -0.81 / +0.84	□	
8.3 +0.30	8.0	4.00 -0.40	1.00 ±0.15	0.15	43.53 -0.86 / +0.89	□ ● □	
8.8 +0.30		4.50 -0.60	1.00 ±0.15	0.20	46.25 -0.92 / +0.95	□	
9.3 +0.30		4.80 -0.60	1.40 ±0.15	0.20	48.97 -0.97 / +1.00	□	
9.8 +0.30		4.80 -0.60	1.40 ±0.15	0.20	51.69 -1.03 / +1.06	□	
10.3 +0.30	10.0	4.80 -0.60	1.40 ±0.15	0.20	54.41 -1.08 / +1.11	□ ● □	
10.8 +0.40		4.80 -0.60	1.40 ±0.15	0.28	57.13 -1.13 / +1.17	□	
11.3 +0.40		5.30 -0.80	1.40 ±0.15	0.28	59.86 -1.19 / +1.22	□	
11.8 +0.40		5.80 -0.80	1.40 ±0.15	0.30	62.58 -1.24 / +1.28	□	
12.3 +0.40	12.0	6.25 -0.80	1.40 ±0.15	0.30	65.30 -1.30 / +1.34	□ ● □	
12.8 +0.40		6.25 -0.80	1.75 ±0.20	0.33	68.02 -1.35 / +1.39	□	
13.3 +0.40		6.50 -0.80	1.75 ±0.20	0.34	70.74 -1.40 / +1.45	□	
13.8 +0.40		6.80 -0.80	1.75 ±0.20	0.35	73.46 -1.46 / +1.50	□	
14.3 +0.40	14.0	7.10 -0.80	1.75 ±0.20	0.37	76.18 -1.51 / +1.56	□ ● □	
14.8 +0.40		7.40 -0.80	1.75 ±0.20	0.39	78.90 -1.57 / +1.61	□	
15.3 +0.40		7.70 -0.80	1.75 ±0.20	0.40	81.62 -1.62 / +1.67	□	
15.8 +0.40		8.00 -0.80	1.75 ±0.20	0.40	84.34 -1.67 / +1.73	□	

□ raw | ● ground
CO = centre offset | MVS = Mitterversatz

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	30° ±0.5° mm	K40UF 7305	K44UF 7321
16.3 +0.40	16.0	8.30 -0.80	1.75 ±0.20	0.40	87.06 -1.73 / +1.78	□ ● □	□
16.8 +0.50		8.60 -0.80	1.75 ±0.20	0.45	89.78 -1.78 / +1.84	□	
17.3 +0.50		8.90 -0.80	1.75 ±0.20	0.47	92.50 -1.84 / +1.89	□	
17.8 +0.50		9.20 -0.80	1.75 ±0.20	0.48	95.22 -1.89 / +1.95	□	
18.3 +0.50	18.0	9.55 -0.80	2.00 ±0.25	0.50	97.95 -1.94 / +2.00	□ ● □	□
18.8 +0.50		9.75 -0.80	2.00 ±0.25	0.50	100.67 -2.00 / +2.06	□	
19.3 +0.50		10.10 -0.80	2.00 ±0.25	0.50	103.39 -2.05 / +2.12	□	
20.3 +0.50	20.0	10.40 -1.00	2.00 ±0.25	0.50	108.83 -2.16 / +2.23	□ ● □	□
21.3 +0.50		11.15 -1.00	2.00 ±0.25	0.50	114.27 -2.27 / +2.34	□	
22.3 +0.50	22.0	11.60 -1.00	2.00 ±0.25	0.50	119.71 -2.38 / +2.45	□ ● □	□
23.3 +0.50		12.20 -1.00	2.00 ±0.25	0.50	125.15 -2.48 / +2.56	□	
24.3 +0.50		12.80 -1.00	2.00 ±0.25	0.50	130.59 -2.59 / +2.67	□	
25.3 +0.50	25.0	13.30 -1.00	2.00 ±0.25	0.50	136.03 -2.70 / +2.78	□ ● □	
26.3 +0.50		13.80 -1.00	2.00 ±0.25	0.50	141.48 -2.81 / +2.90	□	
27.3 +0.50		14.30 -1.20	2.50 ±0.30	0.60	146.92 -2.92 / +3.01	□	
28.3 +0.50		14.80 -1.20	2.50 ±0.30	0.60	152.36 -3.02 / +3.12	□	
29.3 +0.50		15.40 -1.20	2.50 ±0.30	0.60	157.80 -3.13 / +3.23	□	
30.3 +0.50		16.00 -1.20	2.50 ±0.30	0.70	163.24 -3.24 / +3.34	□	
32.3 +0.50		17.20 -1.20	3.00 ±0.30	0.80	174.12 -3.46 / +3.56	□	

□ raw | ● ground
CO = centre offset | MVS = Mitterversatz



RODS

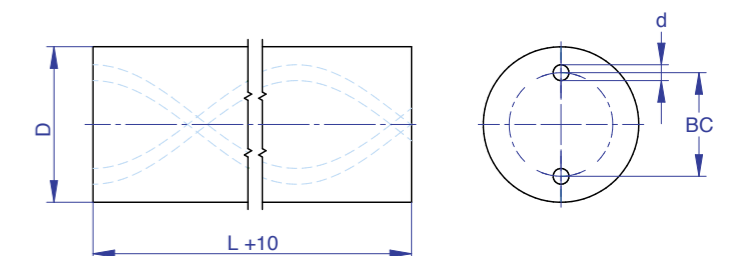
2 COOLANT DUCTS, 30° HELIX, LENGTH: 330mm



D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	30° ±0.5° mm	K40UF 7325
3.3 +0.30	3.0	1.60 -0.20	0.40 ±0.10	0.08	16.32 -0.32 / +0.33	□ ●
3.8 +0.30		1.90 -0.20	0.50 ±0.10	0.09	19.04 -0.38 / +0.39	□
4.3 +0.30	4.0	2.20 -0.20	0.60 ±0.10	0.10	21.77 -0.43 / +0.45	□ ●
4.8 +0.30		2.40 -0.30	0.70 ±0.10	0.10	24.49 -0.49 / +0.50	□
5.3 +0.30	5.0	2.60 -0.40	0.70 ±0.10	0.13	27.21 -0.54 / +0.56	□ ●
5.8 +0.30		2.60 -0.40	0.70 ±0.10	0.14	29.93 -0.59 / +0.61	□
6.3 +0.30	6.0	2.60 -0.40	0.70 ±0.10	0.15	32.65 -0.65 / +0.67	□ ●
6.8 +0.30		3.50 -0.40	1.00 ±0.15	0.15	35.37 -0.70 / +0.72	□
7.3 +0.30	7.0	3.70 -0.40	1.00 ±0.15	0.15	38.09 -0.76 / +0.78	□ ●
7.8 +0.30		4.00 -0.40	1.00 ±0.15	0.15	40.81 -0.81 / +0.84	□
8.3 +0.30	8.0	4.00 -0.40	1.00 ±0.15	0.15	43.53 -0.86 / +0.89	□ ●
8.8 +0.30		4.50 -0.60	1.00 ±0.15	0.20	46.25 -0.92 / +0.95	□
9.3 +0.30	9.0	4.80 -0.60	1.40 ±0.15	0.20	48.97 -0.97 / +1.00	□ ●
9.8 +0.30		4.80 -0.60	1.40 ±0.15	0.20	51.69 -1.03 / +1.06	□
10.3 +0.30	10.0	4.80 -0.60	1.40 ±0.15	0.20	54.41 -1.08 / +1.11	□ ●
10.8 +0.40		4.80 -0.60	1.40 ±0.15	0.28	57.13 -1.13 / +1.17	□
11.3 +0.40	11.0	5.30 -0.80	1.40 ±0.15	0.28	59.86 -1.19 / +1.22	□ ●
11.8 +0.40		5.80 -0.80	1.40 ±0.15	0.30	62.58 -1.24 / +1.28	□
12.3 +0.40	12.0	6.25 -0.80	1.40 ±0.15	0.30	65.30 -1.30 / +1.34	□ ●
12.8 +0.40		6.25 -0.80	1.75 ±0.20	0.33	68.02 -1.35 / +1.39	□
13.3 +0.40	13.0	6.50 -0.80	1.75 ±0.20	0.34	70.74 -1.40 / +1.45	□ ●
13.8 +0.40		6.80 -0.80	1.75 ±0.20	0.35	73.46 -1.46 / +1.50	□

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	30° ±0.5° mm	K40UF 7325
14.3 +0.40	14.0	7.10 -0.80	1.75 ±0.20	0.37	76.18 -1.51 / +1.56	□ ●
15.3 +0.40	15.0	7.70 -0.80	1.75 ±0.20	0.40	81.62 -1.62 / +1.67	□ ●
16.3 +0.40	16.0	8.30 -0.80	1.75 ±0.20	0.40	87.06 -1.73 / +1.78	□ ●
16.8 +0.50		8.60 -0.80	1.75 ±0.20	0.45	89.78 -1.78 / +1.84	□
17.3 +0.50		8.90 -0.80	1.75 ±0.20	0.47	92.50 -1.84 / +1.89	□
18.3 +0.50	18.0	9.55 -0.80	2.00 ±0.25	0.50	97.95 -1.94 / +2.00	□ ●
18.8 +0.50		9.75 -0.80	2.00 ±0.25	0.50	100.67 -2.00 / +2.06	□
19.3 +0.50		10.10 -0.80	2.00 ±0.25	0.50	103.39 -2.05 / +2.12	□
20.3 +0.50	20.0	10.40 -1.00	2.00 ±0.25	0.50	108.83 -2.16 / +2.23	□ ●
21.3 +0.50		11.15 -1.00	2.00 ±0.25	0.50	114.27 -2.27 / +2.34	□
22.3 +0.50	22.0	11.60 -1.00	2.00 ±0.25	0.50	119.71 -2.38 / +2.45	□ ●
23.3 +0.50		12.20 -1.00	2.00 ±0.25	0.50	125.15 -2.48 / +2.56	□
24.3 +0.50		12.80 -1.00	2.00 ±0.25	0.50	130.59 -2.59 / +2.67	□
25.3 +0.50	25.0	13.30 -1.00	2.00 ±0.25	0.50	136.03 -2.70 / +2.78	□ ●
26.3 +0.50		13.80 -1.00	2.00 ±0.25	0.50	141.48 -2.81 / +2.90	□
27.3 +0.50		14.30 -1.20	2.50 ±0.30	0.60	146.92 -2.92 / +3.01	□
28.3 +0.50		14.80 -1.20	2.50 ±0.30	0.60	152.36 -3.02 / +3.12	□
30.3 +0.50		16.00 -1.20	2.50 ±0.30	0.70	163.24 -3.24 / +3.34	□
32.3 +0.50		17.20 -1.20	3.00 ±0.30	0.80	174.12 -3.46 / +3.56	□
34.3 +0.50		18.00 -1.20	3.00 ±0.30	0.80	185.01 -3.67 / +3.79	□
35.3 +0.50		18.00 -1.20	3.00 ±0.30	0.80	190.45 -3.78 / +3.90	□

□ raw | ● ground
CO = centre offset | MVS = Mittenversatz

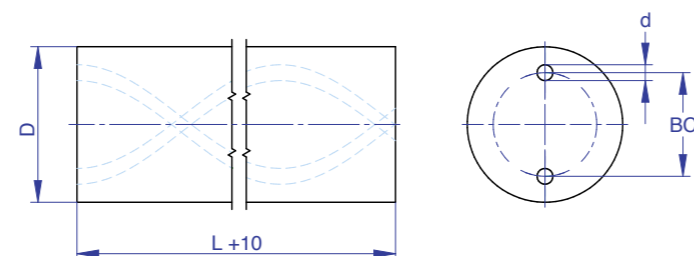


□ raw | ● ground
CO = centre offset | MVS = Mittenversatz

RODS

2 COOLANT DUCTS, 40° HELIX, LENGTH: 310mm

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	40° ±0.5° mm	K40UF 7306
6.3 +0.30	6.0	2.20 -0.40	0.50 ±0.15	0.15	22.46 -0.39 / +0.40	□ ●
6.8 +0.30		2.30 -0.40	0.50 ±0.15	0.15	24.34 -0.43 / +0.44	□
7.3 +0.30		2.40 -0.40	0.65 ±0.15	0.15	26.21 -0.46 / +0.47	□
7.8 +0.30		2.50 -0.40	0.65 ±0.15	0.15	28.08 -0.49 / +0.50	□
8.3 +0.30	8.0	2.70 -0.60	0.65 ±0.15	0.15	29.95 -0.53 / +0.54	□ ●
8.8 +0.30		2.90 -0.60	0.65 ±0.15	0.15	31.82 -0.56 / +0.57	□
9.3 +0.30		3.20 -0.60	0.75 ±0.15	0.20	33.70 -0.59 / +0.60	□
9.8 +0.30		3.50 -0.60	0.75 ±0.15	0.20	35.57 -0.62 / +0.64	□
10.3 +0.40	10.0	3.50 -0.80	0.80 ±0.15	0.20	37.44 -0.66 / +0.67	□ ●
10.8 +0.40		3.50 -0.80	0.80 ±0.15	0.28	39.31 -0.69 / +0.70	□
11.3 +0.40		3.70 -0.80	0.80 ±0.15	0.28	41.18 -0.72 / +0.74	□
12.3 +0.40	12.0	4.20 -0.80	0.90 ±0.20	0.30	44.93 -0.79 / +0.80	□ ●
12.8 +0.40		4.35 -0.80	0.90 ±0.20	0.33	46.80 -0.82 / +0.84	□
13.3 +0.40		4.40 -0.80	0.90 ±0.20	0.34	48.67 -0.85 / +0.87	□
14.3 +0.40	14.0	4.70 -0.80	1.00 ±0.20	0.37	52.42 -0.92 / +0.94	□ ●
14.8 +0.40		4.90 -0.80	1.10 ±0.20	0.39	54.29 -0.95 / +0.97	□
15.3 +0.50		5.10 -0.80	1.10 ±0.20	0.40	56.16 -0.99 / +1.01	□
15.8 +0.50		5.30 -0.80	1.10 ±0.20	0.40	58.03 -1.02 / +1.04	□
16.3 +0.50	16.0	5.50 -0.80	1.20 ±0.20	0.40	59.90 -1.05 / +1.07	□ ●
16.8 +0.50		5.75 -0.80	1.20 ±0.20	0.45	61.78 -1.08 / +1.11	□
17.3 +0.50		5.90 -0.80	1.20 ±0.25	0.47	63.65 -1.12 / +1.14	□
18.3 +0.50	18.0	6.30 -0.80	1.40 ±0.25	0.50	67.39 -1.18 / +1.21	□ ●
19.3 +0.50		6.70 -1.00	1.40 ±0.25	0.50	71.14 -1.25 / +1.27	□
20.3 +0.50	20.0	7.10 -1.00	1.50 ±0.25	0.50	74.88 -1.31 / +1.34	□ ●
22.3 +0.50	22.0	7.70 -1.00	1.70 ±0.25	0.50	82.37 -1.44 / +1.48	□ ●
24.3 +0.50		8.00 -1.00	1.75 ±0.25	0.50	89.86 -1.58 / +1.61	□
25.3 +0.50	25.0	8.10 -1.00	1.75 ±0.25	0.50	93.60 -1.64 / +1.68	□ ●
26.3 +0.50		8.20 -1.00	1.75 ±0.25	0.50	97.34 -1.71 / +1.74	□
28.3 +0.50		9.00 -1.20	2.00 ±0.30	0.50	104.83 -1.84 / +1.88	□
30.3 +0.50		10.00 -1.20	2.00 ±0.30	0.50	112.32 -1.97 / +2.01	□

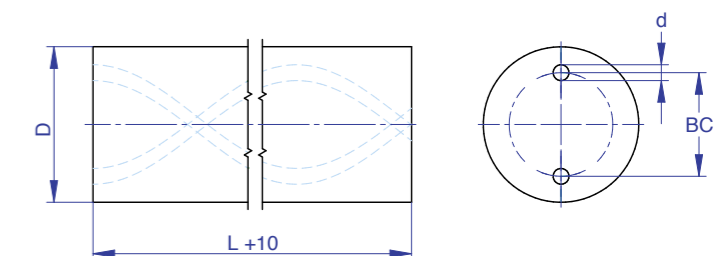


□ raw | ● ground
CO = centre offset | MVS = Mitterversatz

RODS

2 COOLANT DUCTS, 40° HELIX, LENGTH: 330mm

D mm	D h6 mm	BC TK mm	d mm	CO MVS mm	40° ±0.5° mm	K40UF 7329
6.3 +0.30	6.0	2.20 -0.40	0.50 ±0.15	0.15	22.46 -0.39 / +0.40	□ ●
6.8 +0.30		2.30 -0.40	0.50 ±0.15	0.15	24.34 -0.43 / +0.44	□
7.3 +0.30		2.40 -0.40	0.65 ±0.15	0.15	26.21 -0.46 / +0.47	□
7.8 +0.30		2.50 -0.40	0.65 ±0.15	0.15	28.08 -0.49 / +0.50	□
8.3 +0.30	8.0	2.70 -0.60	0.65 ±0.15	0.15	29.95 -0.53 / +0.54	□ ●
8.8 +0.30		2.90 -0.60	0.65 ±0.15	0.15	31.82 -0.56 / +0.57	□
9.3 +0.30		3.20 -0.60	0.75 ±0.15	0.20	33.70 -0.59 / +0.60	□
9.8 +0.30		3.50 -0.60	0.75 ±0.15	0.20	35.57 -0.62 / +0.64	□
10.3 +0.40	10.0	3.50 -0.80	0.80 ±0.15	0.20	37.44 -0.66 / +0.67	□ ●
10.8 +0.40		3.50 -0.80	0.80 ±0.15	0.28	39.31 -0.69 / +0.70	□
11.3 +0.40		3.70 -0.80	0.80 ±0.15	0.28	41.18 -0.72 / +0.74	□
12.3 +0.40	12.0	4.20 -0.80	0.90 ±0.20	0.30	44.93 -0.79 / +0.80	□ ●
12.8 +0.40		4.35 -0.80	0.90 ±0.20	0.33	46.80 -0.82 / +0.84	□
13.3 +0.40	13.0	4.40 -0.80	0.90 ±0.20	0.34	48.67 -0.85 / +0.87	□ ●
14.3 +0.40	14.0	4.70 -0.80	1.00 ±0.20	0.37	52.42 -0.92 / +0.94	□ ●
15.3 +0.50		5.10 -0.80	1.10 ±0.20	0.40	56.16 -0.99 / +1.01	□
16.3 +0.50	16.0	5.50 -0.80	1.20 ±0.20	0.40	59.90 -1.05 / +1.07	□ ●
17.3 +0.50		5.90 -0.80	1.20 ±0.25	0.47	63.65 -1.12 / +1.14	□
18.3 +0.50	18.0	6.30 -0.80	1.40 ±0.25	0.50	67.39 -1.18 / +1.21	□ ●
18.8 +0.50		6.50 -0.80	1.40 ±0.25	0.50	69.26 -1.21 / +1.24	□
19.3 +0.50		6.70 -1.00	1.40 ±0.25	0.50	71.14 -1.25 / +1.27	□
20.3 +0.50	20.0	7.10 -1.00	1.50 ±0.25	0.50	74.88 -1.31 / +1.34	□ ●
21.3 +0.50		7.40 -1.00	1.50 ±0.25	0.50	78.62 -1.38 / +1.41	□
22.3 +0.50	22.0	7.70 -1.00	1.70 ±0.25	0.50	82.37 -1.44 / +1.48	□ ●
24.3 +0.50		8.00 -1.00	1.75 ±0.25	0.50	89.86 -1.58 / +1.61	□
25.3 +0.50	25.0	8.10 -1.00	1.75 ±0.25	0.50	93.60 -1.64 / +1.68	□ ●
26.3 +0.50		8.20 -1.00	1.75 ±0.25	0.50	97.34 -1.71 / +1.74	□
28.3 +0.50		9.00 -1.20	2.00 ±0.30	0.50	104.83 -1.84 / +1.88	□
30.3 +0.50		10.00 -1.20	2.00 ±0.30	0.50	112.32 -1.97 / +2.01	□
32.3 +0.50		11.00 -1.20	2.00 ±0.30	0.50	119.81 -2.10 / +2.15	□

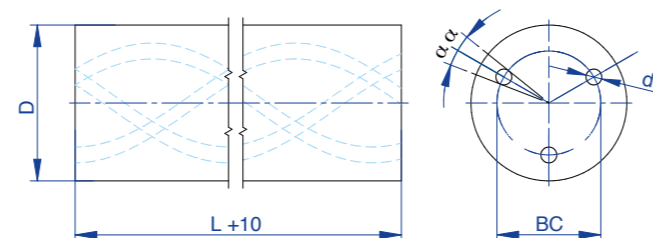


□ raw | ● ground
CO = centre offset | MVS = Mitterversatz

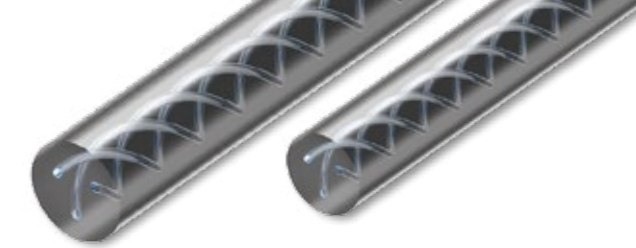
RODS

3 COOLANT DUCTS, 30° HELIX, LENGTH: 310mm

D mm	D h6 mm	BC TK mm	d mm	α	30° ±0.5° mm	K40UF 7303
5.3 +0.30		2.60 -0.30	0.40 ±0.10	±4°	27.21 -0.54 / +0.56	□
6.3 +0.30		2.90 -0.30	0.50 ±0.10	±4°	32.65 -0.65 / +0.67	□
7.3 +0.30		4.00 -0.30	0.65 ±0.10	±4°	38.09 -0.76 / +0.78	□
8.3 +0.30	8.0	4.00 -0.30	0.70 ±0.10	±4°	43.53 -0.86 / +0.89	□ ●
9.3 +0.30		5.10 -0.30	0.85 ±0.15	±4°	48.97 -0.97 / +1.00	□
10.3 +0.30	10.0	5.10 -0.30	0.85 ±0.15	±4°	54.41 -1.08 / +1.11	□ ●
11.3 +0.40		5.70 -0.50	1.10 ±0.15	±4°	59.86 -1.19 / +1.22	□
12.3 +0.40	12.0	6.30 -0.50	1.10 ±0.15	±4°	65.30 -1.30 / +1.34	□ ●
13.3 +0.40		6.80 -0.50	1.20 ±0.15	±4°	70.74 -1.40 / +1.45	□
14.3 +0.40	14.0	7.30 -0.50	1.40 ±0.15	±4°	76.18 -1.51 / +1.56	□ ●
15.3 +0.40		7.80 -0.50	1.40 ±0.15	±4°	81.62 -1.62 / +1.67	□
16.3 +0.40	16.0	8.30 -0.50	1.60 ±0.15	±4°	87.06 -1.73 / +1.78	□ ●
17.3 +0.50		8.60 -0.50	1.60 ±0.20	±4°	92.50 -1.84 / +1.89	□
18.3 +0.50	18.0	9.50 -0.50	1.70 ±0.20	±4°	97.95 -1.94 / +2.00	□ ●
20.3 +0.50	20.0	10.20 -0.70	1.90 ±0.25	±4°	108.83 -2.16 / +2.23	□ ●
22.3 +0.50		11.50 -0.70	2.00 ±0.25	±4°	119.71 -2.38 / +2.45	□
23.3 +0.50		11.80 -0.70	2.00 ±0.25	±4°	125.15 -2.48 / +2.56	□
24.3 +0.50		12.10 -0.70	2.00 ±0.25	±4°	130.59 -2.59 / +2.67	□
25.3 +0.50	25.0	12.50 -0.70	2.00 ±0.25	±4°	136.03 -2.70 / +2.78	□ ●
26.3 +0.50		13.10 -0.70	2.00 ±0.25	±4°	141.48 -2.81 / +2.90	□
28.3 +0.50		14.10 -0.90	2.50 ±0.30	±4°	152.36 -3.02 / +3.12	□
32.3 +0.50		16.10 -1.20	3.00 ±0.30	±4°	174.12 -3.46 / +3.56	□



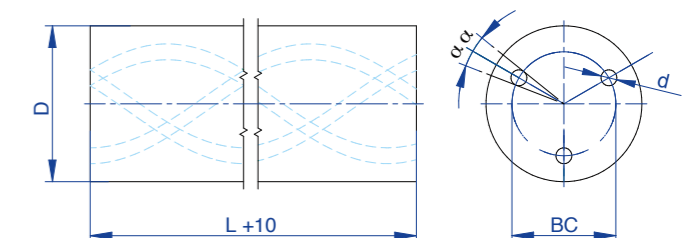
□ raw | ● ground



RODS

3 COOLANT DUCTS, 30° HELIX, LENGTH: 330mm

D mm	D h6 mm	BC TK mm	d mm	α	30° ±0.5° mm	K40UF 7346
6.3 +0.30	6.0	2.90 -0.30	0.50 ±0.10	±4°	32.65 -0.65 / +0.67	□ ●
6.8 +0.30		2.90 -0.30	0.50 ±0.10	±4°	35.37 -0.70 / +0.72	□
7.3 +0.30		4.00 -0.30	0.65 ±0.10	±4°	38.09 -0.76 / +0.78	□
7.8 +0.30		4.00 -0.30	0.70 ±0.10	±4°	40.81 -0.81 / +0.84	□
8.3 +0.30	8.0	4.00 -0.30	0.70 ±0.10	±4°	43.53 -0.86 / +0.89	□ ●
8.8 +0.30		4.00 -0.30	0.70 ±0.10	±4°	46.25 -0.92 / +0.95	□
9.3 +0.30		5.10 -0.30	0.85 ±0.15	±4°	48.97 -0.97 / +1.00	□
9.8 +0.30		5.10 -0.30	0.85 ±0.15	±4°	51.69 -1.03 / +1.06	□
10.3 +0.30	10.0	5.10 -0.30	0.85 ±0.15	±4°	54.41 -1.08 / +1.11	□ ●
10.8 +0.40		5.10 -0.30	0.85 ±0.15	±4°	57.13 -1.13 / +1.17	□
11.3 +0.40		5.70 -0.50	1.10 ±0.15	±4°	59.86 -1.19 / +1.22	□
11.8 +0.40		6.10 -0.50	1.10 ±0.15	±4°	62.58 -1.24 / +1.28	□
12.3 +0.40	12.0	6.30 -0.50	1.10 ±0.15	±4°	65.30 -1.30 / +1.34	□ ●
12.8 +0.40		6.30 -0.50	1.10 ±0.15	±4°	68.02 -1.35 / +1.39	□
13.3 +0.40		6.80 -0.50	1.20 ±0.15	±4°	70.74 -1.40 / +1.45	□
13.8 +0.40		7.00 -0.50	1.20 ±0.15	±4°	73.46 -1.46 / +1.50	□
14.3 +0.40	14.0	7.30 -0.50	1.40 ±0.15	±4°	76.18 -1.51 / +1.56	□ ●
15.3 +0.40		7.80 -0.50	1.40 ±0.15	±4°	81.62 -1.62 / +1.67	□
15.8 +0.40		7.80 -0.50	1.40 ±0.15	±4°	84.34 -1.67 / +1.73	□
16.3 +0.40	16.0	8.30 -0.50	1.60 ±0.15	±4°	87.06 -1.73 / +1.78	□ ●
17.3 +0.50		8.60 -0.50	1.60 ±0.20	±4°	92.50 -1.84 / +1.89	□
18.3 +0.50	18.0	9.50 -0.50	1.70 ±0.20	±4°	97.95 -1.94 / +2.00	□ ●
19.3 +0.50		10.20 -0.50	1.70 ±0.20	±4°	103.39 -2.05 / +2.12	□
20.3 +0.50	20.0	10.20 -0.70	1.90 ±0.25	±4°	108.83 -2.16 / +2.23	□ ●
21.3 +0.50		11.10 -0.70	2.00 ±0.25	±4°	114.27 -2.27 / +2.34	□
22.3 +0.50		11.50 -0.70	2.00 ±0.25	±4°	119.71 -2.38 / +2.45	□
24.3 +0.50		12.10 -0.70	2.00 ±0.25	±4°	130.59 -2.59 / +2.67	□
25.3 +0.50	25.0	12.50 -0.70	2.00 ±0.25	±4°	136.03 -2.70 / +2.78	□ ●
26.3 +0.50		13.10 -0.70	2.00 ±0.25	±4°	141.48 -2.81 / +2.90	□
28.3 +0.50		14.10 -0.90	2.50 ±0.30	±4°	152.36 -3.02 / +3.12	□
30.3 +0.50	30.0	15.10 -1.20	2.50 ±0.30	±4°	163.24 -3.24 / +3.34	□ ●
32.3 +0.50	32.0	16.10 -1.20	3.00 ±0.30	±4°	174.12 -3.46 / +3.56	□ ●

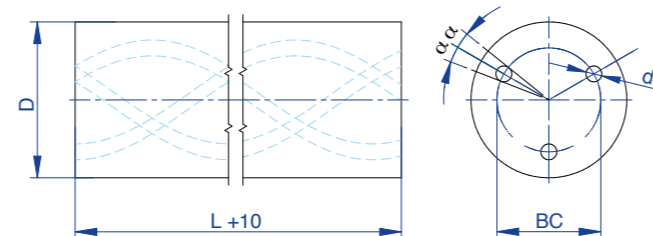


□ raw | ● ground

RODS

3 COOLANT DUCTS, 40° HELIX, LENGTH: 310mm

D mm	BC TK mm	d mm	α	40° ±0.5° mm	K40UF 7304
6.3 +0.30	2.20 -0.30	0.50 ±0.15	±4°	22.46 -0.39 / +0.40	□
8.3 +0.30	2.70 -0.30	0.65 ±0.15	±4°	29.95 -0.53 / +0.54	□
8.8 +0.30	2.90 -0.30	0.65 ±0.15	±4°	31.82 -0.56 / +0.57	□
10.3 +0.40	3.50 -0.30	0.80 ±0.15	±4°	37.44 -0.66 / +0.67	□
10.8 +0.40	3.50 -0.50	0.80 ±0.15	±4°	39.31 -0.69 / +0.70	□
12.3 +0.40	4.20 -0.50	0.90 ±0.20	±4°	44.93 -0.79 / +0.80	□
12.8 +0.40	4.35 -0.50	0.90 ±0.20	±4°	46.80 -0.82 / +0.84	□
14.8 +0.40	4.90 -0.50	1.10 ±0.20	±4°	54.29 -0.95 / +0.97	□
16.3 +0.50	5.50 -0.50	1.20 ±0.20	±4°	59.90 -1.05 / +1.07	□
16.8 +0.50	5.75 -0.50	1.20 ±0.20	±4°	61.78 -1.08 / +1.11	□
19.3 +0.50	6.70 -0.70	1.40 ±0.25	±4°	71.14 -1.25 / +1.27	□
20.3 +0.50	7.10 -0.70	1.50 ±0.25	±4°	74.88 -1.31 / +1.34	□
22.3 +0.50	7.70 -0.70	1.70 ±0.25	±4°	82.37 -1.44 / +1.48	□
24.3 +0.50	8.00 -0.90	1.75 ±0.25	±4°	89.86 -1.58 / +1.61	□
25.3 +0.50	8.10 -0.90	1.75 ±0.25	±4°	93.60 -1.64 / +1.68	□
26.3 +0.50	8.20 -0.90	1.75 ±0.25	±4°	97.34 -1.71 / +1.74	□
32.3 +0.50	11.00 -1.10	2.00 ±0.30	±4°	119.81 -2.10 / +2.15	□

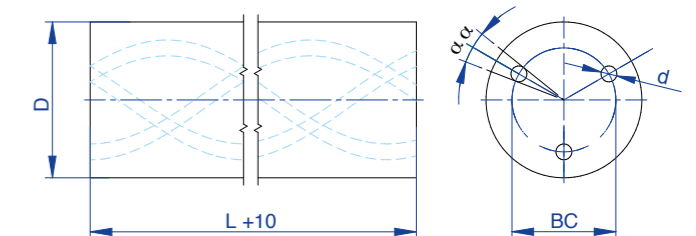


□ raw | ● ground

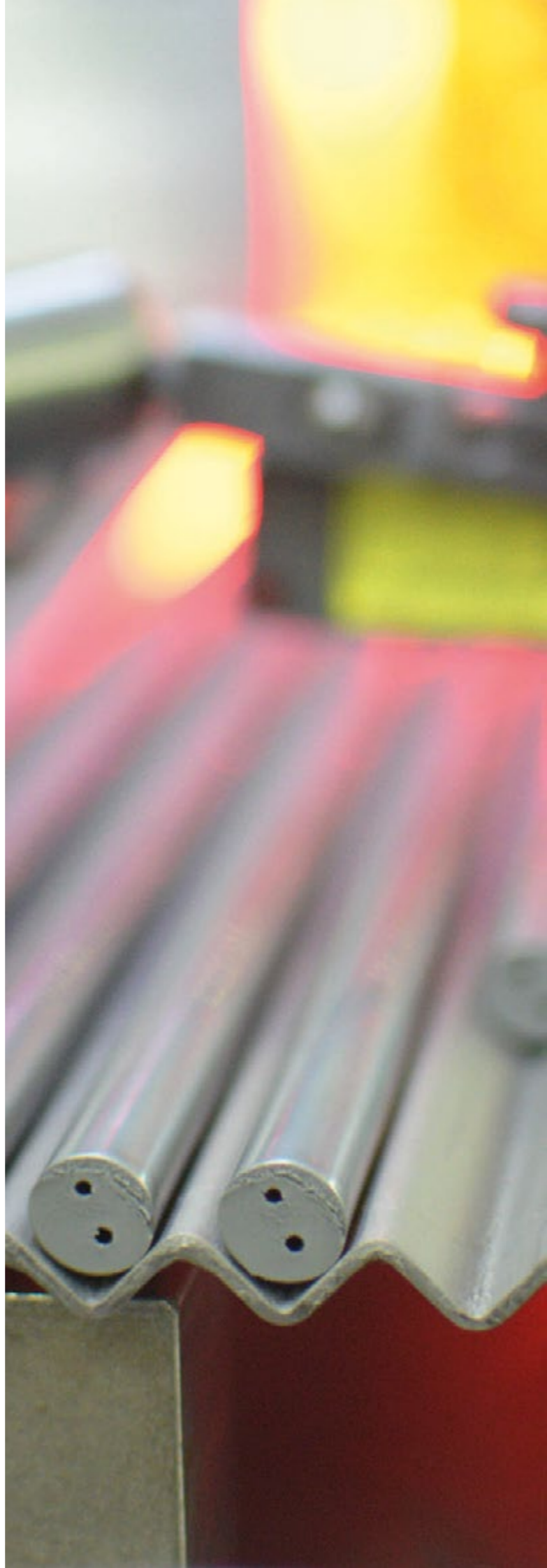
RODS

3 COOLANT DUCTS, 40° HELIX, LENGTH: 330mm

D mm	D h6 mm	BC TK mm	d mm	α	40° ±0.5° mm	K40UF 7347
6.3 +0.30	6.0	2.20 -0.30	0.50 ±0.15	±4°	22.46 -0.39 / +0.40	□ ●
6.8 +0.30		2.30 -0.30	0.50 ±0.15	±4°	24.34 -0.43 / +0.44	□
7.3 +0.30		2.40 -0.30	0.65 ±0.15	±4°	26.21 -0.46 / +0.47	□
7.8 +0.30		2.50 -0.30	0.65 ±0.15	±4°	28.08 -0.49 / +0.50	□
8.3 +0.30	8.0	2.70 -0.30	0.65 ±0.15	±4°	29.95 -0.53 / +0.54	□ ●
8.8 +0.30		2.90 -0.30	0.65 ±0.15	±4°	31.82 -0.56 / +0.57	□
9.3 +0.30		3.20 -0.30	0.75 ±0.15	±4°	33.70 -0.59 / +0.60	□
9.8 +0.30		3.50 -0.30	0.75 ±0.15	±4°	35.57 -0.62 / +0.64	□
10.3 +0.40	10.0	3.50 -0.30	0.80 ±0.15	±4°	37.44 -0.66 / +0.67	□ ●
10.8 +0.40		3.50 -0.50	0.80 ±0.15	±4°	39.31 -0.69 / +0.70	□
11.3 +0.40		3.70 -0.50	0.80 ±0.15	±4°	41.18 -0.72 / +0.74	□
11.8 +0.40		4.00 -0.50	0.85 ±0.15	±4°	43.06 -0.76 / +0.77	□
12.3 +0.40	12.0	4.20 -0.50	0.90 ±0.20	±4°	44.93 -0.79 / +0.80	□ ●
12.8 +0.40		4.35 -0.50	0.90 ±0.20	±4°	46.80 -0.82 / +0.84	□
13.3 +0.40		4.40 -0.50	0.90 ±0.20	±4°	48.67 -0.85 / +0.87	□
14.3 +0.40		4.70 -0.50	1.00 ±0.20	±4°	52.42 -0.92 / +0.94	□
15.3 +0.50		5.10 -0.50	1.10 ±0.20	±4°	56.16 -0.99 / +1.01	□
16.3 +0.50	16.0	5.50 -0.50	1.20 ±0.20	±4°	59.90 -1.05 / +1.07	□ ●
17.3 +0.50		5.90 -0.50	1.20 ±0.25	±4°	63.65 -1.12 / +1.14	□
18.3 +0.50	18.0	6.30 -0.50	1.40 ±0.25	±4°	67.39 -1.18 / +1.21	□ ●
19.3 +0.50		6.70 -0.70	1.40 ±0.25	±4°	71.14 -1.25 / +1.27	□
20.3 +0.50	20.0	7.10 -0.70	1.50 ±0.25	±4°	74.88 -1.31 / +1.34	□ ●
21.3 +0.50		7.40 -0.70	1.50 ±0.25	±4°	78.62 -1.38 / +1.41	□
22.3 +0.50		7.70 -0.70	1.70 ±0.25	±4°	82.37 -1.44 / +1.48	□
24.3 +0.50		8.00 -0.90	1.75 ±0.25	±4°	89.86 -1.58 / +1.61	□
25.3 +0.50	25.0	8.10 -0.90	1.75 ±0.25	±4°	93.60 -1.64 / +1.68	□ ●
26.3 +0.50		8.20 -0.90	1.75 ±0.25	±4°	97.34 -1.71 / +1.74	□
28.3 +0.50		9.00 -0.90	2.00 ±0.30	±4°	104.83 -1.84 / +1.88	□
30.3 +0.50	30.0	10.00 -1.10	2.00 ±0.30	±4°	112.32 -1.97 / +2.01	□ ●
32.3 +0.50		11.00 -1.10	2.00 ±0.30	±4°	119.81 -2.10 / +2.15	□



□ raw | ● ground

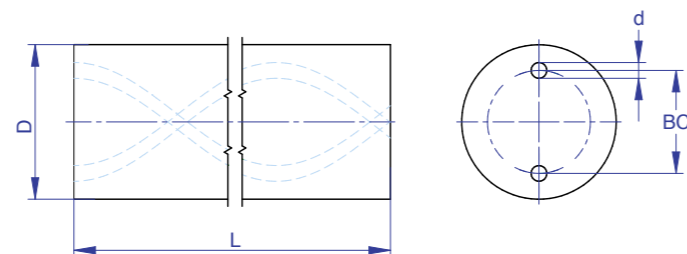


MICRO-TWISTED RODS

2 COOLANT DUCTS

D mm	BC TK mm	d mm	Pitch Steig. mm	L	D mm	BC TK mm	d mm	Pitch Steig. mm	L
3.3	0.45	0.16	5.44	-	4.3	1.00	0.40	13.00	—
3.3	0.50	0.20	5.44	-	4.3	1.20	0.30	13.50	—
3.3	0.40	0.15	6.00	-	4.3	1.50	0.40	13.50	—
3.3	0.60	0.20	6.80	-	4.3	0.50	0.20	14.98	-
3.3	0.75	0.20	7.60	-	4.3	1.00	0.30	14.98	—
3.3	0.70	0.25	8.16	-	4.3	1.50	0.40	14.98	—
3.3	0.90	0.30	9.00	-	4.3	1.60	0.40	14.98	—
3.3	0.75	0.20	9.80	-	4.3	1.90	0.50	16.00	—
3.3	0.50	0.20	10.10	-	4.3	0.90	0.26	17.00	—
3.3	0.90	0.25	10.76	—	4.3	1.60	0.45	17.95	—
3.3	0.30	0.15	11.23	-	4.3	1.50	0.50	19.04	—
3.3	1.30	0.30	11.23	—	4.3	1.60	0.50	19.04	—
3.3	1.00	0.30	12.20	—	4.3	1.57	0.42	19.10	—
3.3	1.40	0.30	13.49	—	4.3	1.15	0.30	19.50	—
3.3	1.20	0.30	13.60	—	4.3	1.25	0.34	21.50	—
3.3	1.25	0.35	14.20	—	4.3	1.70	0.40	21.77	—
3.3	1.10	0.25	14.50	—	4.3	1.75	0.40	21.77	—
3.3	1.20	0.30	15.00	—	4.3	2.20	0.60	21.77	—
3.3	1.20	0.50	15.00	—	4.3	1.70	0.60	21.77	—
3.3	0.70	0.24	15.44	—	4.3	2.10	0.60	21.77	—
3.3	0.50	0.20	16.32	-	4.3	2.20	0.60	21.77	—
3.3	1.00	0.30	16.32	—	4.3	1.30	0.80	22.46	—
3.3	1.50	0.40	16.32	—	4.3	1.40	0.40	24.50	—
3.3	1.60	0.50	16.32	—	4.3	1.47	0.42	25.76	—
3.3	1.60	0.60	16.32	—	4.3	1.50	0.42	28.00	—
3.3	1.47	0.42	19.10	—	4.3	1.70	0.47	32.00	—
3.3	0.90	0.30	29.30	—	4.3	1.40	0.40	46.90	—
3.3	1.40	0.40	35.17	—	6.3	1.00	0.30	10.88	—
4.3	0.45	0.13	7.25	-	6.3	1.40	0.40	32.65	—
4.3	1.20	0.30	10.50	—					
4.3	0.90	0.25	10.76	—					
4.3	1.00	0.30	12.20	—					

— Available in length 330mm and as fix lengths
 - Only available as fix length

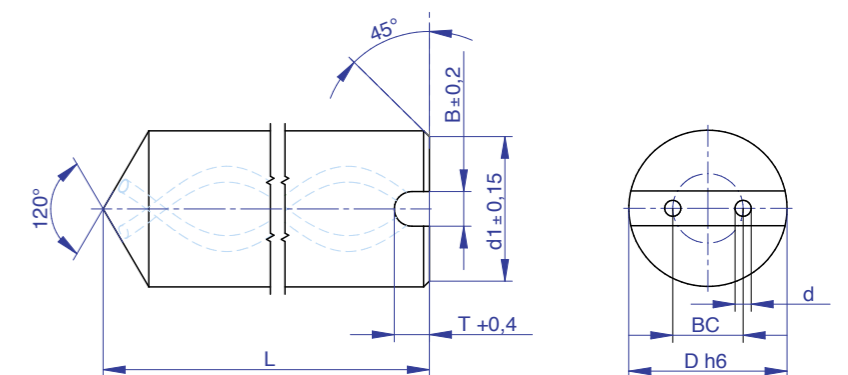


DRILL BLANKS

GROUND (h6), WITH POINT, CHAMFER AND COOLANT CONNECTION SLIT

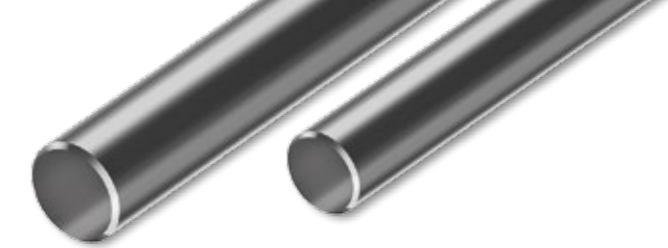
D h6 mm	d1 mm	L mm	BC TK mm	d mm	30° ±0.5° mm	B mm	T mm	K40UF 7157	K40UF 7159	K40UF 7161				
6.0	4.80	67.0	+1.50	2.60	-0.40	0.70	±0.10	32.65	-0.65 / +0.67	1.50	0.90	•		
8.0	6.80	80.5	+1.50	4.00	-0.40	1.00	±0.15	43.53	-0.86 / +0.89	2.00	1.40	•		
10.0	8.80	90.5	+1.50	4.80	-0.60	1.40	±0.15	54.41	-1.08 / +1.11	2.50	1.65	•		
12.0	10.50	104.0	+1.50	6.25	-0.80	1.40	±0.15	65.30	-1.30 / +1.34	2.50	1.75	•		
14.0	12.50	109.0	+1.50	7.10	-0.80	1.75	±0.20	76.18	-1.51 / +1.56	3.00	2.15	•		
16.0	14.50	117.5	+1.50	8.30	-0.80	1.75	±0.20	87.06	-1.73 / +1.78	3.00	2.30	•		
18.0	16.50	125.5	+2.00	9.55	-0.80	2.00	±0.25	97.95	-1.94 / +2.00	3.50	2.50	•		
20.0	18.50	134.0	+2.00	10.40	-1.00	2.00	±0.25	108.83	-2.16 / +2.23	3.50	2.70	•		
6.0	4.80	83.0	+1.50	2.60	-0.40	0.70	±0.10	32.65	-0.65 / +0.67	1.50	0.90		•	
8.0	6.80	92.5	+1.50	4.00	-0.40	1.00	±0.15	43.53	-0.86 / +0.89	2.00	1.40		•	
10.0	8.80	104.5	+1.50	4.80	-0.60	1.40	±0.15	54.41	-1.08 / +1.11	2.50	1.65		•	
12.0	10.50	120.0	+2.00	6.25	-0.80	1.40	±0.15	65.30	-1.30 / +1.34	2.50	1.75		•	
14.0	12.50	126.0	+2.00	7.10	-0.80	1.75	±0.20	76.18	-1.51 / +1.56	3.00	2.15		•	
16.0	14.50	135.5	+2.00	8.30	-0.80	1.75	±0.20	87.06	-1.73 / +1.78	3.00	2.30		•	
18.0	16.50	145.5	+2.00	9.55	-0.80	2.00	±0.25	97.95	-1.94 / +2.00	3.50	2.50		•	
20.0	18.50	156.0	+2.00	10.40	-1.00	2.00	±0.25	108.83	-2.16 / +2.23	3.50	2.70		•	
6.0	4.80	98.0	+1.50	2.60	-0.40	0.70	±0.10	32.65	-0.65 / +0.67	1.50	0.90			•
8.0	6.80	107.5	+1.50	4.00	-0.40	1.00	±0.15	43.53	-0.86 / +0.89	2.00	1.40			•
10.0	8.80	132.5	+1.50	4.80	-0.60	1.40	±0.15	54.41	-1.08 / +1.11	2.50	1.65			•
12.0	10.50	157.0	+2.00	6.25	-0.80	1.40	±0.15	65.30	-1.30 / +1.34	2.50	1.75			•
14.0	12.50	184.0	+2.00	7.10	-0.80	1.75	±0.20	76.18	-1.51 / +1.56	3.00	2.15			•
16.0	14.50	206.5	+2.00	8.30	-0.80	1.75	±0.20	87.06	-1.73 / +1.78	3.00	2.30			•
18.0	16.50	225.5	+2.00	9.55	-0.80	2.00	±0.25	97.95	-1.94 / +2.00	3.50	2.50			•
20.0	18.50	247.0	+2.00	10.40	-1.00	2.00	±0.25	108.83	-2.16 / +2.23	3.50	2.70			•

• ground



MILLING CUTTER BLANKS

GROUND (h6), SOLID, CHAMFERED ONE END, FOR MILLING CUTTERS DIN 6527



D h6 mm	d mm	L mm	Code	K40UF 7127	K44UF 7126	K6UF 7200	K55SF 7125
3.0	2.4	38.3	3.002		•		
3.0	2.4	39.5	3.001	•	•		•
3.0	2.4	45.0	3.006	•			
3.0	2.4	52.3	3.005	•			
3.0	2.4	76.2	3.003		•		
4.0	3.4	40.3	4.002		•		
4.0	3.4	40.5	4.001	•			
4.0	3.4	50.3	4.003		•		
4.0	3.4	51.0	4.000	•	•		•
4.0	3.4	59.3	4.004	•			
4.0	3.4	76.2	4.001		•		
4.76	3.76	65.0	4.760			•	
5.0	4.0	50.3	5.002		•		
5.0	4.0	51.2	5.000	•	•		•
5.0	4.0	60.3	5.003		•		
5.0	4.0	76.2	5.001		•		
6.0	5.0	38.0	6.010	•			
6.0	5.0	40.3	6.004		•		
6.0	5.0	50.3	6.005		•		
6.0	5.0	51.2	6.000	•	•		•
6.0	5.0	55.0	6.001	•	•		•
6.0	5.0	57.5	6.008		•		
6.0	5.0	58.2	6.002	•	•		•
6.0	5.0	60.3	6.006		•		
6.0	5.0	63.0	6.009	•			
6.0	5.0	63.0	6.013		•		
6.0	5.0	66.2	6.000			•	
6.0	5.0	66.2	6.008	•			
6.0	5.0	69.0	6.012	•			
6.0	5.0	70.0	6.001			•	
6.0	5.0	70.0	6.011	•			
6.0	5.0	75.0	6.013	•			

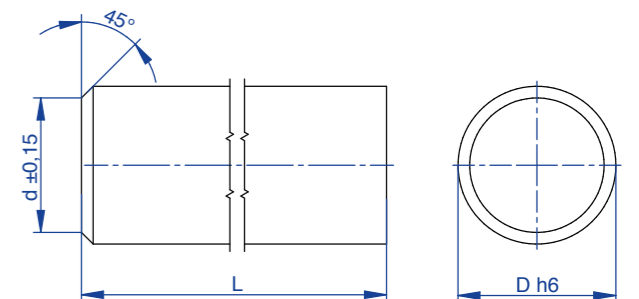
D h6 mm	d mm	L mm	Code	K40UF 7127	K44UF 7126	K6UF 7200	K55SF 7125
6.0	5.0	76.0	6.009		•		
6.0	5.0	80.0	6.014	•			
6.0	5.0	80.3	6.007		•		
6.0	5.0	80.5	6.012		•		
6.0	5.0	90.5	6.014		•		
6.0	5.0	100.0	6.002				
6.0	5.0	100.5	6.003		•		
6.35	5.4	63.5	6.351		•		
6.35	5.35	71.2	6.350			•	
7.0	5.0	50.3	7.000		•		
7.0	5.0	61.0	7.001	•			
7.0	5.0	75.3	7.001		•		
8.0	6.0	41.0	8.007	•			
8.0	6.0	44.0	8.002	•			
8.0	6.0	50.3	8.003		•		
8.0	6.0	59.0	8.000	•	•		•
8.0	6.0	63.5	8.006		•		
8.0	6.0	64.2	8.001	•	•		•
8.0	6.0	64.3	8.004		•		
8.0	6.0	72.0	8.008	•	•		
8.0	6.0	73.5	8.011	•			
8.0	6.0	75.5	8.009		•		
8.0	6.0	76.2	8.000			•	
8.0	6.0	80.0	8.009	•			
8.0	6.0	80.3	8.005		•		
8.0	6.0	90.0	8.010	•			
8.0	6.0	100.0	8.001			•	
8.0	6.0	100.5	8.007		•		
8.0	6.0	101.2	8.005	•			
8.0	6.0	120.5	8.002		•		
9.0	7.0	50.3	9.000		•		
9.0	7.0	68.0	9.002	•			

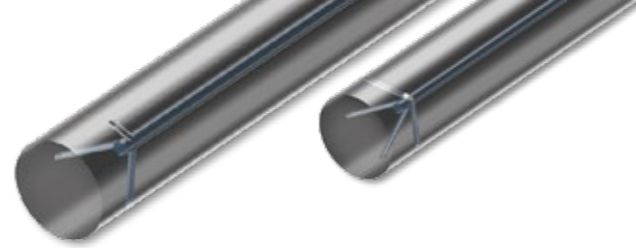
D h6 mm	d mm	L mm	Code	K40UF 7127	K44UF 7126	K6UF 7200	K55SF 7125
9.0	7.0	70.3	9.001		•		
9.0	7.0	90.3	9.002		•		
9.525	7.525	77.5	9.525			•	
10.0	8.0	48.0	10.009	•			
10.0	8.0	60.3	10.004		•		
10.0	8.0	67.2	10.000	•	•		•
10.0	8.0	72.5	10.007		•		
10.0	8.0	73.2	10.002	•	•		•
10.0	8.0	80.3	10.005		•		
10.0	8.0	84.0	10.010	•			
10.0	8.0	100.0	10.000			•	
10.0	8.0	100.0	10.011	•			
10.0	8.0	101.0	10.001		•		
10.0	8.0	101.2	10.004	•			
10.0	8.0	105.0	10.012	•			
10.0	8.0	120.5	10.006		•		
10.0	8.0	150.5	10.003		•		
11.0	9.0	72.0	11.000	•			
12.0	10.0	60.3	12.003		•		
12.0	10.0	74.2	12.000	•	•		•
12.0	10.0	83.5	12.006		•		
12.0	10.0	84.2	12.001	•	•		•
12.0	10.0	84.3	12.004		•		
12.0	10.0	97.0	12.008	•			
12.0	10.0	100.0	12.000			•	
12.0	10.0	100.0	12.005		•		
12.0	10.0	101.2	12.004	•			
12.0	10.0	110.0	12.009	•			
12.0	10.0	120.0	12.010	•			
12.0	10.0	120.5	12.002		•		
12.0	10.0	151.0	12.007		•		
12.7	10.7	90.2	12.700			•	

D h6 mm	d mm	L mm	Code	K40UF 7127	K44UF 7126	K6UF 7200	K55SF 7125
13.0	11.0	85.0	13.001	•			
14.0	12.0	60.3	14.004		•		
14.0	12.0	76.2	14.001	•	•		•
14.0	12.0	84.0	14.003		•		
14.0	12.0	84.2	14.000	•	•		•
14.0	12.0	84.3	14.002		•		
14.0	12.0	101.2	14.004	•			
15.0	12.0	94.0	15.001	•			
16.0	13.0	70.5	16.002	•			
16.0	13.0	83.2	16.001	•	•		•
16.0	13.0	93.0	16.002		•		
16.0	13.0	93.2	16.000	•	•		•
16.0	13.0	100.0	16.000			•	
16.0	13.0	105.5	16.009	•			
16.0	13.0	108.0	16.007	•			
16.0	13.0	109.2	16.006	•			
16.0	13.0	123.0	16.008	•			
16.0	13.0	151.0	16.003		•		
16.0	13.0	151.2	16.004	•	•		•
18.0	15.0	93.0	18.002	•	•		•
20.0	17.0	93.2	20.000	•	•		•
20.0	17.0	105.0	20.001	•	•		•
20.0	17.0	122.0	20.007	•			
20.0	17.0	127.2	20.006	•			•
20.0	17.0	141.0	20.008	•			
20.0	17.0	151.0	20.002		•		
25.0	22.0	123.0	25.001	•			

• ground

• ground



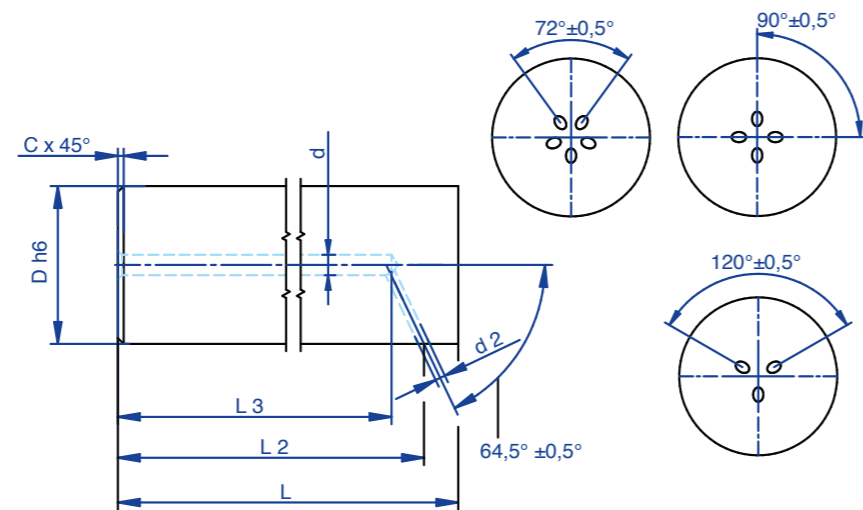


MILLING CUTTER BLANKS

GROUND (h6), WITH AXIAL COOLANT DUCT AND LATERAL EXITS*

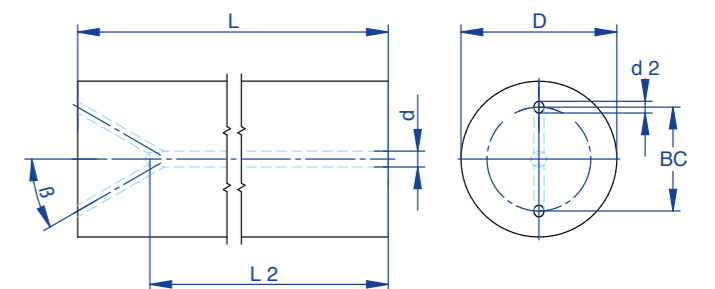
D h6 mm	L mm	d mm	L2 mm	d2 mm	C mm	L3 mm	Code	K40UF 3 exits	K40UF 4 exits	K40UF 5 exits
6.0	58.0 +0.80	1.75 +0.30	55.0 ±0.30	1.0 +0.25	0.5	54.6	6.058	•	•	•
6.0	76.5 +0.90	1.75 +0.30	73.0 ±0.30	1.0 +0.25	0.5	72.6	6.076	•	•	•
8.0	64.2 +0.80	1.75 +0.30	60.0 ±0.30	1.2 +0.25	1.0	59.1	8.064	•	•	
8.0	101.2 +1.00	1.75 +0.30	97.0 ±0.30	1.2 +0.25	1.0	96.1	8.101	•	•	•
10.0	67.2 +0.80	2.00 +0.30	62.2 ±0.30	1.2 +0.25	1.0	60.6	10.067		•	
10.0	73.2 +0.90	2.00 +0.30	68.0 ±0.30	1.2 +0.25	1.0	66.6	10.073	•	•	•
10.0	101.2 +1.00	2.00 +0.30	96.0 ±0.30	1.2 +0.25	1.0	94.6	10.101	•	•	•
12.0	74.2 +0.90	2.00 +0.30	68.0 ±0.30	1.5 +0.25	1.0	66.1	12.074	•	•	
12.0	84.2 +0.90	2.00 +0.30	78.0 ±0.30	1.5 +0.25	1.0	76.1	12.084	•	•	•
12.0	101.1 +1.00	2.00 +0.30	95.0 ±0.30	1.5 +0.25	1.0	93.1	12.101	•	•	•
14.0	84.2 +0.90	2.00 +0.30	77.0 ±0.30	1.5 +0.25	1.0	74.7	14.084	•	•	
14.0	101.2 +1.00	2.00 +0.30	94.0 ±0.30	1.5 +0.25	1.0	91.7	14.101	•	•	
16.0	83.2 +0.90	4.00 +0.30	75.0 ±0.30	1.5 +0.25	1.5	72.2	16.083			•
16.0	93.2 +1.00	4.00 +0.30	85.0 ±0.30	1.5 +0.25	1.5	82.2	16.093	•	•	•
16.0	101.2 +1.00	4.00 +0.30	93.0 ±0.30	1.5 +0.25	1.5	90.2	16.101	•	•	•
18.0	93.0 +1.00	4.00 +0.30	84.0 ±0.30	2.0 +0.25	1.5	80.7	18.093	•	•	
18.0	102.0 +1.00	4.00 +0.30	93.0 ±0.30	2.0 +0.25	1.5	89.7	18.102	•	•	
18.0	151.3 +1.60	4.00 +0.30	142.0 ±0.30	2.0 +0.25	1.5	138.7	18.151	•	•	
20.0	93.2 +1.00	4.00 +0.30	83.0 ±0.30	2.0 +0.25	1.5	79.2	20.093	•	•	
20.0	105.0 +1.10	4.00 +0.30	95.0 ±0.30	2.0 +0.25	1.5	91.2	20.105	•	•	•
20.0	151.2 +1.60	4.00 +0.30	141.0 ±0.30	2.0 +0.25	1.5	137.2	20.151	•	•	•
25.0	122.0 +1.20	4.00 +0.30	109.5 ±0.30	2.0 +0.25	1.5	104.5	25.122	•	•	•
25.0	152.0 +1.60	4.00 +0.30	139.5 ±0.30	2.0 +0.25	1.5	134.5	25.152	•	•	•

• ground
*on request – all grades available



MILLING CUTTER BLANKS

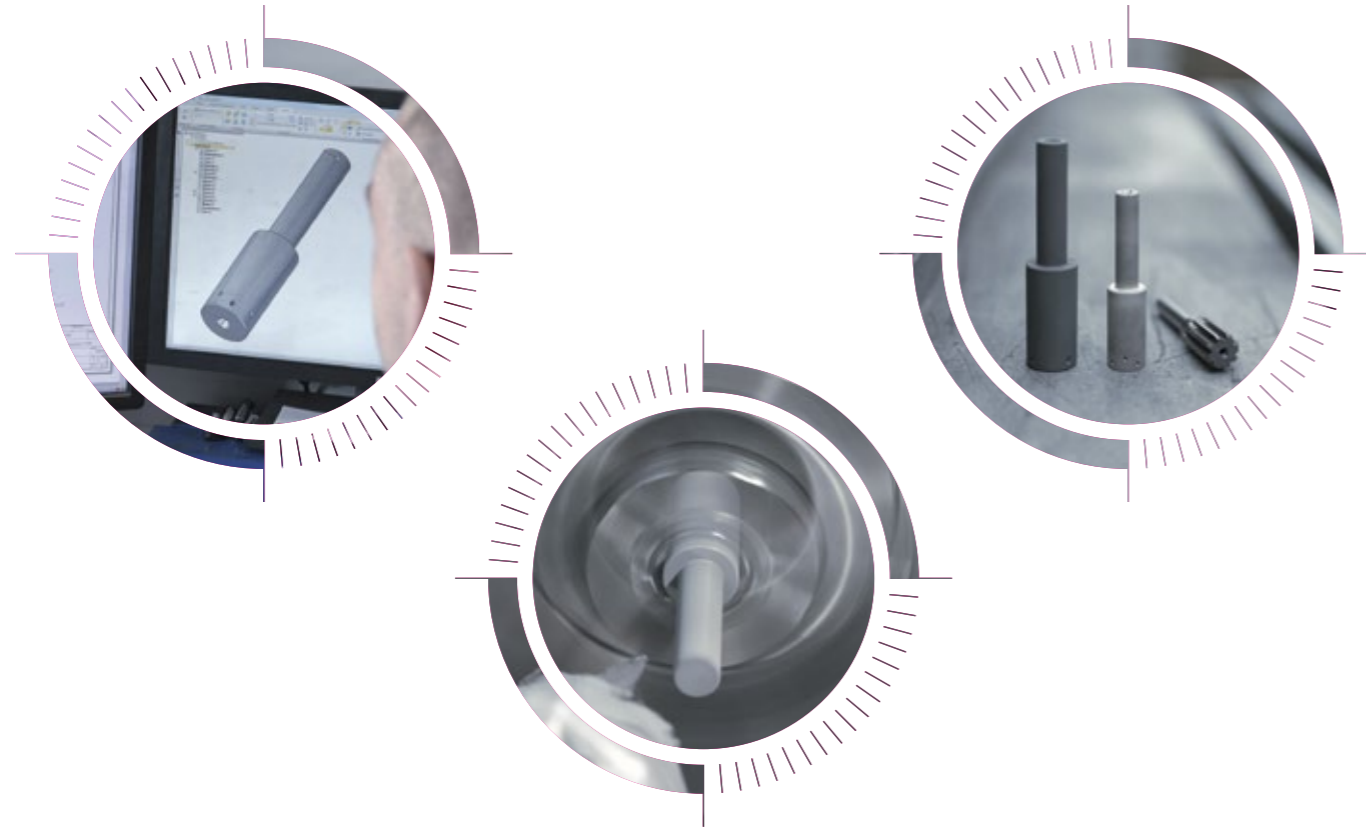
GROUND (h6), WITH AXIAL COOLANT DUCT AND Y-EXITS*



*on request – all grades available

PREFORMS

CUSTOM-MADE PREFORMS FOR ROTATING TOOLS



Cutting options:

- production of symmetrical and prismatic unground preforms close to the final shape with 0.2mm excess material
- diameter range of \varnothing 3.0–60.0mm
- max. 0.1–0.5mm tolerance of total concentric runout for unground parts
- helical, axial and radial coolant duct geometries \varnothing 0.7–26.0mm
- multiple coolant duct geometries for parallel and helical step-tools
- application of reference surfaces
- laser etching, e. g. data matrix codes (DMC)

Special preforms are available in our KF premium carbide grades.

Bearbeitungsmöglichkeiten:

- endkonturnahe Fertigung von symmetrischen und prismenförmigen Rohteilen mit Aufmaß ab 0,2mm
- Durchmesserbereich \varnothing 3,0–60,0mm
- Gesamtrundlauf toleranzen von 0,1–0,5mm bei Rohteilen
- verdrehte, axiale und radiale Kühlkanalgeometrien \varnothing 0,7–26,0mm
- Mehrfachkühlkanalgeometrien, verdreht und parallel, z. B. für Stufenwerkzeuge
- Anbringen von Referenzflächen
- Lasergravur, z. B. Data Matrix Codes (DMC)

Sondereile sind in unseren KF-Premium-Hartmetallsorten erhältlich.

CERTIFICATION



DIN EN ISO 9001:2015

Basis for sustainable production of high-quality sub-micrometer carbide structures is our DIN EN ISO 9001:2015 certification.

Traceability and reproducibility of our products and processes are always guaranteed by a complete documentation.

Unsere Zertifizierung nach DIN EN ISO 9001:2015 bildet die Grundlage für die nachhaltige Produktion von qualitativ hochwertigen sub-Mikrometer Hartmetall-Gefügestrukturen.

Die lückenlose Dokumentation gewährleistet stets die Rückverfolgbarkeit und Reproduzierbarkeit unserer Produkte für alle Prozessschritte.



DIN EN ISO 50001:2011

Increase of energy efficiency, lower energy costs, less CO₂ emission and thereby relieving the environment – by certification to DIN EN ISO 50001:2011 we want to make our contribute to environmental protection.

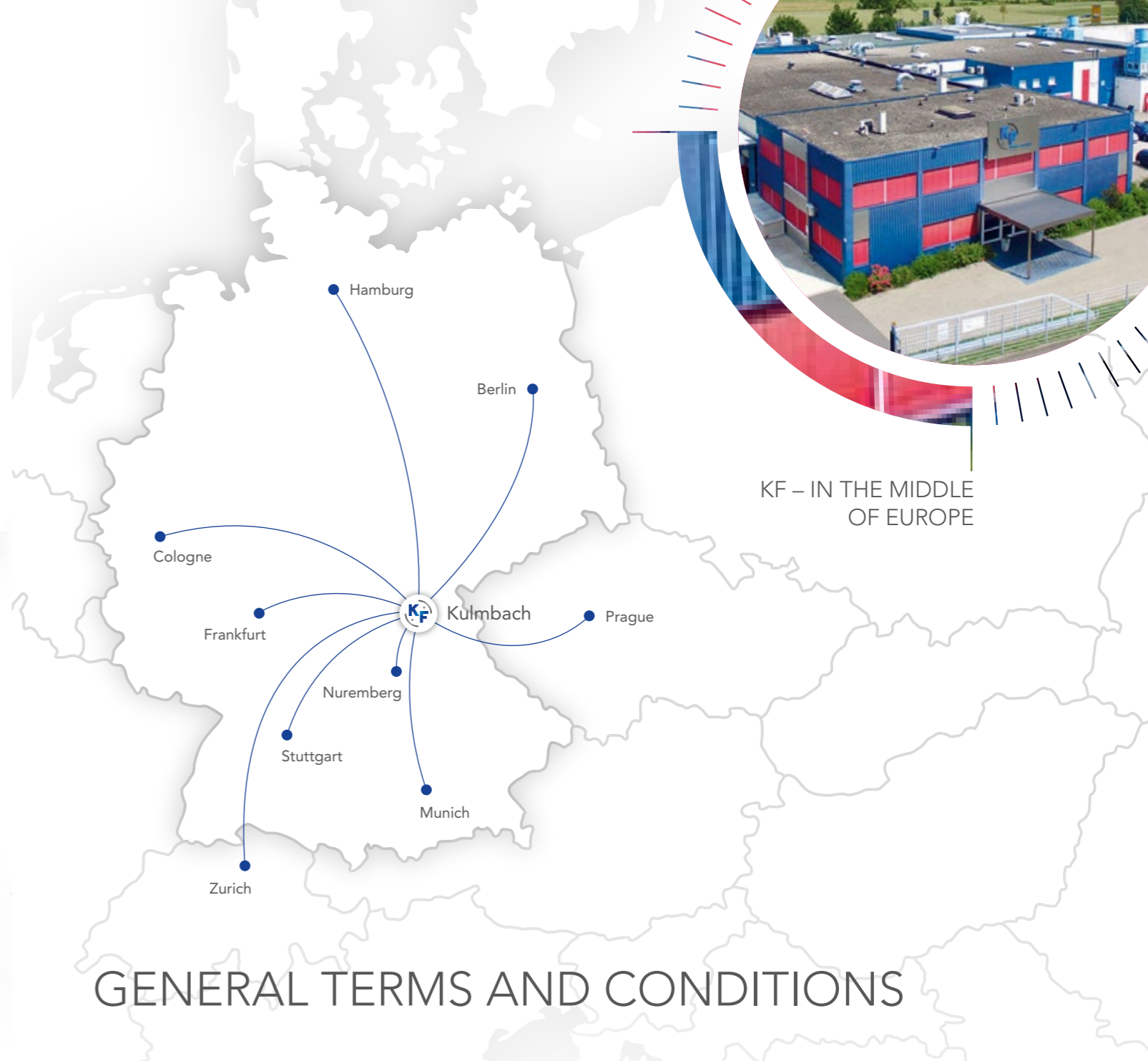
Steigerung der Energieeffizienz, geringere Energiekosten, weniger CO₂-Emission und dadurch Entlastung der Umwelt – durch die Zertifizierung nach DIN EN ISO 50001:2011 wollen wir unseren Beitrag zum Umweltschutz leisten.

SALES NETWORK WORLDWIDE



Together with our partners, we established a worldwide sales network covering all five continents. As a medium-sized company with slender structure, we react fast and flexible to our customers' requirements. Based on partnership, we compile suitable solutions for their respective needs.

Zusammen mit unseren Partnern haben wir ein weltweites Vertriebsnetz auf allen 5 Kontinenten geschaffen. Als mittelständisches Unternehmen mit schlanker Struktur reagieren wir schnell und flexibel auf die Anforderungen unserer Kunden. Durch eine partnerschaftliche Zusammenarbeit gestalten wir passende Lösungen für die jeweiligen Bedürfnisse.



KF – IN THE MIDDLE OF EUROPE



GENERAL TERMS AND CONDITIONS

Goods supplied are subject to our conditions, available on request. All products marked with „DIN“, deviating from the dimensions listed in the catalogue, can be delivered, as long as they are in conformity with the DIN standard form. The DIN standard forms are available at the „Deutsches Institut für Normung e.V.“, 10787 Berlin or at www.din.de.

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Terms and conditions for special parts
When ordering specials, the quantity delivered can deviate by approx. 10%, at least by two pieces plus or minus from the original order. Payment is for quantity supplied.

Lieferbedingungen für Sonderwerkzeuge
Werden Sonderwerkzeuge in Auftrag gegeben, so darf die Bestellmenge um ca. 10%, mindestens jedoch um 2 Stück, über- oder unterschritten werden. Berechnet wird die Liefermenge.

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GRADE SPECIFICATIONS

MORE DETAILS AT PAGE 21

Grade		K40XF	K40UF	K44UF	K20F	K88UF	K6UF	K55SF	K5UF
Co	%	10.0	10.0	12.0	8.0	10.0	6.0	9.0	5.0
HV ₃₀	kg/mm ²	1560 ± 50	1620 ± 50	1690 ± 50	1720 ± 50	1770 ± 50	1870 ± 50	1920 ± 50	2010 ± 50
WC grain size	µm	0.80	0.65	0.50	0.70	0.50	0.65	0.20	0.50

TOLERANCES

SOLID RODS, RAW

L mm		↗ mm
< 200	variable	0.15
200–300	variable	0.25
> 300	+10.0	0.25

COOLANT DUCT RODS, RAW

L mm		↗ mm
< 200	variable	0.15
200–300	variable	0.25
> 300	+10.0	0.35

GROUND RODS (h6) ≥ 300mm, SOLID OR WITH COOLANT DUCTS

D h6 mm	↗ mm	○ mm	D h6 mm	↗ mm	○ mm	D h6 mm	↗ mm	○ mm
3.0	0.11	0.002	11.113	0.05	0.003	20.0	0.02	0.004
3.175	0.11	0.002	11.5	0.05	0.003	21.0	0.02	0.004
3.5	0.11	0.002	12.0	0.05	0.003	22.0	0.02	0.004
4.0	0.11	0.002	12.5	0.05	0.003	22.225	0.02	0.004
4.5	0.11	0.002	12.7	0.05	0.003	23.0	0.02	0.004
4.763	0.11	0.002	13.0	0.05	0.003	24.0	0.02	0.004
5.0	0.11	0.002	13.5	0.05	0.003	25.0	0.02	0.004
5.5	0.11	0.002	14.0	0.05	0.003	25.4	0.02	0.005
6.0	0.11	0.002	14.288	0.05	0.003	26.0	0.02	0.005
6.35	0.11	0.003	14.5	0.05	0.003	27.0	0.02	0.005
6.5	0.11	0.003	15.0	0.05	0.003	28.0	0.02	0.005
7.0	0.11	0.003	15.5	0.05	0.003	29.0	0.02	0.005
7.5	0.06	0.003	15.875	0.05	0.003	30.0	0.02	0.005
7.938	0.06	0.003	16.0	0.05	0.003	31.0	0.02	0.005
8.0	0.06	0.003	16.5	0.02	0.003	32.0	0.02	0.005
8.5	0.06	0.003	17.0	0.02	0.003	36.0	0.02	0.006
9.0	0.06	0.003	17.5	0.02	0.003	40.0	0.02	0.006
9.5	0.06	0.003	18.0	0.02	0.003			
9.525	0.06	0.003	18.5	0.02	0.004			
10.0	0.06	0.003	19.0	0.02	0.004			
10.5	0.05	0.003	19.05	0.02	0.004			
11.0	0.05	0.003	19.5	0.02	0.004			

↗ Circular run-out | ○ Roundness

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