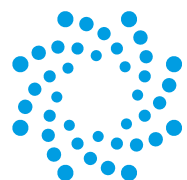




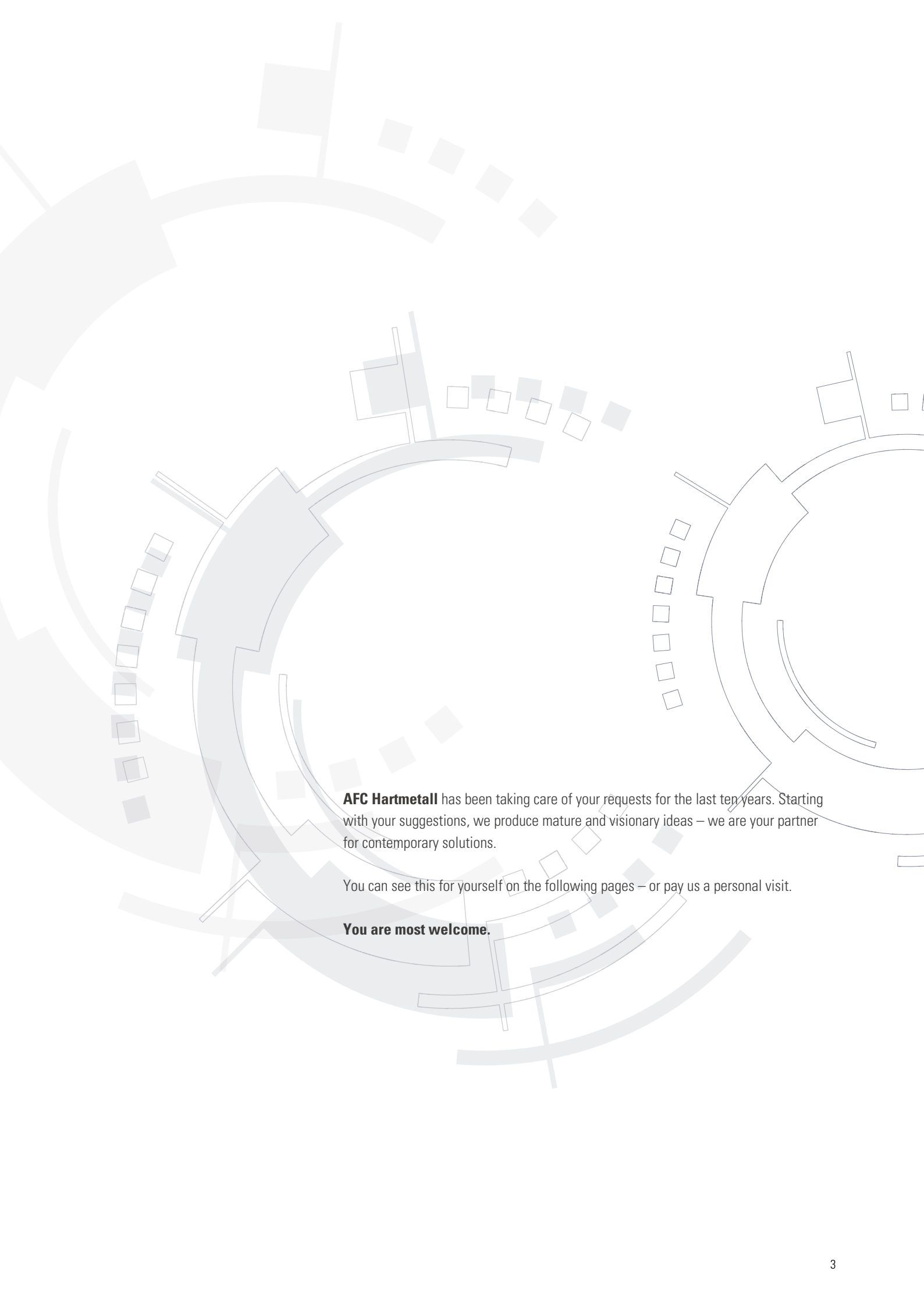
HOME FOR YOUR TOOLS



AFC
HARTMETALL



10 YEARS — PERFECTION AND
ATTENTION TO DETAILS



AFC Hartmetall has been taking care of your requests for the last ten years. Starting with your suggestions, we produce mature and visionary ideas – we are your partner for contemporary solutions.

You can see this for yourself on the following pages – or pay us a personal visit.

You are most welcome.





INDIVIDUAL AND IMPRESSIVE

Absolutely dynamic, simply innovative with versatile talent

Since the founding of our company ten years ago and the start of production in the following year, new things have been happening all the time.

Our greatest capital? Our employees who constantly make a contribution to our development through their highly dedicated work. And our inexhaustible wealth of innovative product ideas.

Simple ideas are often the best ones here: such an idea was also the basis of our »Specialty« patented manufacturing procedure – carbide rods with twisted cooling ducts.

Our motto: Today's topics — tomorrow's solutions.

Highly specialised products require highly qualified know-how. We have it: a team experienced in the carbide sector works hand-in-hand with young staff on the further development of our products and services. A lucrative potential that pays off for you.





RANGE OF SERVICES TO YOUR SATISFACTION

Service approach with no limits

Do you still have some wishes? Then let us know about them! We'll make your ideas with respect to carbide come true.

Our customers are located all over the world, everywhere where great things should happen. **AFC Hartmetall** is the right partner for this as our service knows no limits. As an independent, mid-sized company, we can handle and react to our customers' individual requests quickly and flexibly. We support you through cooperative consultation that has developed out of customised, economical and individual solutions. Because that's the only thing that we consider to be customer satisfaction — **cooperation that brings satisfaction.**

Our offer: Solid-carbide blanks for increasing requirements

- // Solid-carbide round rods without cooling ducts
- // Solid-carbide round rods with cooling ducts in various designs:
 - // One, two, three or, on request, more cooling ducts
 - // Straight or twisted
 - // Round, oval or, on request, with an individual shape
 - // With counter boring in the shaft
 - // Adapted exit drill hole at the head
- // Microdrill and deep hole drill blanks
- // Fixed lengths
- // Preslotted rods
- // Machining of ends
- // Ground rods





CERTIFIED AND EXCELLENT

Certified for Top Quality

Our certification in compliance with DIN EN ISO 9001:2008 stands for transparent structures, logical working processes and comprehensive controls. That adds up to a consistently high quality level with regard to development, manufacturing and sales of carbide. Strict concentration on the top quality of our services provides our customers with proof of our competence — as an active promise for what we stand. Today and tomorrow.

Certified in Service to our Environment

By being certified in compliance with DIN EN 14001:2004, we have placed our efforts on sustainable business in the service of our environment and for the next generations. We do everything in our power to minimise the risks to our environment, to our staff, to our customers and to our deliverability.





INTERESTING FACTS ABOUT CARBIDE

Advantageous and profitable all round

Carbide consists essentially of two components: **The hard material (WC) and the binding agent (Co).**

The hard material has an extremely high hardness level thanks to the carbide, and the binder for its high degree of toughness at this high level of hardness. This results in an advantage for carbide compared to steel, also compared to high speed steel. The high level of hardness of the steel is produced through a quench hardening phase, as it always breaks down when annealing in the stable, but softer phases. For the main part, carbide consists of a naturally hard, stable phase that practically doesn't lose any of its hardness during heating up. The extremely high hardness and outstanding high temperature strength are the reasons why carbide tools last significantly longer than HSS tools.

The basic materials for carbides are WC and Co powder. This powder is mixed intensively together. It is then processed by kneading, and can be subsequently pressed into rod form on extrusion presses. The dried mould can be processed into shape in many ways before sintering i.e. the heat treatment that produces rigidity, which leaves a lot of leeway to take account of customers' requests. The customer saves a working step and we can feed any material removed during this step back into our process.





INDIVIDUAL AND **PERFECT**

Quality can be taken for granted

The quality of the carbide is already determined by the quality of the powder. For this reason, we place considerable value at this point on outstanding quality. By working closely together with our suppliers, we can use raw materials that are customised for our products.

Carbide — completely individually

Initially, we have two possibilities of influencing its properties to produce carbide that meets your requirements:

Either we vary the grain size of the starting WC powder or we vary the ratio of the WC/Co.

A distinction is made between fine grain, ultrafine grain and superfine grain grades. As the fineness of the grain increases, the hardness and flexibility increase, but the toughness decreases. If the Co-share of the carbide increases, the toughness and flexibility increase, but the hardness decreases. Our wide experience in preparing the powder, in shaping as well as sintering guarantee that the carbide you have selected from our range will also produce impressive results through its homogeneous properties.

We would be glad to advise you when choosing the grade of carbide that is optimally suited to meet your requirements.

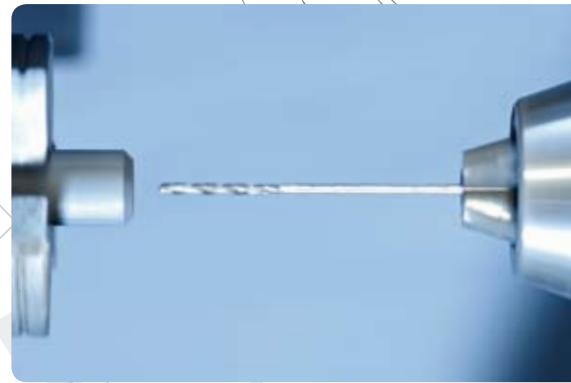


TABLE — QUICK OVERVIEW

AF K10 UF

ISO-Range	K10
Chemical Data	
Co (%)	6
WC incl. Doping (%)	94

Physical Data

Density (g/cm ³)	14,8
Hardness	
HV 30 (N/mm ²)	1900
HRA	93,8
Transverse Rupture Strength (N/mm ²)	> 3500

Metallographic Data

Porosity		
≤10 μm A	≤ 02	
10 -25 μm B	00	
C	00	

Microstructure

Tungsten Carbide α	Ø 0,6 μm
Binding Phase β	unif. distr.
Mixed carbide γ	—
Eta Phase η	—

Areas of Application

Grey cast iron
Unalloyed steels
Plastics

Microstructure

Murakami-Etching



AF K20 CF

ISO-Range	K10 - K20
Chemical Data	
Co (%)	8
WC incl. Doping (%)	92

Physical Data

Density (g/cm ³)	14,6
Hardness	
HV 30 (N/mm ²)	1710
HRA	92,5
Transverse Rupture Strength (N/mm ²)	> 3200

Metallographic Data

Porosity		
≤10 μm A	≤ 02	
10 -25 μm B	00	
C	00	

Microstructure

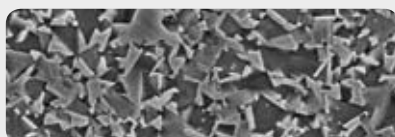
Tungsten Carbide α	Ø 0,7 μm
Binding Phase β	unif. distr.
Mixed carbide γ	—
Eta Phase η	—

Areas of Application

Grey cast iron
Unalloyed steels

Microstructure

Murakami-Etching



AF K34 EF

ISO-Range	K20 - K30
Chemical Data	
Co (%)	9
WC incl. Doping (%)	91

Physical Data

Density (g/cm ³)	14,3
Hardness	
HV 30 (N/mm ²)	1930
HRA	94,0
Transverse Rupture Strength (N/mm ²)	> 3900

Metallographic Data

Porosity		
≤10 μm A	≤ 02	
10 -25 μm B	00	
C	00	

Microstructure

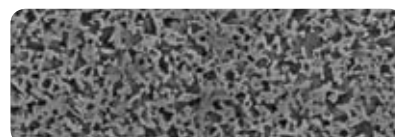
Tungsten Carbide α	Ø < 0,5 μm
Binding Phase β	unif. distr.
Mixed carbide γ	—
Eta Phase η	—

Areas of Application

Grey cast iron
Unalloyed steels
Aluminium alloys
Plastics
Fibre reinforced materials

Microstructure

Murakami-Etching



AF K40 UF

ISO-Range	K30 - K40
Chemical Data	
Co (%)	10
WC incl. Doping (%)	90

Physical Data

Density (g/cm ³)	14,5
Hardness	
HV 30 (N/mm ²)	1610
HRA	91,9
Transverse Rupture Strength (N/mm ²)	> 3600

Metallographic Data

Porosity	
≤10 μm A	≤ 02
10 -25 μm B	00
C	00

Microstructure

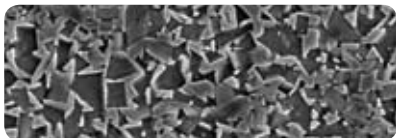
Tungsten Carbide α	Ø 0,6 μm
Binding Phase β	unif. distr.
Mixed carbide γ	—
Eta Phase η	—

Areas of Application

Corrosion and heat resistant steels
Stainless steels
Non ferrous metals
Plastics

Microstructure

Murakami-Etching



AF K44 EF

ISO-Range	K40 - K50
Chemical Data	
Co (%)	12
WC incl. Doping (%)	88

Physical Data

Density (g/cm ³)	14,1
Hardness	
HV 30 (N/mm ²)	1680
HRA	92,3
Transverse Rupture Strength (N/mm ²)	> 3800

Metallographic Data

Porosity	
≤10 μm A	≤ 02
10 -25 μm B	00
C	00

Microstructure

Tungsten Carbide α	Ø 0,5 μm
Binding Phase β	unif. distr.
Mixed carbide γ	—
Eta Phase η	—

Areas of Application

Corrosion and heat resistant steels
Stainless steels
Titanium alloys
Non ferrous metals

Microstructure

Murakami-Etching



AF K45 EF

ISO-Range	K40 - K50
Chemical Data	
Co (%)	13
WC incl. Doping (%)	87

Physical Data

Density (g/cm ³)	13,9
Hardness	
HV 30 (N/mm ²)	1700
HRA	92,4
Transverse Rupture Strength (N/mm ²)	> 3900

Metallographic Data

Porosity	
≤10 μm A	≤ 02
10 -25 μm B	00
C	00

Microstructure

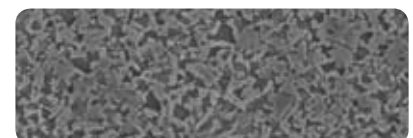
Tungsten Carbide α	Ø < 0,5 μm
Binding Phase β	unif. distr.
Mixed carbide γ	—
Eta Phase η	—

Areas of Application

Corrosion and heat resistant steels
Stainless steels
Titanium alloys
Non ferrous metals

Microstructure

Murakami-Etching



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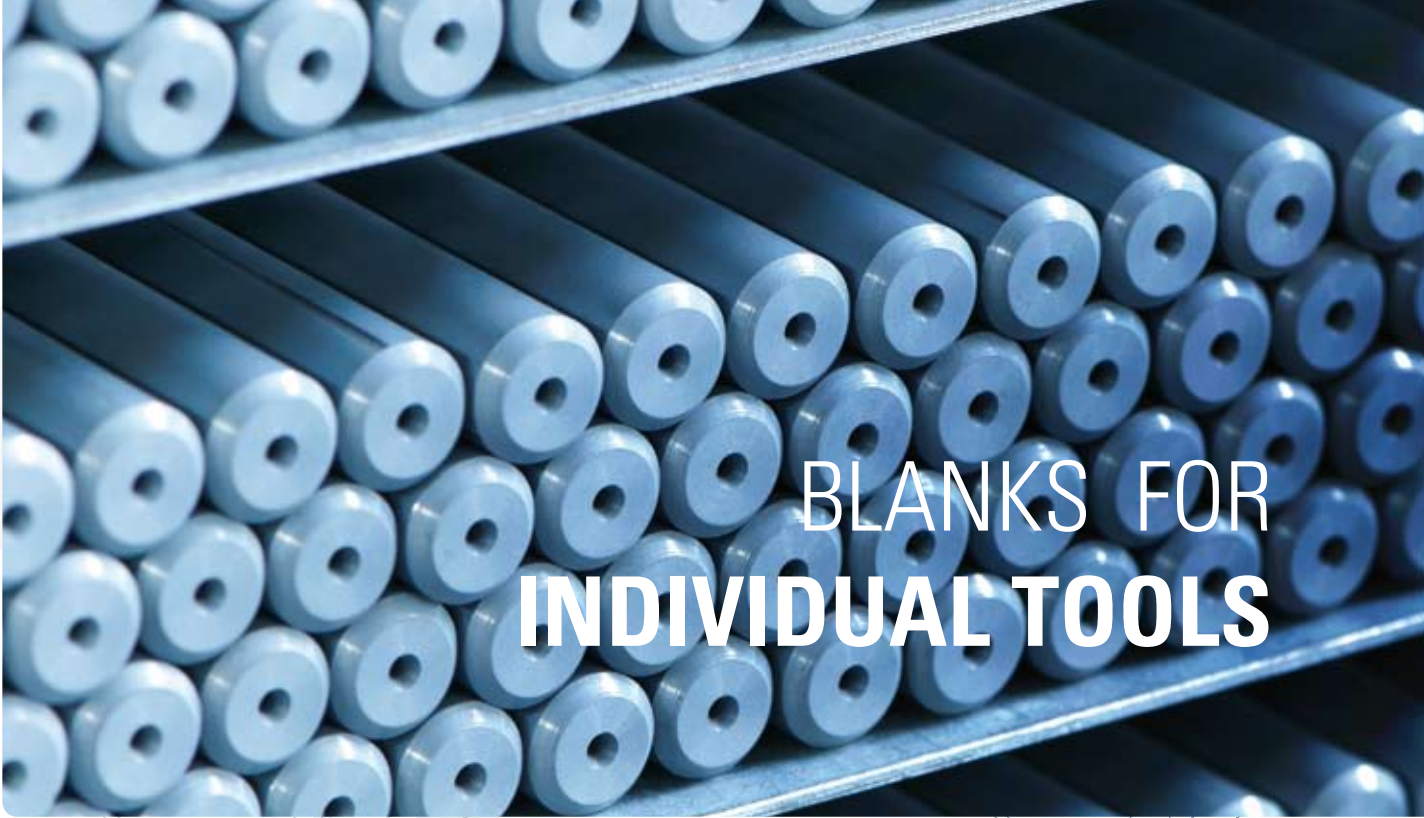
Interested parties and regular customers are not restricted by fixed opening hours, as we offer our products in our Online Shop around the clock, independent of time zones and distances. Are you looking for a special product? Then simply enter the name of the product and you'll soon make a discovery. Even if you are looking for an alternative in other types of carbide and lengths.

This is how it works — a quick introduction to our online-shop

Rods with central hole				Grade			
				AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
				AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
				AF K34 EF	XXX.49.XXX	AF K45 EF	XXX.53.XXX
Article-No.				101.XX.XXX/103.XX.XXX			
D (mm)	+Tol	D h6 (mm)	Hole Ø	+Tol	L+10 (mm)	Article	Article ground
4,3	+0,3	4,0	0,6	±0,10	310/330	XXX.XX.043	XXX.XX.040-h6
6,3	+0,3	6,0	1,0	±0,15	310/330	XXX.XX.063	XXX.XX.060-h6
8,3	+0,3	8,0	1,3	±0,15	310/330	XXX.XX.083	XXX.XX.080-h6
				±0,20	310/330	XXX.XX.103	XXX.XX.100-h6
						XXX.XX.123	XXX.XX.120-h6

103.70.063

- Diameter (Ø mm x 10)
- Carbide grade (e.g. AF K40 UF = 70 or AF K45 EF = 53)
- Length (e.g. 3 = 330 mm)
- Pitch (e.g. 3 = 30°, 4 = 40°)
- Number of cooling channels (0,1, 2, 3)



BLANKS FOR INDIVIDUAL TOOLS

We already take account of your special requests in the green state when machining our carbide.

In this way, we already give your tools an individual touch at this stage

Processing your tools in the green state means significantly easing your workload. You will benefit from an almost 90% reduction in grinding effort.

The amount of material removed during the green state is separated by grade. This means optimum recovery of the material that we can feed back into our process.

- // We machine the ends of your tools.
- // You benefit from an inflow of coolant that is adjusted precisely to the application of your tools.
- // An especially elegant solution: with the incorporated chipping space, only grinding the cutting edges of your tools is necessary.





GROUND COMPETENCE

»Our capacities are based on your requirements! «

Your request is our incentive!

On request, we can also offer you ready-ground rods from our own grinding shop. We have significantly increased our grinding capacities as a result of the considerable interest for ground rods.

Guaranteed technical competence

Our grinding shop is headed by an experienced specialist, who has focused on the centreless grinding process. The diameter tolerance of our products complies with DIN ISO 286/h6, the surface quality $Ra < 0.06 \mu\text{m}$ polish-ground. Other diameters and tolerances are also possible on request.

Everything from a single source

Raw carbide manufacturing including grinding means: you already get the blanks ground to the shaft dimension and only need to take care of the final grinding step. We guarantee the highest precision and documented quality. We can perform cutting to length and chamfering for you. We process the blanks in line with your request on fully automatic chamfering machines.





TECHNICAL FACTS **AND INFORMATIONS**

Solid rods



Grade

AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
AF K34 EF	XXX.49.XXX	AF K45 EF	XXX.53.XXX

Article-No.

001.XX.XXX/003.XX.XXX/004.XX.XXX

D (mm)	Tol	Dh6 (mm)	L+10 (mm)	Article	Article _{ground}
1,2	+0,2	1,0	310/330	XXX.XX.012	XXX.XX.010-h6
1,7	+0,2	1,5	310/330	XXX.XX.017	XXX.XX.015-h6
2,2	+0,2	2,0	310/330	XXX.XX.022	XXX.XX.020-h6
2,7	+0,2	2,5	310/330	XXX.XX.027	XXX.XX.025-h6
3,2	+0,2	3,0	310/330	XXX.XX.032	XXX.XX.030-h6
3,7	+0,2	3,5	310/330	XXX.XX.037	XXX.XX.035-h6
4,2	+0,2	4,0	310/330	XXX.XX.042	XXX.XX.040-h6
4,7	+0,2	4,5	310/330	XXX.XX.047	XXX.XX.045-h6
5,2	+0,2	5,0	310/330	XXX.XX.052	XXX.XX.050-h6
5,7	+0,2	5,5	310/330	XXX.XX.057	XXX.XX.055-h6
6,2	+0,2	6,0	310/330/415	XXX.XX.062	XXX.XX.060-h6
6,7	+0,2	6,5	310/330/415	XXX.XX.067	XXX.XX.065-h6
7,2	+0,2	7,0	310/330/415	XXX.XX.072	XXX.XX.070-h6
7,7	+0,2	7,5	310/330/415	XXX.XX.077	XXX.XX.075-h6
8,2	+0,3	8,0	310/330/415	XXX.XX.082	XXX.XX.080-h6
8,7	+0,3	8,5	310/330/415	XXX.XX.087	XXX.XX.085-h6
9,2	+0,3	9,0	310/330/415	XXX.XX.092	XXX.XX.090-h6
9,7	+0,3	9,5	310/330/415	XXX.XX.097	XXX.XX.095-h6
10,2	+0,3	10,0	310/330/415	XXX.XX.102	XXX.XX.100-h6
10,7	+0,3	10,5	310/330/415	XXX.XX.107	XXX.XX.105-h6
11,2	+0,3	11,0	310/330/415	XXX.XX.112	XXX.XX.110-h6
11,7	+0,3	11,5	310/330/415	XXX.XX.117	XXX.XX.115-h6
12,2	+0,3	12,0	310/330/415	XXX.XX.122	XXX.XX.120-h6
12,7	+0,3	12,5	310/330/415	XXX.XX.127	XXX.XX.125-h6
13,2	+0,3	13,0	310/330/415	XXX.XX.132	XXX.XX.130-h6
13,7	+0,3		310/330/415	XXX.XX.137	
14,2	+0,3	14,0	310/330/415	XXX.XX.142	XXX.XX.140-h6
14,7	+0,3		310/330/415	XXX.XX.147	
15,2	+0,3	15,0	310/330/415	XXX.XX.152	XXX.XX.150-h6
15,7	+0,3		310/330/415	XXX.XX.157	
16,2	+0,4	16,0	310/330/415	XXX.XX.162	XXX.XX.160-h6
16,7	+0,4		310/330/415	XXX.XX.167	
17,2	+0,4	17,0	310/330/415	XXX.XX.172	XXX.XX.170-h6
17,7	+0,4		310/330/415	XXX.XX.177	
18,2	+0,4	18,0	310/330/415	XXX.XX.182	XXX.XX.180-h6
18,7	+0,4		310/330/415	XXX.XX.187	
19,2	+0,4	19,0	310/330/415	XXX.XX.192	XXX.XX.190-h6
19,7	+0,4		310/330/415	XXX.XX.197	
20,2	+0,5	20,0	310/330/415	XXX.XX.202	XXX.XX.200-h6

Article-No.**001.XX.XXX/003.XX.XXX/004.XX.XXX**

D (mm)	Tol	Dh6 (mm)	L+10 (mm)	Article	Article ground
20,7	+0,5		310/330/415	XXX.XX. 207	
21,2	+0,5	21,0	310/330/415	XXX.XX. 212	XXX.XX. 210-h6
21,7	+0,5		310/330/415	XXX.XX. 217	
22,2	+0,5	22,0	310/330/415	XXX.XX. 222	XXX.XX. 220-h6
22,7	+0,5		310/330/415	XXX.XX. 227	
23,2	+0,5	23,0	310/330/415	XXX.XX. 232	XXX.XX. 230-h6
23,7	+0,5		310/330/415	XXX.XX. 237	
24,2	+0,5	24,0	310/330/415	XXX.XX. 242	XXX.XX. 240-h6
25,2	+0,5	25,0	310/330/415	XXX.XX. 252	XXX.XX. 250-h6
25,7	+0,5		310/330	XXX.XX. 257	
26,2	+0,5	26,0	310/330	XXX.XX. 262	XXX.XX. 260-h6
27,2	+0,5	27,0	310/330	XXX.XX. 272	XXX.XX. 270-h6
28,2	+0,5	28,0	310/330	XXX.XX. 282	XXX.XX. 280-h6
29,2	+0,5	29,0	310/330	XXX.XX. 292	XXX.XX. 290-h6
30,2	+0,5	30,0	310/330	XXX.XX. 302	XXX.XX. 300-h6
31,2	+0,5	31,0	310/330	XXX.XX. 312	XXX.XX. 310-h6
32,2	+0,5	32,0	310/330	XXX.XX. 322	XXX.XX. 320-h6
33,2	+0,5	33,0	310/330	XXX.XX. 332	XXX.XX. 330-h6
34,2	+0,5	34,0	310/330	XXX.XX. 342	XXX.XX. 340-h6
35,2	+0,5	35,0	310/330	XXX.XX. 352	XXX.XX. 350-h6
36,2	+0,5	36,0	310/330	XXX.XX. 362	XXX.XX. 360-h6
38,2	+0,5	38,0	310/330	XXX.XX. 382	XXX.XX. 380-h6
40,2	+0,5	40,0	310/330	XXX.XX. 402	XXX.XX. 400-h6

Article-No.**003.XX.XXX***in inch sizes*

D (inch)	D (mm)	Tol	Dh6 (mm)	L+10 (mm)	Article	Article ground
1/16	1,8	+0,2	1,5875	330	003.XX. 018	003.XX. 001-16
1/8	3,4	+0,2	3,1750	330	003.XX. 034	003.XX. 001-08
3/16	5,0	+0,2	4,7625	330	003.XX. 050	003.XX. 003-16
1/4	6,6	+0,2	6,3500	330	003.XX. 066	003.XX. 001-04
5/16	8,2	+0,3	7,9375	330	003.XX. 082	003.XX. 005-16
3/8	9,7	+0,3	9,5250	330	003.XX. 097	003.XX. 003-08
7/16	11,3	+0,3	11,1125	330	003.XX. 113	003.XX. 007-16
1/2	12,9	+0,3	12,7000	330	003.XX. 129	003.XX. 001-02
9/16	14,5	+0,3	14,2875	330	003.XX. 145	003.XX. 009-16
5/8	16,1	+0,4	15,8750	330	003.XX. 161	003.XX. 005-08
11/16	17,7	+0,4	17,4625	330	003.XX. 177	003.XX. 011-16
3/4	19,3	+0,4	19,0500	330	003.XX. 193	003.XX. 003-04
13/16	20,9	+0,5	20,6375	330	003.XX. 209	003.XX. 013-16
7/8	22,5	+0,5	22,2250	330	003.XX. 225	003.XX. 007-08
15/16	24,2	+0,5	23,8125	330	003.XX. 242	003.XX. 015-16
1	25,7	+0,5	25,4000	330	003.XX. 257	003.XX. 001-00

Rods with central hole



Grade

AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
AF K34 EF	XXX.49.XXX	AF K45 EF	XXX.53.XXX

Article-No.

101.XX.XXX/103.XX.XXX

D (mm)	Tol	Dh6 (mm)	Hole Ø	Tol	L+10 (mm)	Article	Article _{ground}
4,3	+0,3	4,0	0,6	±0,10	310/330	XXX.XX. 043	XXX.XX. 040-h6
6,3	+0,3	6,0	1,0	±0,15	310/330	XXX.XX. 063	XXX.XX. 060-h6
8,3	+0,3	8,0	1,3	±0,15	310/330	XXX.XX. 083	XXX.XX. 080-h6
10,3	+0,4	10,0	2,0	±0,20	310/330	XXX.XX. 103	XXX.XX. 100-h6
12,3	+0,4	12,0	2,0	±0,20	310/330	XXX.XX. 123	XXX.XX. 120-h6
14,3	+0,4	14,0	2,0	±0,20	310/330	XXX.XX. 143	XXX.XX. 140-h6
16,3	+0,5	16,0	2,0	±0,20	310/330	XXX.XX. 163	XXX.XX. 160-h6
18,3	+0,5	18,0	3,0	±0,25	310/330	XXX.XX. 183	XXX.XX. 180-h6
20,3	+0,5	20,0	3,0	±0,25	310/330	XXX.XX. 203	XXX.XX. 200-h6
22,3	+0,5	22,0	3,0	±0,25	310/330	XXX.XX. 223	XXX.XX. 220-h6
24,3	+0,5	24,0	4,0	±0,30	310/330	XXX.XX. 243	XXX.XX. 240-h6
26,3	+0,5	26,0	4,0	±0,30	310/330	XXX.XX. 263	XXX.XX. 260-h6
28,3	+0,5	28,0	4,0	±0,30	310/330	XXX.XX. 283	XXX.XX. 280-h6
30,3	+0,5	30,0	5,0	±0,35	310/330	XXX.XX. 303	XXX.XX. 300-h6
32,3	+0,5	32,0	5,0	±0,35	310/330	XXX.XX. 323	XXX.XX. 320-h6

Parallel holes with standard bolt circle



Grade

AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
AF K34 EF	XXX.49.XXX	AF K45 EF	XXX.53.XXX

Article-No.

201.XX.XXX/203.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	L+10 (mm)	Article	Article _{ground}
4,2	+0,30	4,0	1,72	±0,08	0,80	±0,10	310/330	XXX.XX. 042	XXX.XX. 040-h6
5,2	+0,30	5,0	1,92	±0,08	0,80	±0,10	310/330	XXX.XX. 052	XXX.XX. 050-h6
6,3	+0,30	6,0	2,90	±0,10	1,00	±0,10	310/330	XXX.XX. 063	XXX.XX. 060-h6
7,3	+0,30	7,0	3,40	±0,10	1,00	±0,15	310/330	XXX.XX. 073	XXX.XX. 070-h6
8,3	+0,30	8,0	3,85	±0,15	1,00	±0,15	310/330	XXX.XX. 083	XXX.XX. 080-h6
9,3	+0,30	9,0	3,85	±0,15	1,40	±0,15	310/330	XXX.XX. 093	XXX.XX. 090-h6
10,3	+0,30	10,0	4,85	±0,15	1,40	±0,15	310/330	XXX.XX. 103	XXX.XX. 100-h6
11,3	+0,40	11,0	4,85	±0,15	1,40	±0,15	310/330	XXX.XX. 113	XXX.XX. 110-h6
12,3	+0,40	12,0	5,85	±0,15	1,75	±0,15	310/330	XXX.XX. 123	XXX.XX. 120-h6
13,3	+0,40	13,0	5,85	±0,15	1,75	±0,15	310/330	XXX.XX. 133	XXX.XX. 130-h6
14,3	+0,40	14,0	6,85	±0,15	1,75	±0,15	310/330	XXX.XX. 143	XXX.XX. 140-h6
15,3	+0,40	15,0	6,85	±0,15	2,00	±0,20	310/330	XXX.XX. 153	XXX.XX. 150-h6
16,3	+0,40	16,0	7,85	±0,15	2,00	±0,20	310/330	XXX.XX. 163	XXX.XX. 160-h6
17,3	+0,50	17,0	7,85	±0,15	2,00	±0,20	310/330	XXX.XX. 173	XXX.XX. 170-h6
18,3	+0,50	18,0	8,85	±0,15	2,00	±0,20	310/330	XXX.XX. 183	XXX.XX. 180-h6
19,3	+0,50	19,0	8,85	±0,15	2,00	±0,20	310/330	XXX.XX. 193	XXX.XX. 190-h6
20,4	+0,50	20,0	9,80	±0,20	2,50	±0,25	310/330	XXX.XX. 204	XXX.XX. 200-h6
21,4	+0,50	21,0	9,80	±0,20	2,50	±0,25	310/330	XXX.XX. 214	XXX.XX. 210-h6
22,4	+0,50	22,0	10,80	±0,20	2,50	±0,25	310/330	XXX.XX. 224	XXX.XX. 220-h6
23,4	+0,50	23,0	10,80	±0,20	2,50	±0,25	310/330	XXX.XX. 234	XXX.XX. 230-h6
24,4	+0,50	24,0	11,75	±0,25	3,00	±0,25	310/330	XXX.XX. 244	XXX.XX. 240-h6
25,4	+0,50	25,0	11,75	±0,25	3,00	±0,25	310/330	XXX.XX. 254	XXX.XX. 250-h6
26,4	+0,50	26,0	12,75	±0,25	3,00	±0,25	310/330	XXX.XX. 264	XXX.XX. 260-h6
28,4	+0,50	28,0	13,75	±0,25	3,00	±0,25	310/330	XXX.XX. 284	XXX.XX. 280-h6
30,4	+0,50	30,0	13,75	±0,25	3,00	±0,25	310/330	XXX.XX. 304	XXX.XX. 300-h6
32,4	+0,50	32,0	13,75	±0,25	3,00	±0,25	310/330	XXX.XX. 324	XXX.XX. 320-h6
34,4	+0,50	34,0	13,75	±0,25	3,00	±0,25	310/330	XXX.XX. 344	XXX.XX. 340-h6

Parallel holes with reduced bolt circle



Grade

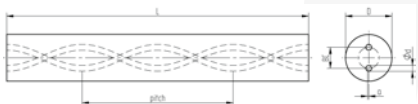
AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
AF K34 EF	XXX.49.XXX		

Article-No.

211.XX.XXX/213.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	L+10 (mm)	Article	Article _{ground}
6,3	+0,30	6,0	1,40	±0,10	0,80	±0,10	310/330	XXX.XX. 063	XXX.XX. 060-h6
7,3	+0,30	7,0	1,40	±0,10	0,80	±0,10	310/330	XXX.XX. 073	XXX.XX. 070-h6
8,3	+0,30	8,0	1,40	±0,10	0,80	±0,10	310/330	XXX.XX. 081	XXX.XX. 081-h6
8,3	+0,30	8,0	1,85	±0,15	0,80	±0,10	310/330	XXX.XX. 082	XXX.XX. 082-h6
8,3	+0,30	8,0	2,45	±0,15	1,00	±0,10	310/330	XXX.XX. 083	XXX.XX. 080-h6
9,3	+0,30	9,0	2,45	±0,15	1,00	±0,10	310/330	XXX.XX. 093	XXX.XX. 090-h6
10,3	+0,30	10,0	2,45	±0,15	1,00	±0,10	310/330	XXX.XX. 103	XXX.XX. 100-h6
11,3	+0,40	11,0	3,35	±0,15	1,20	±0,15	310/330	XXX.XX. 113	XXX.XX. 110-h6
12,3	+0,40	12,0	3,35	±0,15	1,20	±0,15	310/330	XXX.XX. 123	XXX.XX. 120-h6
13,3	+0,40	13,0	3,35	±0,15	1,20	±0,15	310/330	XXX.XX. 133	XXX.XX. 130-h6
14,3	+0,40	14,0	4,85	±0,15	1,50	±0,15	310/330	XXX.XX. 143	XXX.XX. 140-h6
15,3	+0,40	15,0	4,85	±0,15	1,50	±0,15	310/330	XXX.XX. 153	XXX.XX. 150-h6
16,3	+0,40	16,0	4,85	±0,15	1,50	±0,15	310/330	XXX.XX. 163	XXX.XX. 160-h6
17,3	+0,50	17,0	6,00	±0,20	2,00	±0,20	310/330	XXX.XX. 173	XXX.XX. 170-h6
18,3	+0,50	18,0	6,00	±0,20	2,00	±0,20	310/330	XXX.XX. 183	XXX.XX. 180-h6
19,3	+0,50	19,0	6,00	±0,20	2,00	±0,20	310/330	XXX.XX. 193	XXX.XX. 190-h6
20,4	+0,50	20,0	6,00	±0,20	2,00	±0,20	310/330	XXX.XX. 204	XXX.XX. 200-h6
21,4	+0,50	21,0	6,00	±0,20	2,00	±0,20	310/330	XXX.XX. 214	XXX.XX. 210-h6
22,4	+0,50	22,0	6,00	±0,20	2,00	±0,20	310/330	XXX.XX. 224	XXX.XX. 220-h6
23,4	+0,50	23,0	7,30	±0,20	2,00	±0,20	310/330	XXX.XX. 234	XXX.XX. 230-h6
24,4	+0,50	24,0	7,30	±0,20	2,00	±0,20	310/330	XXX.XX. 244	XXX.XX. 240-h6
25,4	+0,50	25,0	7,30	±0,20	2,00	±0,20	310/330	XXX.XX. 254	XXX.XX. 250-h6

2 hole 30° helix



Grade

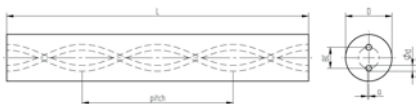
AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
AF K34 EF	XXX.49.XXX	AF K45 EF	XXX.53.XXX

Article-No.

231.XX.XXX/233.XX.XXX/234.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	Pitch ±0,5°	L+10 (mm)	Article	Article _{ground}
3,3	+0,3	3,0	1,60	±0,10	0,40	±0,10	16,32	310/330	XXX.XX.033	XXX.XX.030-h6
3,8	+0,3	3,5	1,80	±0,10	0,50	±0,10	19,04	310/330	XXX.XX.038	XXX.XX.035-h6
4,3	+0,3	4,0	2,10	±0,10	0,60	±0,10	21,77	310/330	XXX.XX.043	XXX.XX.040-h6
4,8	+0,3	4,5	2,25	±0,15	0,70	±0,10	24,49	310/330	XXX.XX.048	XXX.XX.045-h6
5,3	+0,3	5,0	2,40	±0,20	0,70	±0,10	27,21	310/330	XXX.XX.053	XXX.XX.050-h6
5,8	+0,3	5,5	2,40	±0,20	0,70	±0,10	29,93	310/330	XXX.XX.058	XXX.XX.055-h6
6,3	+0,3	6,0	2,40	±0,20	0,70	±0,10	32,65	310/330/415	XXX.XX.063	XXX.XX.060-h6
6,8	+0,3	6,5	3,30	±0,20	1,00	±0,15	35,37	310/330/415	XXX.XX.068	XXX.XX.065-h6
7,3	+0,3	7,0	3,50	±0,20	1,00	±0,15	38,09	310/330/415	XXX.XX.073	XXX.XX.070-h6
7,8	+0,3	7,5	3,80	±0,20	1,00	±0,15	40,81	310/330/415	XXX.XX.078	XXX.XX.075-h6
8,3	+0,3	8,0	3,80	±0,20	1,00	±0,15	43,53	310/330/415	XXX.XX.083	XXX.XX.080-h6
8,8	+0,3	8,5	4,20	±0,30	1,00	±0,15	46,25	310/330/415	XXX.XX.088	XXX.XX.085-h6
9,3	+0,3	9,0	4,50	±0,30	1,40	±0,15	48,97	310/330/415	XXX.XX.093	XXX.XX.090-h6
9,8	+0,3	9,5	4,50	±0,30	1,40	±0,15	51,69	310/330/415	XXX.XX.098	XXX.XX.095-h6
10,3	+0,3	10,0	4,50	±0,30	1,40	±0,15	54,41	310/330/415	XXX.XX.103	XXX.XX.100-h6
10,8	+0,4	10,5	4,50	±0,30	1,40	±0,15	57,13	310/330/415	XXX.XX.108	XXX.XX.105-h6
11,3	+0,4	11,0	4,90	±0,40	1,40	±0,15	59,86	310/330/415	XXX.XX.113	XXX.XX.110-h6
11,8	+0,4	11,5	5,40	±0,40	1,40	±0,15	62,58	310/330/415	XXX.XX.118	XXX.XX.115-h6
12,3	+0,4	12,0	5,85	±0,40	1,40	±0,15	65,30	310/330/415	XXX.XX.123	XXX.XX.120-h6
12,8	+0,4	12,5	5,85	±0,40	1,75	±0,20	68,02	310/330/415	XXX.XX.128	XXX.XX.125-h6
13,3	+0,4	13,0	6,10	±0,40	1,75	±0,20	70,74	310/330/415	XXX.XX.133	XXX.XX.130-h6
13,8	+0,4	13,5	6,40	±0,40	1,75	±0,20	73,46	310/330/415	XXX.XX.138	XXX.XX.135-h6
14,3	+0,4	14,0	6,70	±0,40	1,75	±0,20	76,18	310/330/415	XXX.XX.143	XXX.XX.140-h6
14,8	+0,4	14,5	7,00	±0,40	1,75	±0,20	78,90	310/330/415	XXX.XX.148	XXX.XX.145-h6
15,3	+0,4	15,0	7,30	±0,40	1,75	±0,20	81,62	310/330/415	XXX.XX.153	XXX.XX.150-h6
15,8	+0,4	15,5	7,60	±0,40	1,75	±0,20	84,34	310/330/415	XXX.XX.158	XXX.XX.155-h6
16,3	+0,4	16,0	7,90	±0,40	1,75	±0,20	87,06	310/330/415	XXX.XX.163	XXX.XX.160-h6
16,8	+0,5	16,5	8,20	±0,40	1,75	±0,20	89,78	310/330/415	XXX.XX.168	XXX.XX.165-h6
17,3	+0,5	17,0	8,50	±0,40	1,75	±0,20	92,50	310/330/415	XXX.XX.173	XXX.XX.170-h6
17,8	+0,5	17,5	8,80	±0,40	1,75	±0,20	95,22	310/330/415	XXX.XX.178	XXX.XX.175-h6
18,3	+0,5	18,0	9,15	±0,40	2,00	±0,25	97,95	310/330/415	XXX.XX.183	XXX.XX.180-h6
18,8	+0,5	18,5	9,35	±0,40	2,00	±0,25	100,67	310/330/415	XXX.XX.188	XXX.XX.185-h6
19,3	+0,5	19,0	9,70	±0,40	2,00	±0,25	103,39	310/330/415	XXX.XX.193	XXX.XX.190-h6
19,8	+0,5	19,5	9,75	±0,50	2,00	±0,25	106,11	310/330/415	XXX.XX.198	XXX.XX.195-h6
20,3	+0,5	20,0	9,90	±0,50	2,00	±0,25	108,83	310/330/415	XXX.XX.203	XXX.XX.200-h6
21,3	+0,5	21,0	10,65	±0,50	2,00	±0,25	114,27	310/330/415	XXX.XX.213	XXX.XX.210-h6
22,3	+0,5	22,0	11,10	±0,50	2,00	±0,25	119,71	310/330/415	XXX.XX.223	XXX.XX.220-h6
23,3	+0,5	23,0	11,70	±0,50	2,00	±0,25	125,15	310/330/415	XXX.XX.233	XXX.XX.230-h6
24,3	+0,5	24,0	12,30	±0,50	2,00	±0,25	130,59	310/330/415	XXX.XX.243	XXX.XX.240-h6

2 hole 30° helix



Grade

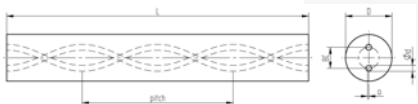
AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
AF K34 EF	XXX.49.XXX	AF K45 EF	XXX.53.XXX

Article-No.

231.XX.XXX/233.XX.XXX/234.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	Pitch ±0,5°	L+10 (mm)	Article	Article _{ground}
25,3	+0,5	25,0	12,80	±0,50	2,00	±0,25	136,03	310/330/415	XXX.XX. 253	XXX.XX. 250-h6
26,3	+0,5	26,0	13,30	±0,50	2,00	±0,25	141,48	310/330	XXX.XX. 263	XXX.XX. 260-h6
27,3	+0,5	27,0	13,70	±0,60	2,50	±0,30	146,92	310/330	XXX.XX. 273	XXX.XX. 270-h6
28,3	+0,5	28,0	14,20	±0,60	2,50	±0,30	152,36	310/330	XXX.XX. 283	XXX.XX. 280-h6
29,3	+0,5	29,0	14,80	±0,60	2,50	±0,30	157,80	310/330	XXX.XX. 293	XXX.XX. 290-h6
30,3	+0,5	30,0	15,40	±0,60	2,50	±0,30	163,24	310/330	XXX.XX. 303	XXX.XX. 300-h6
31,3	+0,5	31,0	16,00	±0,60	2,50	±0,30	168,68	310/330	XXX.XX. 313	XXX.XX. 310-h6
32,3	+0,5	32,0	16,60	±0,60	3,00	±0,30	174,12	310/330	XXX.XX. 323	XXX.XX. 320-h6
33,3	+0,5	33,0	17,20	±0,60	3,00	±0,30	179,57	310/330	XXX.XX. 333	XXX.XX. 330-h6
34,3	+0,5	34,0	17,40	±0,60	3,00	±0,30	185,01	310/330	XXX.XX. 343	XXX.XX. 340-h6
35,3	+0,5	35,0	17,40	±0,60	3,00	±0,30	190,45	310/330	XXX.XX. 353	XXX.XX. 350-h6

2 hole 40° helix



Grade

AF K10 UF	XXX.66.XXX	AF K40 UF	XXX.70.XXX
AF K20 CF	XXX.78.XXX	AF K44 EF	XXX.62.XXX
AF K34 EF	XXX.49.XXX	AF K45 EF	XXX.53.XXX

Article-No.

241.XX.XXX/243.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	Pitch ±0,5°	L+10 (mm)	Article	Article _{ground}
6,3	+0,30	6,0	2,00	±0,20	0,50	±0,15	22,46	310/330	XXX.XX.063	XXX.XX.060-h6
6,8	+0,30	6,5	2,10	±0,20	0,50	±0,15	24,34	310/330	XXX.XX.068	XXX.XX.065-h6
7,3	+0,30	7,0	2,20	±0,20	0,65	±0,15	26,21	310/330	XXX.XX.073	XXX.XX.070-h6
7,8	+0,30	7,5	2,30	±0,20	0,65	±0,15	28,08	310/330	XXX.XX.078	XXX.XX.075-h6
8,3	+0,30	8,0	2,40	±0,30	0,65	±0,15	29,95	310/330	XXX.XX.083	XXX.XX.080-h6
8,8	+0,30	8,5	2,60	±0,30	0,65	±0,15	31,82	310/330	XXX.XX.088	XXX.XX.085-h6
9,3	+0,30	9,0	2,90	±0,30	0,75	±0,15	33,70	310/330	XXX.XX.093	XXX.XX.090-h6
9,8	+0,30	9,5	3,20	±0,30	0,75	±0,15	35,57	310/330	XXX.XX.098	XXX.XX.095-h6
10,3	+0,40	10,0	3,20	±0,30	0,80	±0,15	37,44	310/330	XXX.XX.103	XXX.XX.100-h6
10,8	+0,40	10,5	3,20	±0,30	0,80	±0,15	39,31	310/330	XXX.XX.108	XXX.XX.105-h6
11,3	+0,40	11,0	3,30	±0,40	0,80	±0,15	41,18	310/330	XXX.XX.113	XXX.XX.110-h6
11,8	+0,40	11,5	3,60	±0,40	0,85	±0,15	43,06	310/330	XXX.XX.118	XXX.XX.115-h6
12,3	+0,40	12,0	3,80	±0,40	0,90	±0,20	44,93	310/330	XXX.XX.123	XXX.XX.120-h6
12,8	+0,40	12,5	3,95	±0,40	0,90	±0,20	46,80	310/330	XXX.XX.128	XXX.XX.125-h6
13,3	+0,40	13,0	4,00	±0,40	0,90	±0,20	48,67	310/330	XXX.XX.133	XXX.XX.130-h6
13,8	+0,40	13,5	4,10	±0,40	1,00	±0,20	50,54	310/330	XXX.XX.138	XXX.XX.135-h6
14,3	+0,40	14,0	4,30	±0,40	1,00	±0,20	52,42	310/330	XXX.XX.143	XXX.XX.140-h6
14,8	+0,40	14,5	4,50	±0,40	1,10	±0,20	54,29	310/330	XXX.XX.148	XXX.XX.145-h6
15,3	+0,50	15,0	4,70	±0,40	1,10	±0,20	56,16	310/330	XXX.XX.153	XXX.XX.150-h6
15,8	+0,50	15,5	4,90	±0,40	1,10	±0,20	58,03	310/330	XXX.XX.158	XXX.XX.155-h6
16,3	+0,50	16,0	5,10	±0,40	1,20	±0,20	59,90	310/330	XXX.XX.163	XXX.XX.160-h6
16,8	+0,50	16,5	5,35	±0,40	1,20	±0,25	61,78	310/330	XXX.XX.168	XXX.XX.165-h6
17,3	+0,50	17,0	5,50	±0,40	1,20	±0,25	63,65	310/330	XXX.XX.173	XXX.XX.170-h6
17,8	+0,50	17,5	5,70	±0,40	1,30	±0,25	65,52	310/330	XXX.XX.178	XXX.XX.175-h6
18,3	+0,50	18,0	5,90	±0,40	1,40	±0,25	67,39	310/330	XXX.XX.183	XXX.XX.180-h6
18,8	+0,50	18,5	6,10	±0,40	1,40	±0,25	69,26	310/330	XXX.XX.188	XXX.XX.185-h6
19,3	+0,50	19,0	6,40	±0,50	1,40	±0,25	71,14	310/330	XXX.XX.193	XXX.XX.190-h6
20,3	+0,50	20,0	6,60	±0,50	1,50	±0,25	74,88	310/330	XXX.XX.203	XXX.XX.200-h6
21,3	+0,50	21,0	6,90	±0,50	1,50	±0,25	78,62	310/330	XXX.XX.213	XXX.XX.210-h6
22,3	+0,50	22,0	7,20	±0,50	1,70	±0,25	82,37	310/330	XXX.XX.223	XXX.XX.220-h6
24,3	+0,50	24,0	7,50	±0,50	1,75	±0,25	89,86	310/330	XXX.XX.243	XXX.XX.240-h6
25,3	+0,50	25,0	7,60	±0,50	1,75	±0,25	93,60	310/330	XXX.XX.253	XXX.XX.250-h6
26,3	+0,50	26,0	7,70	±0,50	1,75	±0,25	97,34	310/330	XXX.XX.263	XXX.XX.260-h6
28,3	+0,50	28,0	8,40	±0,60	2,00	±0,30	104,83	310/330	XXX.XX.283	XXX.XX.280-h6
30,3	+0,50	30,0	9,40	±0,60	2,00	±0,30	112,32	310/330	XXX.XX.303	XXX.XX.300-h6
32,3	+0,50	32,0	10,40	±0,60	2,00	±0,30	119,81	310/330	XXX.XX.323	XXX.XX.320-h6

3 holes 30° helix



Grade

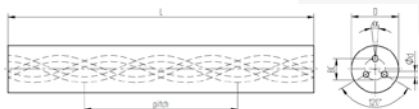
AF K20 CF	XXX.78.XXX	AF K34 EF	XXX.49.XXX
AF K40 UF	XXX.70.XXX	AF K44 EF	XXX.62.XXX

Article-No.

331.XX.XXX/333.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	Pitch ±0,5°	L+10 (mm)	Article	Article _{ground}
4,8	+0,30	4,5	2,20	±0,10	0,40	±0,10	24,49	310/330	XXX.XX.048	XXX.XX.045-h6
5,3	+0,30	5,0	2,45	±0,15	0,40	±0,10	27,21	310/330	XXX.XX.053	XXX.XX.050-h6
5,8	+0,30	5,5	2,75	±0,15	0,50	±0,10	29,93	310/330	XXX.XX.058	XXX.XX.055-h6
6,3	+0,30	6,0	2,75	±0,15	0,50	±0,10	32,65	310/330	XXX.XX.063	XXX.XX.060-h6
6,8	+0,30	6,5	2,75	±0,15	0,50	±0,10	35,37	310/330	XXX.XX.068	XXX.XX.065-h6
7,3	+0,30	7,0	3,85	±0,15	0,65	±0,10	38,09	310/330	XXX.XX.073	XXX.XX.070-h6
7,8	+0,30	7,5	3,85	±0,15	0,70	±0,10	40,81	310/330	XXX.XX.078	XXX.XX.075-h6
8,3	+0,30	8,0	3,85	±0,15	0,70	±0,10	43,53	310/330	XXX.XX.083	XXX.XX.080-h6
8,8	+0,30	8,5	3,85	±0,15	0,70	±0,10	46,25	310/330	XXX.XX.088	XXX.XX.085-h6
9,3	+0,30	9,0	4,95	±0,15	0,85	±0,15	48,97	310/330	XXX.XX.093	XXX.XX.090-h6
9,8	+0,30	9,5	4,95	±0,15	0,85	±0,15	51,69	310/330	XXX.XX.098	XXX.XX.095-h6
10,3	+0,30	10,0	4,95	±0,15	0,85	±0,15	54,41	310/330	XXX.XX.103	XXX.XX.100-h6
10,8	+0,40	10,5	4,95	±0,15	0,85	±0,15	57,13	310/330	XXX.XX.108	XXX.XX.105-h6
11,3	+0,40	11,0	5,45	±0,25	1,10	±0,15	59,86	310/330	XXX.XX.113	XXX.XX.110-h6
11,8	+0,40	11,5	5,85	±0,25	1,10	±0,15	62,58	310/330	XXX.XX.118	XXX.XX.115-h6
12,3	+0,40	12,0	6,05	±0,25	1,10	±0,15	65,30	310/330	XXX.XX.123	XXX.XX.120-h6
12,8	+0,40	12,5	6,05	±0,25	1,10	±0,15	68,02	310/330	XXX.XX.128	XXX.XX.125-h6
13,3	+0,40	13,0	6,55	±0,25	1,20	±0,15	70,74	310/330	XXX.XX.133	XXX.XX.130-h6
13,8	+0,40	13,5	6,75	±0,25	1,20	±0,15	73,46	310/330	XXX.XX.138	XXX.XX.135-h6
14,3	+0,40	14,0	7,05	±0,25	1,40	±0,15	76,18	310/330	XXX.XX.143	XXX.XX.140-h6
14,8	+0,40	14,5	7,35	±0,25	1,40	±0,15	78,90	310/330	XXX.XX.148	XXX.XX.145-h6
15,3	+0,40	15,0	7,55	±0,25	1,40	±0,15	81,62	310/330	XXX.XX.153	XXX.XX.150-h6
15,8	+0,40	15,5	7,55	±0,25	1,40	±0,15	84,34	310/330	XXX.XX.158	XXX.XX.155-h6
16,3	+0,40	16,0	8,05	±0,25	1,60	±0,20	87,06	310/330	XXX.XX.163	XXX.XX.160-h6
16,8	+0,50	16,5	8,05	±0,25	1,60	±0,20	89,78	310/330	XXX.XX.168	XXX.XX.165-h6
17,3	+0,50	17,0	8,35	±0,25	1,60	±0,20	92,50	310/330	XXX.XX.173	XXX.XX.170-h6
17,8	+0,50	17,5	8,35	±0,25	1,60	±0,20	95,22	310/330	XXX.XX.178	XXX.XX.175-h6
18,3	+0,50	18,0	9,25	±0,25	1,70	±0,20	97,95	310/330	XXX.XX.183	XXX.XX.180-h6
18,8	+0,50	18,5	9,25	±0,25	1,70	±0,20	100,67	310/330	XXX.XX.188	XXX.XX.185-h6
19,3	+0,50	19,0	9,95	±0,25	1,70	±0,20	103,39	310/330	XXX.XX.193	XXX.XX.190-h6
19,8	+0,50	19,5	9,95	±0,25	1,90	±0,25	106,11	310/330	XXX.XX.198	XXX.XX.195-h6
20,3	+0,50	20,0	9,95	±0,25	1,90	±0,25	108,83	310/330	XXX.XX.203	XXX.XX.200-h6
21,3	+0,50	21,0	10,75	±0,35	2,00	±0,25	114,27	310/330	XXX.XX.213	XXX.XX.210-h6
22,3	+0,50	22,0	11,15	±0,35	2,00	±0,25	119,71	310/330	XXX.XX.223	XXX.XX.220-h6
23,3	+0,50	23,0	11,45	±0,35	2,00	±0,25	125,15	310/330	XXX.XX.233	XXX.XX.230-h6
24,3	+0,50	24,0	11,75	±0,35	2,00	±0,25	130,59	310/330	XXX.XX.243	XXX.XX.240-h6
25,3	+0,50	25,0	12,15	±0,35	2,00	±0,25	136,03	310/330	XXX.XX.253	XXX.XX.250-h6
26,3	+0,50	26,0	12,75	±0,35	2,00	±0,25	141,48	310/330	XXX.XX.263	XXX.XX.260-h6
27,3	+0,50	27,0	13,15	±0,45	2,50	±0,30	146,92	310/330	XXX.XX.273	XXX.XX.270-h6

3 holes 30° helix



Grade

AF K20 CF	XXX.78.XXX	AF K34 EF	XXX.49.XXX
AF K40 UF	XXX.70.XXX	AF K44 EF	XXX.62.XXX

Article-No.

331.XX.XXX/333.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	Pitch ±0,5°	L+10 (mm)	Article	Article _{ground}
28,3	+0,50	28,0	13,65	±0,45	2,50	±0,30	152,36	310/330	XXX.XX. 283	XXX.XX. 280-h6
29,3	+0,50	29,0	14,15	±0,45	2,50	±0,30	157,80	310/330	XXX.XX. 293	XXX.XX. 290-h6
30,3	+0,50	30,0	14,50	±0,60	2,50	±0,30	163,24	310/330	XXX.XX. 303	XXX.XX. 300-h6
31,3	+0,50	31,0	15,00	±0,60	3,00	±0,30	168,68	310/330	XXX.XX. 313	XXX.XX. 310-h6
32,3	+0,50	32,0	15,50	±0,60	3,00	±0,30	174,12	310/330	XXX.XX. 323	XXX.XX. 320-h6
33,3	+0,50	33,0	16,00	±0,60	3,00	±0,30	179,57	310/330	XXX.XX. 333	XXX.XX. 330-h6

3 holes 40° helix



Grade

AF K20 CF	XXX.78.XXX	AF K34 EF	XXX.49.XXX
AF K40 UF	XXX.70.XXX	AF K44 EF	XXX.62.XXX

Article-No. 341.XX.XXX/343.XX.XXX

D (mm)	Tol	Dh6 (mm)	BC	Tol	Hole Ø	Tol	Pitch ±0,5°	L+10 (mm)	Article	Article _{ground}
6,3	+0,30	6,0	2,05	±0,15	0,50	±0,15	22,46	310/330	XXX.XX.063	XXX.XX.060-h6
6,8	+0,30	6,5	2,15	±0,15	0,50	±0,15	24,34	310/330	XXX.XX.068	XXX.XX.065-h6
7,3	+0,30	7,0	2,25	±0,15	0,65	±0,15	26,21	310/330	XXX.XX.073	XXX.XX.070-h6
7,8	+0,30	7,5	2,35	±0,15	0,65	±0,15	28,08	310/330	XXX.XX.078	XXX.XX.075-h6
8,3	+0,30	8,0	2,45	±0,15	0,65	±0,15	29,95	310/330	XXX.XX.083	XXX.XX.080-h6
8,8	+0,30	8,5	2,75	±0,15	0,65	±0,15	31,82	310/330	XXX.XX.088	XXX.XX.085-h6
9,3	+0,30	9,0	3,05	±0,15	0,75	±0,15	33,70	310/330	XXX.XX.093	XXX.XX.090-h6
9,8	+0,30	9,5	3,35	±0,15	0,75	±0,15	35,57	310/330	XXX.XX.098	XXX.XX.095-h6
10,3	+0,40	10,0	3,35	±0,15	0,80	±0,15	37,44	310/330	XXX.XX.103	XXX.XX.100-h6
10,8	+0,40	10,5	3,35	±0,15	0,80	±0,15	39,31	310/330	XXX.XX.108	XXX.XX.105-h6
11,3	+0,40	11,0	3,45	±0,25	0,80	±0,15	41,18	310/330	XXX.XX.113	XXX.XX.110-h6
11,8	+0,40	11,5	3,75	±0,25	0,85	±0,15	43,06	310/330	XXX.XX.118	XXX.XX.115-h6
12,3	+0,40	12,0	3,95	±0,25	0,90	±0,20	44,93	310/330	XXX.XX.123	XXX.XX.120-h6
12,8	+0,40	12,5	4,10	±0,25	0,90	±0,20	46,80	310/330	XXX.XX.128	XXX.XX.125-h6
13,3	+0,40	13,0	4,15	±0,25	0,90	±0,20	48,67	310/330	XXX.XX.133	XXX.XX.130-h6
13,8	+0,40	13,5	4,25	±0,25	1,00	±0,20	50,54	310/330	XXX.XX.138	XXX.XX.135-h6
14,3	+0,40	14,0	4,45	±0,25	1,00	±0,20	52,42	310/330	XXX.XX.143	XXX.XX.140-h6
14,8	+0,40	14,5	4,65	±0,25	1,10	±0,20	54,29	310/330	XXX.XX.148	XXX.XX.145-h6
15,3	+0,50	15,0	4,85	±0,25	1,10	±0,20	56,16	310/330	XXX.XX.153	XXX.XX.150-h6
15,8	+0,50	15,5	5,05	±0,25	1,10	±0,20	58,03	310/330	XXX.XX.158	XXX.XX.155-h6
16,3	+0,50	16,0	5,25	±0,25	1,20	±0,20	59,90	310/330	XXX.XX.163	XXX.XX.160-h6
16,8	+0,50	16,5	5,50	±0,25	1,20	±0,20	61,78	310/330	XXX.XX.168	XXX.XX.165-h6
17,3	+0,50	17,0	5,65	±0,25	1,20	±0,20	63,65	310/330	XXX.XX.173	XXX.XX.170-h6
17,8	+0,50	17,8	5,85	±0,25	1,35	±0,25	65,52	310/330	XXX.XX.178	XXX.XX.175-h6
18,3	+0,50	18,0	6,05	±0,25	1,40	±0,25	67,39	310/330	XXX.XX.183	XXX.XX.180-h6
18,8	+0,50	18,5	6,25	±0,25	1,40	±0,25	69,26	310/330	XXX.XX.188	XXX.XX.185-h6
19,3	+0,50	19,0	6,35	±0,35	1,40	±0,25	71,14	310/330	XXX.XX.193	XXX.XX.190-h6
19,8	+0,50	19,5	6,55	±0,35	1,50	±0,25	73,01	310/330	XXX.XX.198	XXX.XX.195-h6
20,3	+0,50	20,0	6,75	±0,35	1,50	±0,25	74,88	310/330	XXX.XX.203	XXX.XX.200-h6
21,3	+0,50	21,0	7,05	±0,35	1,50	±0,25	78,62	310/330	XXX.XX.213	XXX.XX.210-h6
22,3	+0,50	22,0	7,35	±0,35	1,70	±0,25	82,37	310/330	XXX.XX.223	XXX.XX.220-h6
24,3	+0,50	24,0	7,55	±0,45	1,75	±0,25	89,86	310/330	XXX.XX.243	XXX.XX.240-h6
25,3	+0,50	25,0	7,65	±0,45	1,75	±0,25	93,60	310/330	XXX.XX.253	XXX.XX.250-h6
26,3	+0,50	26,0	7,75	±0,45	1,75	±0,25	97,34	310/330	XXX.XX.263	XXX.XX.260-h6
28,3	+0,50	28,0	8,55	±0,45	2,00	±0,30	104,83	310/330	XXX.XX.283	XXX.XX.280-h6
30,3	+0,50	30,0	9,45	±0,55	2,00	±0,30	112,32	310/330	XXX.XX.303	XXX.XX.300-h6
32,3	+0,50	32,0	10,45	±0,55	2,00	±0,30	119,81	310/330	XXX.XX.323	XXX.XX.320-h6

Milling cutter blanks



Grade

AF K40 UF

XXX.70.XXX

AF K44 EF

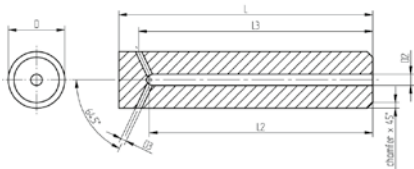
XXX.62.XXX

Article-No.

009.XX.XXX

D (mm)	Tol	Dh6 (mm)	Tol	L (mm)	Tol	C x 45°	Article	Article _{ground}
6,2	+0,20	6,0	h6	58,0	+0,8	0,5	009.XX. 062	009.XX. 060-058 h6
6,2	+0,20	6,0	h6	76,5	+0,9	0,5	009.XX. 064	009.XX. 060-076 h6
8,2	+0,30	8,0	h6	64,2	+0,8	1,0	009.XX. 082	009.XX. 080-064 h6
8,2	+0,30	8,0	h6	101,2	+1,0	1,0	009.XX. 084	009.XX. 080-101 h6
10,2	+0,30	10,0	h6	67,2	+0,8	1,0	009.XX. 102	009.XX. 100-067 h6
10,2	+0,30	10,0	h6	73,2	+0,9	1,0	009.XX. 103	009.XX. 100-073 h6
10,2	+0,30	10,0	h6	101,2	+1,0	1,0	009.XX. 104	009.XX. 100-101 h6
12,2	+0,30	12,0	h6	74,2	+0,9	1,0	009.XX. 122	009.XX. 120-074 h6
12,2	+0,30	12,0	h6	84,2	+0,9	1,0	009.XX. 123	009.XX. 120-084 h6
12,2	+0,30	12,0	h6	101,1	+1,0	1,0	009.XX. 124	009.XX. 120-101 h6
14,2	+0,30	14,0	h6	84,2	+0,9	1,0	009.XX. 142	009.XX. 140-084 h6
14,2	+0,30	14,0	h6	101,2	+1,0	1,0	009.XX. 144	009.XX. 140-101 h6
16,2	+0,40	16,0	h6	83,2	+0,9	1,5	009.XX. 162	009.XX. 160-083 h6
16,2	+0,40	16,0	h6	93,2	+1,0	1,5	009.XX. 163	009.XX. 160-093 h6
16,2	+0,40	16,0	h6	101,2	+1,0	1,5	009.XX. 164	009.XX. 160-101 h6
18,2	+0,40	18,0	h6	93,0	+1,0	1,5	009.XX. 182	009.XX. 180-093 h6
18,2	+0,40	18,0	h6	102,0	+1,0	1,5	009.XX. 183	009.XX. 180-101 h6
18,2	+0,40	18,0	h6	151,3	+1,6	1,5	009.XX. 184	009.XX. 180-151 h6
20,2	+0,50	20,0	h6	93,2	+1,0	1,5	009.XX. 202	009.XX. 200-093 h6
20,2	+0,50	20,0	h6	105,0	+1,1	1,5	009.XX. 203	009.XX. 200-105 h6
20,2	+0,50	20,0	h6	151,2	+1,6	1,5	009.XX. 204	009.XX. 200-151 h6
25,2	+0,50	25,0	h6	122,0	+1,2	1,5	009.XX. 252	009.XX. 250-122 h6
25,2	+0,50	25,0	h6	152,0	+1,6	1,5	009.XX. 254	009.XX. 250-152 h6

Milling cutter blanks*



Grade

AF K40 UF XXX.70.XXX **AF K44 EF** XXX.62.XXX

* with center coolant duct and 2, 3, 4, 5 lateral exits

Dimensions

D (mm)	Tol	L (mm)	Tol	Ø D2	Tol	L2	Ø D3	Tol	L3	Tol	C x 45°
6,2	+0,20	58,0	+0,8	1,75	±0,25	54,6	1,0	±0,2	55,0	±0,30	0,5
6,2	+0,20	76,5	+0,9	1,75	±0,25	72,6	1,0	±0,2	73,0	±0,30	0,5
8,2	+0,30	64,2	+0,8	1,75	±0,25	59,1	1,2	±0,2	60,0	±0,30	1,0
8,2	+0,30	101,2	+1,0	1,75	±0,25	96,1	1,2	±0,2	97,0	±0,30	1,0
10,2	+0,30	67,2	+0,8	2,00	±0,25	60,6	1,2	±0,2	62,0	±0,30	1,0
10,2	+0,30	73,2	+0,9	2,00	±0,25	66,6	1,2	±0,2	68,0	±0,30	1,0
10,2	+0,30	101,2	+1,0	2,00	±0,25	94,6	1,2	±0,2	96,0	±0,30	1,0
12,2	+0,30	74,2	+0,9	2,00	±0,25	66,1	1,5	±0,2	68,0	±0,30	1,0
12,2	+0,30	84,2	+0,9	2,00	±0,25	76,1	1,5	±0,2	78,0	±0,30	1,0
12,2	+0,30	101,1	+1,0	2,00	±0,25	93,1	1,5	±0,2	95,0	±0,30	1,0
14,2	+0,30	84,2	+0,9	2,00	±0,25	74,7	1,5	±0,2	77,0	±0,30	1,0
14,2	+0,30	101,2	+1,0	2,00	±0,25	91,7	1,5	±0,2	94,0	±0,30	1,0
16,2	+0,40	83,2	+0,9	4,00	±0,25	72,2	1,5	±0,2	75,0	±0,30	1,5
16,2	+0,40	93,2	+1,0	4,00	±0,25	82,2	1,5	±0,2	85,0	±0,30	1,5
16,2	+0,40	101,2	+1,0	4,00	±0,25	90,2	1,5	±0,2	93,0	±0,30	1,5
18,2	+0,40	93,0	+1,0	4,00	±0,25	80,7	2,0	±0,2	84,0	±0,30	1,5
18,2	+0,40	102,0	+1,0	4,00	±0,25	89,7	2,0	±0,2	93,0	±0,30	1,5
18,2	+0,40	151,3	+1,6	4,00	±0,25	138,7	2,0	±0,2	142,0	±0,30	1,5
20,2	+0,50	93,2	+1,0	4,00	±0,25	79,2	2,0	±0,2	83,0	±0,30	1,5
20,2	+0,50	105,0	+1,1	4,00	±0,25	91,2	2,0	±0,2	95,0	±0,30	1,5
20,2	+0,50	151,2	+1,6	4,00	±0,25	137,2	2,0	±0,2	141,0	±0,30	1,5
25,2	+0,50	122,0	+1,2	4,00	±0,25	104,5	2,0	±0,2	109,5	±0,30	1,5
25,2	+0,50	152,0	+1,6	4,00	±0,25	134,5	2,0	±0,2	139,5	±0,30	1,5

Article-No.

D (mm)	L (mm)	2 lat. exits	3 lat. exits	4 lat. exits	5 lat. exits
6,2	58,0	922.XX. 062	923.XX. 062	924.XX. 062	925.XX. 062
6,2	76,5	922.XX. 064	923.XX. 064	924.XX. 064	925.XX. 064
8,2	64,2	922.XX. 082	923.XX. 082	924.XX. 082	925.XX. 082
8,2	101,2	922.XX. 084	923.XX. 084	924.XX. 084	925.XX. 084
10,2	67,2	922.XX. 102	923.XX. 102	924.XX. 102	925.XX. 102
10,2	73,2	922.XX. 103	923.XX. 103	924.XX. 103	925.XX. 103
10,2	101,2	922.XX. 104	923.XX. 104	924.XX. 104	925.XX. 104
12,2	74,2	922.XX. 122	923.XX. 122	924.XX. 122	925.XX. 122
12,2	84,2	922.XX. 123	923.XX. 123	924.XX. 123	925.XX. 123
12,2	101,1	922.XX. 124	923.XX. 124	924.XX. 124	925.XX. 124
14,2	84,2	922.XX. 142	923.XX. 142	924.XX. 142	925.XX. 142

Article-No.

D (mm)	L (mm)	2 lat. exits	3 lat. exits	4 lat. exits	5 lat. exits
14,2	101,2	922.XX. 144	923.XX. 144	924.XX. 144	925.XX. 144
16,2	83,2	922.XX. 162	923.XX. 162	924.XX. 162	925.XX. 162
16,2	93,2	922.XX. 163	923.XX. 163	924.XX. 163	925.XX. 163
16,2	101,2	922.XX. 164	923.XX. 164	924.XX. 164	925.XX. 164
18,2	93,0	922.XX. 182	923.XX. 182	924.XX. 182	925.XX. 182
18,2	102,0	922.XX. 183	923.XX. 183	924.XX. 183	925.XX. 183
18,2	151,3	922.XX. 184	923.XX. 184	924.XX. 184	925.XX. 184
20,2	93,2	922.XX. 202	923.XX. 202	924.XX. 202	925.XX. 202
20,2	105,0	922.XX. 203	923.XX. 203	924.XX. 203	925.XX. 203
20,2	151,2	922.XX. 204	923.XX. 204	924.XX. 204	925.XX. 204
25,2	122,0	922.XX. 252	923.XX. 252	924.XX. 252	925.XX. 252
25,2	152,0	922.XX. 254	923.XX. 254	924.XX. 254	925.XX. 254

Article-No. ground (Addition h6)

Dh6 (mm)	L (mm)	2 lat. exits	3 lat. exits	4 lat. exits	5 lat. exits
6,0	58,0	922.XX. 060-058	923.XX. 060-058	924.XX. 060-058	925.XX. 060-058
6,0	76,5	922.XX. 060-076	923.XX. 060-076	924.XX. 060-076	925.XX. 060-076
8,0	64,2	922.XX. 080-064	923.XX. 080-064	924.XX. 080-064	925.XX. 080-064
8,0	101,2	922.XX. 080-101	923.XX. 080-101	924.XX. 080-101	925.XX. 080-101
10,0	67,2	922.XX. 100-067	923.XX. 100-067	924.XX. 100-067	925.XX. 100-067
10,0	73,2	922.XX. 100-073	923.XX. 100-073	924.XX. 100-073	925.XX. 100-073
10,0	101,2	922.XX. 100-101	923.XX. 100-101	924.XX. 100-101	925.XX. 100-101
12,0	74,2	922.XX. 120-074	923.XX. 120-074	924.XX. 120-074	925.XX. 120-074
12,0	84,2	922.XX. 120-084	923.XX. 120-084	924.XX. 120-084	925.XX. 120-084
12,0	101,1	922.XX. 120-101	923.XX. 120-101	924.XX. 120-101	925.XX. 120-101
14,0	84,2	922.XX. 140-084	923.XX. 140-084	924.XX. 140-084	925.XX. 140-084
14,0	101,2	922.XX. 140-101	923.XX. 140-101	924.XX. 140-101	925.XX. 140-101
16,0	83,2	922.XX. 160-083	923.XX. 160-083	924.XX. 160-083	925.XX. 160-083
16,0	93,2	922.XX. 160-093	923.XX. 160-093	924.XX. 160-093	925.XX. 160-093
16,0	101,2	922.XX. 160-101	923.XX. 160-101	924.XX. 160-101	925.XX. 160-101
18,0	93,0	922.XX. 180-093	923.XX. 180-093	924.XX. 180-093	925.XX. 180-093
18,0	102,0	922.XX. 180-102	923.XX. 180-102	924.XX. 180-102	925.XX. 180-102
18,0	151,3	922.XX. 180-151	923.XX. 180-151	924.XX. 180-151	925.XX. 180-151
20,0	93,2	922.XX. 200-093	923.XX. 200-093	924.XX. 200-093	925.XX. 200-093
20,0	105,0	922.XX. 200-105	923.XX. 200-105	924.XX. 200-105	925.XX. 200-105
20,0	151,2	922.XX. 200-151	923.XX. 200-151	924.XX. 200-151	925.XX. 200-151
25,0	122,0	922.XX. 250-122	923.XX. 250-122	924.XX. 250-122	925.XX. 250-122
25,0	152,0	922.XX. 250-152	923.XX. 250-152	924.XX. 250-152	925.XX. 250-152



REQUESTED BRIEFLY

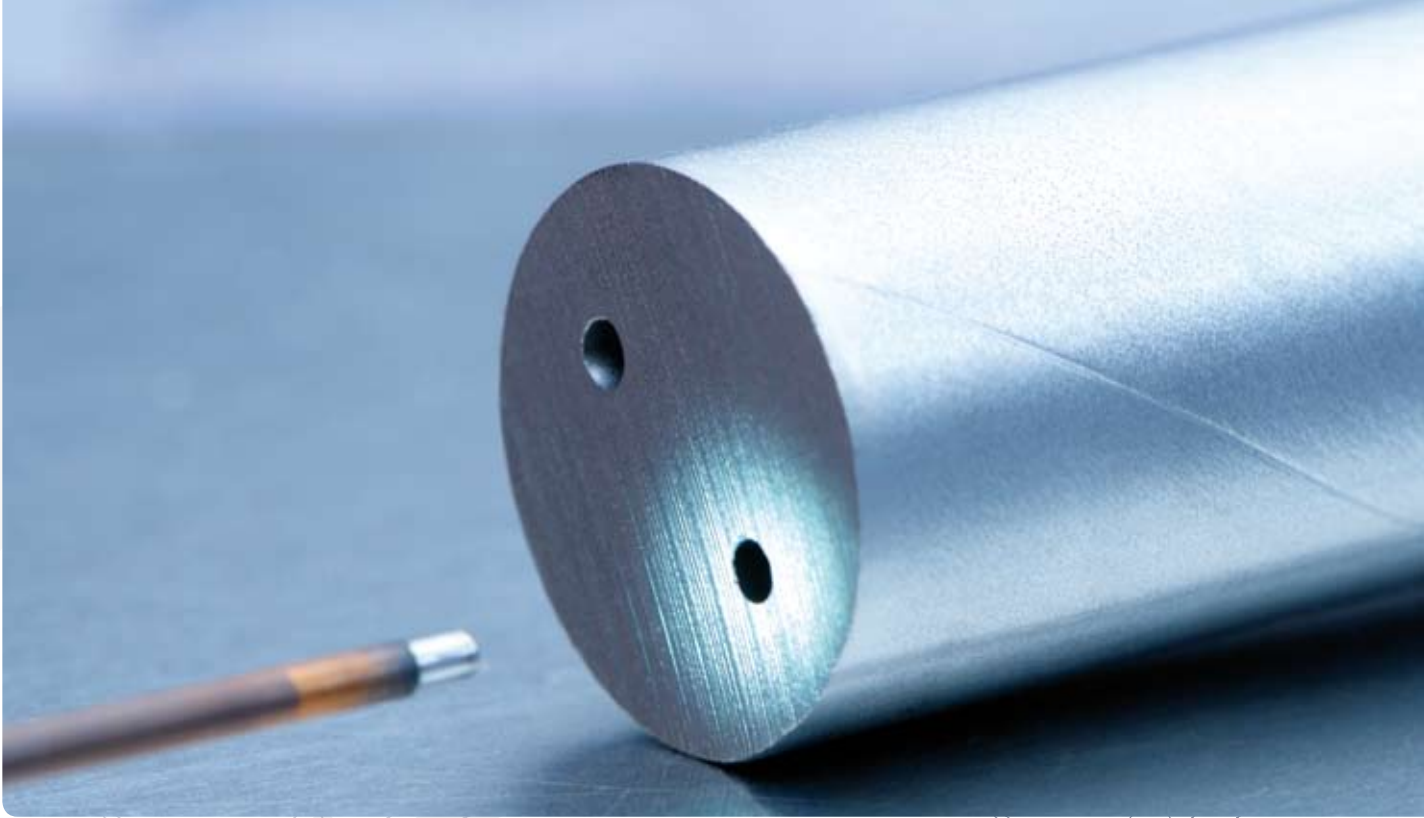
»Everything's possible!« — Describe your ideas and we'll help you during the development.

Our extruders make many things possible:

- // New, reduced pitch tolerances for blanks up to 550 mm for spiralised deep hole drills
- // Variability of the angle of twist, especially interesting for very small pitches in the range from 6–7 mm for very small drills
- // Shape and position of the cooling duct(s)
- // Kidney or lenticular cooling ducts in blanks for deep hole drills
- // Disk blanks for carbide saw blades up to a diameter of 200 mm
- // Blades and rectangular bars

Accordingly, we can be of assistance when machining materials in the green state:

- // Preslotting of blanks as a cost, material and time-saving alternative to hard machining
- // Machining of male and female centres
- // Machining of cooling duct connection in a cup, slot, cylindrical chamber or hollow cone shape
- // Cylindrical offsetting
- // Inserting cooling ducts in blanks with variable partitions in any desired number as an end face or lateral exit
- // Machining of inner and outer threads



This is what we offer in the course of hard machining:

- // Centreless external cylindrical grinding to any desired diameter
- // Cut to length operations
- // Chamfer operations
- // Machining of cooling duct connections in slotted form
- // Machining of ends in line with the customer's drawing, such as ball nose, pointed, double chamfered or also another type
- // Cylindrical stepping





Complete manufacturing line for test tools

For **AFC Hartmetall**, customer service and best quality have the highest priority. To guarantee this at all times, we have a tool laboratory that is equipped to the latest state-of-the-art of technology. Our customers benefit from optimum recommendations and individual advice.

In order to comply with all customer requests, our new tool laboratory has a complete manufacturing line. A centreless and outer cylindrical grinding machine is on hand to grind the carbide blanks on both sides as well as to grind the ends. We have recently invested in a new universal grinding machine to manufacture tools.

AFC Hartmetall has excellent instrumentation technology available to evaluate the condition of the cutting edges. Furthermore, we cooperate with independent university institutes to comprehensively test our tools for the highest quality. In this way, we can assure you of reliable, top quality.

Quality has top priority at **AFC Hartmetall** also during the coating of tools. For this reason, we work closely together exclusively with well-known companies in this sector.



NEW WAYS TOWARDS QUALIFIED ADVICE

Development of grades for the specific processing case

In this way, we can already provide you with qualified recommendations in advance of your pending processing case. The fine tuning of the carbide grade and individual advice for use of the tools in your company are handled jointly from a single source in our company.

Our customers benefit from a shorter development phase for new grades and tools.

Since the founding of the company, **AFC Hartmetall** has been intensively involved with the research and development of high quality grades. To improve the quality of the tools even further, the development of grades at **AFC Hartmetall** is now directly coupled to the specific processing case. It is our aim to constantly optimise our tools together with our customers during the course of research and development projects.





HOW TO FIND US

Welcome to Mainleus

Set in beautiful countryside, a perfect location both geographically and economically — pay us a visit soon!





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