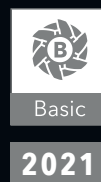
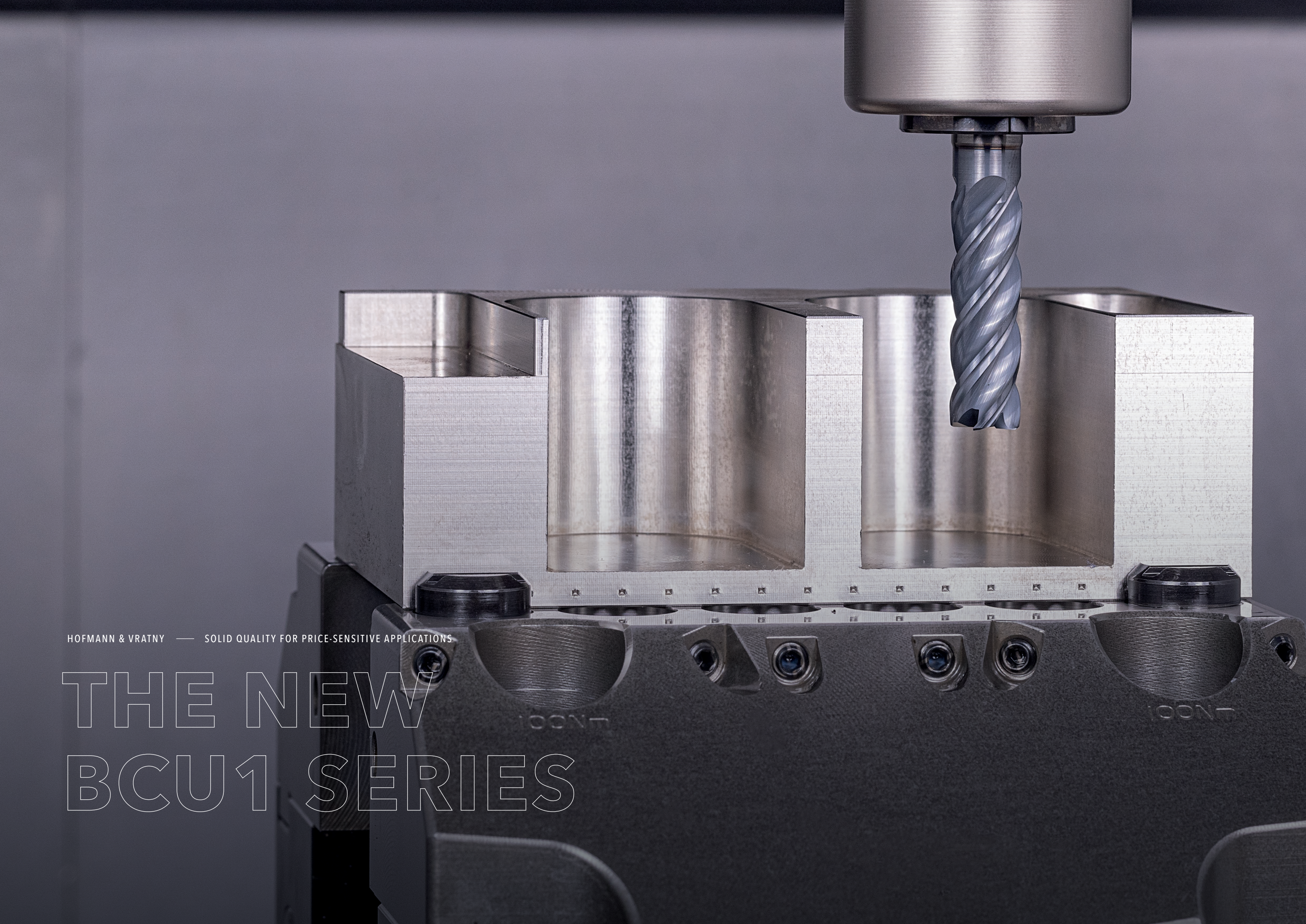


HOFMANN & VRATNY — BCU1 SERIES EN



BCU1 SERIES





HOFMANN & VRATNY — SOLID QUALITY FOR PRICE-SENSITIVE APPLICATIONS

THE NEW BCU1 SERIES

THE RIGHT MILLING CUTTER. AT ALL TIMES.

Welcome to Hofmann & Vratny. As the leading manufacturer of solid carbide milling cutters, we enable companies throughout the world to manufacture their products.

Every day, our strong team works on our collective goal of producing the best milling cutters in the world. Companies from the medical industry, semiconductor industry, machine and plant construction, aviation, aerospace engineering and, not least, the automotive industry have been using our milling cutters for many years now. Quality – Made in Bavaria.

The success of our company is built on innovation, a culture of cooperation, open dealings on an equal footing and many years of successful and trustful collaboration with our business partners. You can count on us, our milling cutters and our irrepressible drive to shape the future of the industry together. To us, that means shaping tomorrow.



Andreas Vratny



Zdenek Vratny



Marius Heinemann-Grüder



OUR NEW
BCU1 Series



MADE IN
BAVARIA

PROVEN QUALITY

45
YEARS OF
EXPERIENCE

2 Mio.
MILLING
CUTTERS
PRODUCED
EVERY YEAR

MADE IN BAVARIA

Our milling cutters are used by companies all over the world. Still they all have the same origin: Our production sites in Bavaria, Germany.

As a traditional company, we are proud of our strong connection to the region. Ever since we were founded, we have been firmly tied to our homeland, and our team works on producing the best milling cutters in the world in a familial environment. Genuine quality work, the highest-quality craftsmanship and a strong promotion and retention of our talent: This is what Made in Bavaria means to us.



OUR NEW BCU1 SERIES

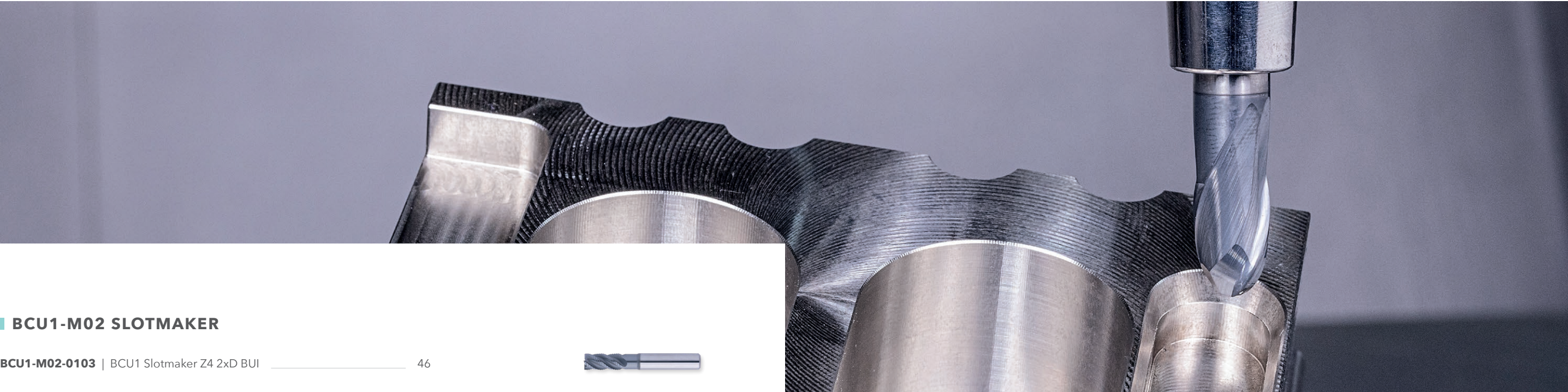
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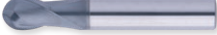




BCU1-M02 SLOTMAKER

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THE NEW BCU1 SERIES

Solid quality for price-sensitive applications



A SPECIAL EDGE PREPARATION PROCESS ENSURES:

- Entirely homogeneous cutting edges
- Even distribution of cutting forces
- Improved surface quality of the component
- Controlled and even wear



DISCOVER OUR NEW
BCU1 SERIES ONLINE



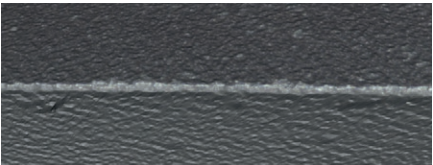
OUR NEW BCU1 SERIES
PERFORMS WELL IN ALL AREAS OF
APPLICATION.

Our H&V BCU1 Series is a very attractively priced supplement to our Expert product line, specially designed for universal machining.

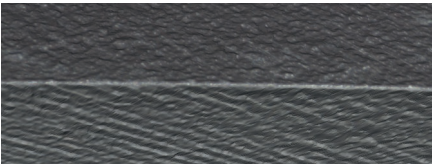
The geometry, material and coating are optimised to ensure an attractive price/performance ratio. Therefore, our milling cutters are ideal for price-conscious users in almost all areas of application.

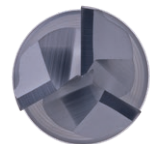
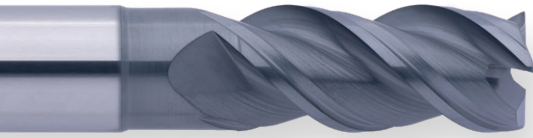
- Versatile application thanks to tried-and-tested geometries
- Stable universal coating for machining, even suitable for the most demanding materials in roughing and finishing
- Special fine grain substrate for reduced cracking and improved resistance to cutting edge breakouts

BEFORE EDGE PREPARATION



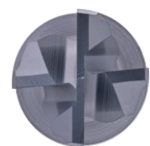
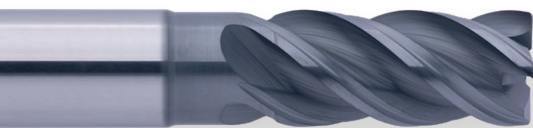
AFTER EDGE PREPARATION





BASIC U1 PERFORMMAKER (M01) Z3

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip disposal
- Available in 1.5xD, 2xD and 3xD
- Available as HA and HB
- With BUI coating

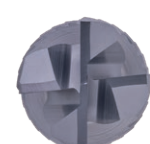


BASIC U1 PERFORMMAKER (M01) Z4

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip disposal
- Available in 1.5xD, 2xD and 3xD
- Available as HA and HB
- With BUI coating

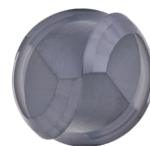
BASIC U1 SLOTMAKER (M02) Z4

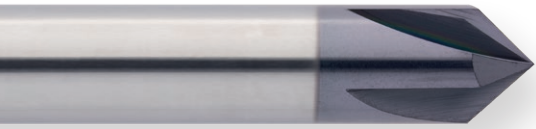
- Optimised chip chambers for a large chip volume, for example with full slot milling
- Adapted roughing teeth for small chips
- Available in 2xD and 3xD
- Available as HA and HB
- With BUI coating



BASIC U1 ROWMAKER (M08) Z2

- Geometry of the face cutting edge designed for a smooth and even cut
- Adapted chip chambers for roughing and finishing
- Suitable for wet and dry processing
- Available in short, long and overlong versions
- With BUI coating





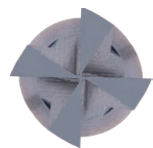
BASIC U1 CHAMFMAKER (M09) Z3-4

- For universal chamfering of components
- Designed for contouring
- Available in 60° and 90°
- Available as HA and HB
- Now with improved BUI coating



BASIC U1 FB CHAMFMAKER (M10) Z4

- For universal chamfering of components
- Designed for contouring
- Forward and backward cutting
- Now with improved BUI coating



BASIC U1 ROUNDMAKER (M11) Z4

- For the universal production of radii on components
- Deburring edges with contours
- Now with improved BUI coating



BASIC U1 FB ROUNDMAKER (M12) Z4

- For universal attachment of radii to components
- Narrow tolerance for high dimensional accuracy
- Forward and backward cutting
- Now with improved BUI coating

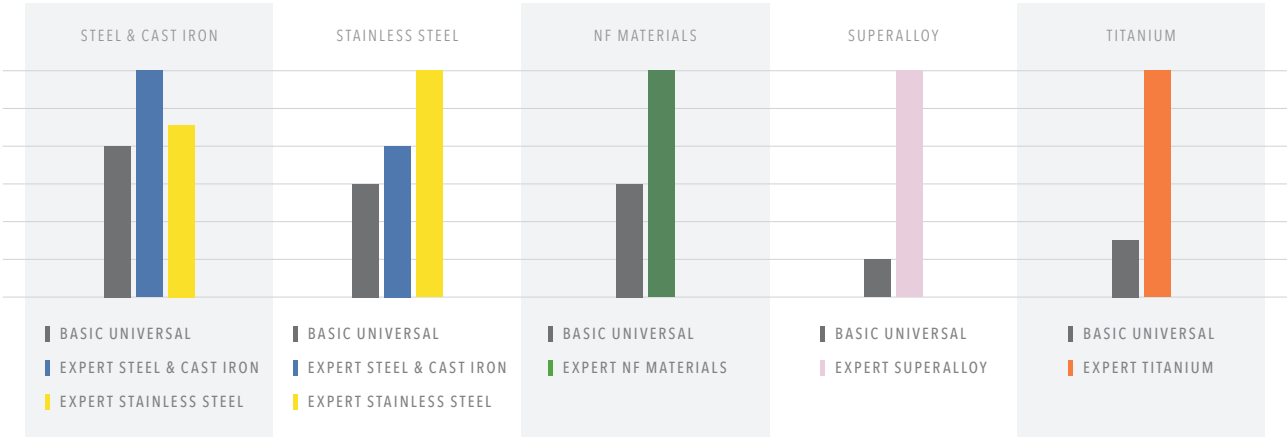


APPLICATION EXAMPLES

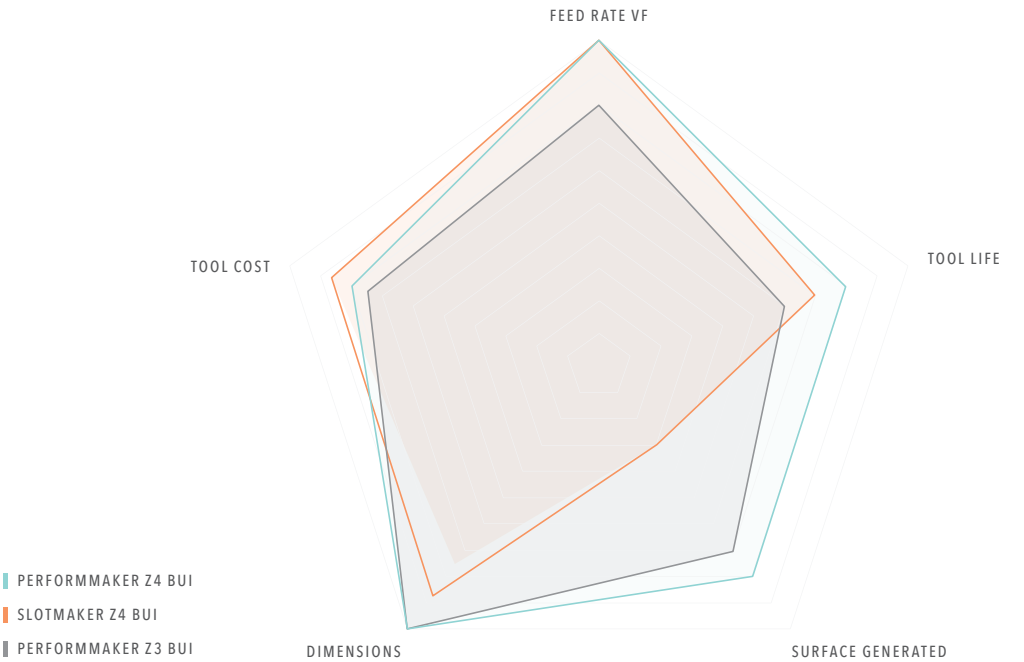
THE BCU1 SERIES IN COMPARISON TO OUR EXPERT SERIES

The **BCU1 series** stands out due to its excellent price/performance ratio and the wide range of possible uses for the tools. The milling cutters in this range can be used on different materials with solid results. Our Expert Series, on the other hand, are specially tailored to one particular area of application and deliver optimum machining performance with the corresponding materials. In order to illustrate the differences in terms of equipment and performance between the BCU1 Series and the Expert Series, we carried out various scenarios and presented the results visually.

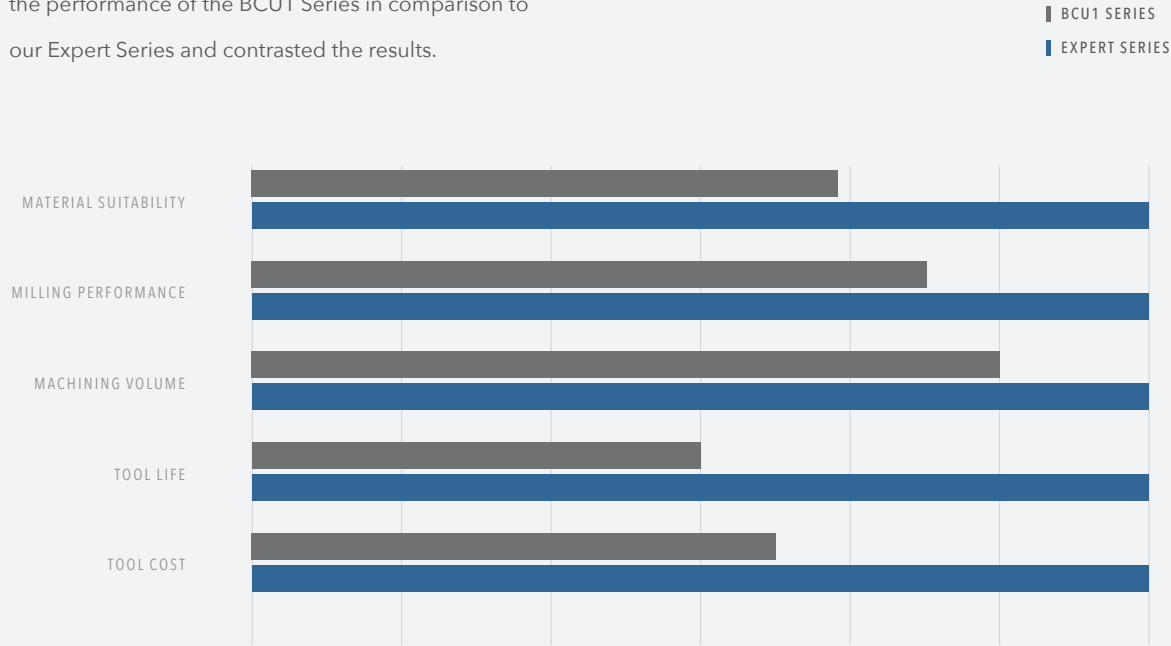
We have tested both the BCU1 Series and the Expert Series with the materials mentioned. Compared with the Expert Series, which are each specially designed for a specific area of application, the BCU1 Series has successfully proven its versatility in internal tests. The results of the service life comparisons are shown in the following diagrams.



The tool matrix for our BCU1 Series compares the performance of individual milling cutters within the series. The values clearly show the performance in relation to the respective property in order to help you choose the right tool for every requirement.



Based on the aforementioned criteria, we determined the performance of the BCU1 Series in comparison to our Expert Series and contrasted the results.



BETA UNI IRON

BUI | Cost-effective and reliable versatile coating for a wide range of applications

BetaUni Iron is an AlCrN-based coating that was developed for demanding universal machining. Thanks to a simple and proven composition, it delivers universally good results for price-sensitive applications.

Due to its nanostructuring, the coating can be used for a wide range of applications and is suitable for use on a wide variety of tool types such as mould tools, shank tools and roughing tools. This reliable universal coating delivers solid results when machining non-ferrous materials, stainless steel, steel and cast iron. It is even possible to machine hard-to-cut materials such as titanium, superalloy and hardened steel in secondary application areas.

PROPERTIES Key features of the BetaUni Iron coating include the following:

- Smooth surfaces due to nanostructuring
- Reduction of built-up edges and cold welds
- High wear resistance thanks to high temperature stability and oxidation resistance

BETAUNI IRON AT A GLANCE	
Structure	Nanostructured
Composition	Aluminium chromium nitride
Layer thickness	2-3 µm
Layer hardness	approx. 3200 HV
Adhesion factor	Friction coefficient: approx. 0.5 (dry on steel)
Max. operating temperature	approx. 1000 °C
Cooling	Dry and wet processing
Main application	Steel and cast iron, stainless steel, non-ferrous materials
Secondary application (limited suitability)	Titanium, superalloy and hardened steel

DIGITAL SERVICES

DISTRIBUTION PARTNERS

We enable companies around the world to manufacture their products. Therefore we work with reliable partners at an international level to ensure that our milling cutters are always available exactly where they are needed and can be delivered straight into your hands.

FIND OUT MORE
ABOUT OUR GLOBAL
SALES PARTNERS



Browse all BCU1 Series products in our shop

Discover the products in the BCU1 Series online or search for the ideal tool for your application based on various product features. We guarantee, that you will find the perfect milling cutter for your machining needs using our online platform.



WHAT ARE YOU
WAITING FOR?

STILL CAN'T FIND A SUITABLE MILLING CUTTER?

No problem – simply customize an existing tool. Using our configurator for special milling cutters, you can customize existing tools to your needs in an instant or create your own tools based on predefined types.

WE WILL RESPOND TO ALL
REQUESTS SUBMITTED VIA THE
CONFIGURATOR WITHIN ONE
WORKING DAY AT THE LATEST



UPDATE 2021

NUMBERING SYSTEM

DISTINGUISHING FEATURES

PRODUCT LINE	TOOL TYPE	MILLING CUTTER TYPE
BC Basic	D Drilling	01 End mill cutter PERFORMMAKER
EX Expert	M Milling	02 Roughing cutter SLOTMAKER
		03 Trochoidal cutter CHIPMAKER
		04 Finishing cutter MIRRORMAKER
		05 Single flute cutter BALANCEMAKER
		06 Torus cutter FORMMAKER
		07 Face torus cutter BLADEMAKER
		08 Full radius cutter ROWMAKER
		09 Deburring cutter CHAMFMAKER
		10 Forward and backward deburring cutter FB CHAMFMAKER
		11 Corner rounding cutter ROUNDMAKER
		12 Forward and backward corner rounding cutter FB ROUNDMAKER
		13 Engraving cutter TEXTMAKER
		14 Conical cutter SLOPEMAKER
		15 Micro end mill cutter PERFORMMAKER MICRO
		16 Micro torus cutter FORMMAKER MICRO
		17 Micro full radius cutter ROWMAKER MICRO

OTHER DISTINGUISHING FEATURES

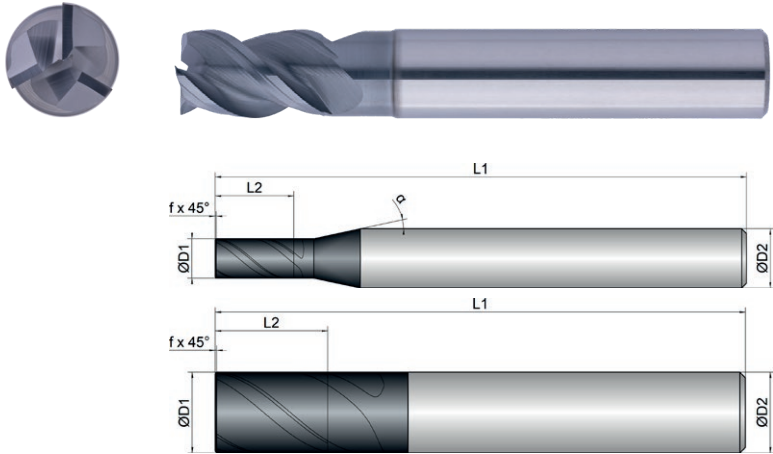
PRODUCT IDENT	DIMENSION
e.g. 0023	3x10 Cutting diameter x length of undercut
	12/0,5 Cutting diameter / corner radius
	10 Diameter



Cooling	
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPC	UNI			
Application					
Features	HA	≠			

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing					Finishing			
inappropriate					optimal			
BCU1-M01-0103	D1 mm Ø	L2 mm	L1 mm	D2 mm Ø	z #	45° mm	°	α °
3	3.0	6.0	54.0	6.0	3	0.10	45	12
4	4.0	8.0	54.0	6.0	3	0.10	45	12
5	5.0	9.0	54.0	6.0	3	0.20	45	12
6	6.0	10.0	54.0	6.0	3	0.20	45	0
8	8.0	12.0	58.0	8.0	3	0.20	45	0
10	10.0	14.0	66.0	10.0	3	0.20	45	0
12	12.0	16.0	73.0	12.0	3	0.20	45	0
16	16.0	22.0	82.0	16.0	3	0.30	45	0
20	20.0	26.0	92.0	20.0	3	0.30	45	0



Download Catalog Pages (PDF)

		Dimension	Ø3		Ø4		Ø5		Ø6		Ø8		Ø10		
Material	Strength (N/mm²)	Infeed in mm	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	
			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD		
			Application												
Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz		
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	170	0.02	0.025	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.06	0.055	0.07
2.1-2.2	Steel, low-alloyed	<950	160	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
3.1-3.2	Steel, high-alloyed	<1100	150	0.012	0.018	0.012	0.018	0.022	0.028	0.032	0.038	0.042	0.052	0.045	0.06
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	190	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	75		0.018		0.02		0.028		0.035		0.052		0.06
2.1	Inox, austenitic	<650	65		0.015		0.018		0.025		0.032		0.048		0.055
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	360	0.02	0.025	0.025	0.04	0.04	0.045	0.045	0.065	0.065	0.085	0.085	0.11
3.1-3.3	Cooper, alloyed	<600	170	0.015	0.02	0.02	0.03	0.03	0.035	0.035	0.055	0.055	0.075	0.075	0.1
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.015		0.018		0.025		0.03		0.045		0.055
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	25		0.01		0.013		0.02		0.025		0.04		0.05

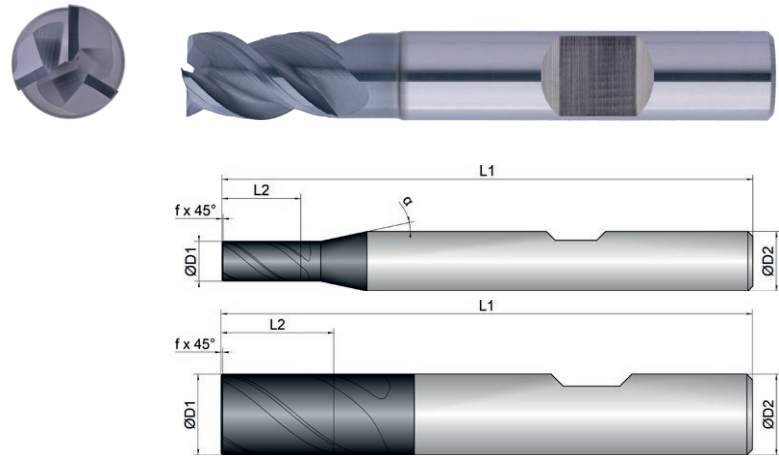
		Dimension	Ø12		Ø16		Ø20				
Material	Strength (N/mm²)	Infeed in mm	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD			
			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD			
			Application								
Feed (mm/Z)	fz	fz	fz	fz	fz	fz					
P		Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	170	0.06	0.08	0.07	0.09	0.09	0.11		
2.1-2.2	Steel, low-alloyed	<950	160	0.055	0.075	0.06	0.08	0.08	0.1		
3.1-3.2	Steel, high-alloyed	<1100	150	0.05	0.07	0.055	0.075	0.075	0.09		
K		Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	190	0.055	0.075	0.07	0.08	0.08	0.1		
M		Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	75		0.07		0.075		0.09		
2.1	Inox, austenitic	<650	65		0.065		0.07		0.08		
N		Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	360	0.11	0.13	0.12	0.14	0.13	0.15		
3.1-3.3	Cooper, alloyed	<600	170	0.1	0.12	0.11	0.13	0.12	0.14		
T		Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.065		0.07		0.08		
S		Vc (m/min)									
1.1-1.3	Super alloys	<1450	25		0.06		0.065		0.075		

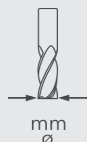
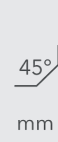
NOTE | The values marked in turquoise are side applications!

Cooling	   
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPC	UNI				 Basic
Application						
Features	HB	≠				

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing					Finishing				
inappropriateoptimal					inappropriateoptimal				
BCU1-M01-0104	D1	L2	L1	D2	z			α	
									
	mm ø	mm	mm	mm ø	#	mm	°	°	
	3	3.0	6.0	54.0	6.0	3	0.10	45	12
	4	4.0	8.0	54.0	6.0	3	0.10	45	12
	5	5.0	9.0	54.0	6.0	3	0.20	45	12
	6	6.0	10.0	54.0	6.0	3	0.20	45	0
	8	8.0	12.0	58.0	8.0	3	0.20	45	0
	10	10.0	14.0	66.0	10.0	3	0.20	45	0
	12	12.0	16.0	73.0	12.0	3	0.20	45	0
16	16.0	22.0	82.0	16.0	3	0.30	45	0	
20	20.0	26.0	92.0	20.0	3	0.30	45	0	



Download Catalog
Pages (PDF)

 Download Catalog Pages (PDF)			Dimension		Ø3		Ø4		Ø5		Ø6		Ø8		Ø10		
			Infeed in mm	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD
				ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	
				Application													
Material	Strength (N/mm²)	Feed (mm/Z)	fz		fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz		
P			Vc (m/min)														
1.1-1.3	Steel, unalloyed	<850	170	0.02	0.025	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.06	0.055	0.07		
2.1-2.2	Steel, low-alloyed	<950	160	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065		
3.1-3.2	Steel, high-alloyed	<1100	150	0.012	0.018	0.012	0.018	0.022	0.028	0.032	0.038	0.042	0.052	0.045	0.06		
K			Vc (m/min)														
1.1-1.2	Grey cast iron	<1000	190	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065		
M			Vc (m/min)														
1.1	Inox, ferritic/martensitic	<850	75	0.018		0.02		0.028		0.035		0.052		0.06			
2.1	Inox, austenitic	<650	65	0.015		0.018		0.025		0.032		0.048		0.055			
N			Vc (m/min)														
1.1-2.3	Alu, alloyed, casted	<600	360	0.02	0.025	0.025	0.04	0.04	0.045	0.045	0.065	0.065	0.085	0.085	0.11		
3.1-3.3	Cooper, alloyed	<600	170	0.015	0.02	0.02	0.03	0.03	0.035	0.035	0.055	0.055	0.075	0.075	0.1		
T			Vc (m/min)														
2.1-2.2	Titanium, pure, alloyed	<1000	50	0.015		0.018		0.025		0.03		0.045		0.055			
S			Vc (m/min)														
1.1-1.3	Super alloys	<1450	25	0.01		0.013		0.02		0.025		0.04		0.05			
			Dimension	Ø12		Ø16		Ø20									
			Infeed in mm	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD								
				ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD								
				Application													
Material	Strength (N/mm²)	Feed (mm/Z)	fz		fz	fz	fz	fz	fz								
P			Vc (m/min)														
1.1-1.3	Steel, unalloyed	<850	170	0.06	0.08	0.07	0.09	0.09	0.11								
2.1-2.2	Steel, low-alloyed	<950	160	0.055	0.075	0.06	0.08	0.08	0.1								
3.1-3.2	Steel, high-alloyed	<1100	150	0.05	0.07	0.055	0.075	0.075	0.09								
K			Vc (m/min)														
1.1-1.2	Grey cast iron	<1000	190	0.055	0.075	0.07	0.08	0.08	0.1								
M			Vc (m/min)														
1.1	Inox, ferritic/martensitic	<850	75	0.07		0.075		0.09									
2.1	Inox, austenitic	<650	65	0.065		0.07		0.08									
N			Vc (m/min)														
1.1-2.3	Alu, alloyed, casted	<600	360	0.11	0.13	0.12	0.14	0.13	0.15								
3.1-3.3	Cooper, alloyed	<600	170	0.1	0.12	0.11	0.13	0.12	0.14								
T			Vc (m/min)														
2.1-2.2	Titanium, pure, alloyed	<1000	50	0.065		0.07		0.08									
S			Vc (m/min)														
1.1-1.3	Super alloys	<1450	25	0.06		0.065		0.075									
NOTE The values marked in turquoise are side applications!																	

Cooling









Tolerance

e8

Coating

BetaUni Iron

Strategy

HPC

UNI

Application









Features

HA

≠

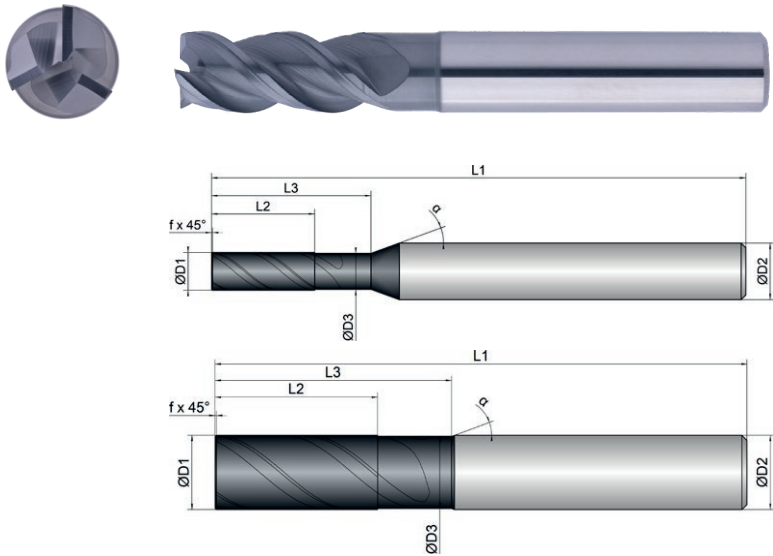




Basic



- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing						Finishing				
inappropriateoptimal						inappropriateoptimal				
BCU1-M01-0113	D1	D3	L2	L3	L1	D2	z			α
										
	mm ø	mm ø	mm	mm	mm	mm ø	#	mm	°	°
3	3.0	2.8	8.0	13.0	57.0	6.0	3	0.10	45	20
4	4.0	3.8	11.0	17.0	57.0	6.0	3	0.10	45	20
5	5.0	4.8	13.0	20.0	57.0	6.0	3	0.20	45	20
6	6.0	5.8	13.0	20.0	57.0	6.0	3	0.20	45	20
8	8.0	7.7	19.0	25.0	63.0	8.0	3	0.20	45	20
10	10.0	9.7	22.0	32.0	72.0	10.0	3	0.20	45	20
12	12.0	11.6	26.0	38.0	83.0	12.0	3	0.20	45	20
16	16.0	15.5	32.0	44.0	92.0	16.0	3	0.30	45	20
20	20.0	19.5	41.0	54.0	104.0	20.0	3	0.30	45	20



Download Catalog Pages (PDF)

		Dimension	Ø3		Ø4		Ø5		Ø6		Ø8		Ø10		
Infeed in mm			ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	
Application			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	
															
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	170	0.02	0.025	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.06	0.055	0.07
2.1-2.2	Steel, low-alloyed	<950	160	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
3.1-3.2	Steel, high-alloyed	<1100	150	0.012	0.018	0.012	0.018	0.022	0.028	0.032	0.038	0.042	0.052	0.045	0.06
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	190	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	75		0.018		0.02		0.028		0.035		0.052		0.06
2.1	Inox, austenitic	<650	65		0.015		0.018		0.025		0.032		0.048		0.055
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	360	0.02	0.025	0.025	0.04	0.04	0.045	0.045	0.065	0.065	0.085	0.085	0.11
3.1-3.3	Cooper, alloyed	<600	170	0.015	0.02	0.02	0.03	0.03	0.035	0.035	0.055	0.055	0.075	0.075	0.1
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.015		0.018		0.025		0.03		0.045		0.055
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	25		0.01		0.013		0.02		0.025		0.04		0.05

		Dimension	Ø12		Ø16		Ø20				
Infeed in mm			ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD			
Application			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD			
											
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz			
P		Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	170	0.06	0.08	0.07	0.09	0.09	0.11		
2.1-2.2	Steel, low-alloyed	<950	160	0.055	0.075	0.06	0.08	0.08	0.1		
3.1-3.2	Steel, high-alloyed	<1100	150	0.05	0.07	0.055	0.075	0.075	0.09		
K		Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	190	0.055	0.075	0.07	0.08	0.08	0.1		
M		Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	75		0.07		0.075		0.09		
2.1	Inox, austenitic	<650	65		0.065		0.07		0.08		
N		Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	360	0.11	0.13	0.12	0.14	0.13	0.15		
3.1-3.3	Cooper, alloyed	<600	170	0.1	0.12	0.11	0.13	0.12	0.14		
T		Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.065		0.07		0.08		
S		Vc (m/min)									
1.1-1.3	Super alloys	<1450	25		0.06		0.065		0.075		

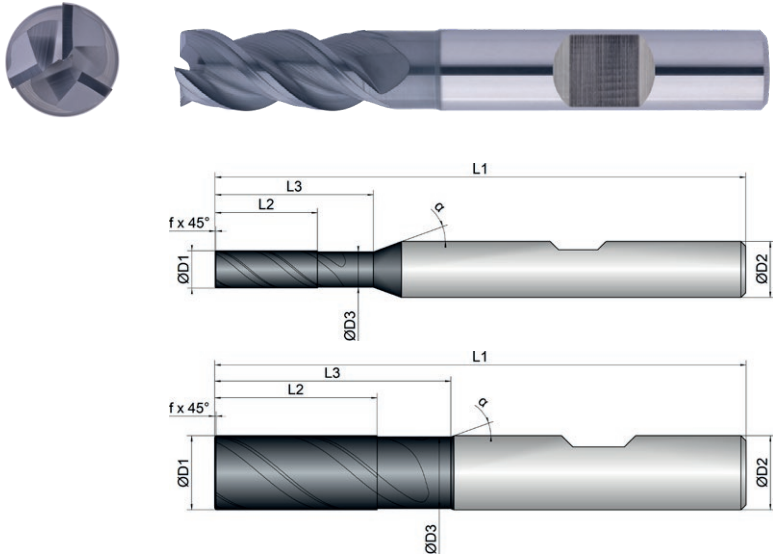
NOTE | The values marked in turquoise are side applications!

Cooling	
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPCUNI	
Application		
Features	HB≠	



- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing						Finishing					
inappropriate						inappropriate					
						optimal					

BCU1-M01-0114	D1 mm Ø	D3 mm Ø	L2 mm	L3 mm	L1 mm	D2 mm Ø	z #	45° mm	°	α °
3	3.0	2.8	8.0	13.0	57.0	6.0	3	0.10	45	20
4	4.0	3.8	11.0	17.0	57.0	6.0	3	0.10	45	20
5	5.0	4.8	13.0	20.0	57.0	6.0	3	0.20	45	20
6	6.0	5.8	13.0	20.0	57.0	6.0	3	0.20	45	20
8	8.0	7.7	19.0	25.0	63.0	8.0	3	0.20	45	20
10	10.0	9.7	22.0	32.0	72.0	10.0	3	0.20	45	20
12	12.0	11.6	26.0	38.0	83.0	12.0	3	0.20	45	20
16	16.0	15.5	32.0	44.0	92.0	16.0	3	0.30	45	20
20	20.0	19.5	41.0	54.0	104.0	20.0	3	0.30	45	20



Download Catalog Pages (PDF)

 Download Catalog Pages (PDF)			Dimension		Ø3		Ø4		Ø5		Ø6		Ø8		Ø10		
			Infeed in mm	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD
				ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD
				Application													
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz		
P			Vc (m/min)														
1.1-1.3	Steel, unalloyed	<850	170	0.02	0.025	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.06	0.055	0.07		
2.1-2.2	Steel, low-alloyed	<950	160	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065		
3.1-3.2	Steel, high-alloyed	<1100	150	0.012	0.018	0.012	0.018	0.022	0.028	0.032	0.038	0.042	0.052	0.045	0.06		
K			Vc (m/min)														
1.1-1.2	Grey cast iron	<1000	190	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065		
M			Vc (m/min)														
1.1	Inox, ferritic/martensitic	<850	75		0.018		0.02		0.028		0.035		0.052		0.06		
2.1	Inox, austenitic	<650	65		0.015		0.018		0.025		0.032		0.048		0.055		
N			Vc (m/min)														
1.1-2.3	Alu, alloyed, casted	<600	360	0.02	0.025	0.025	0.04	0.04	0.045	0.045	0.065	0.065	0.085	0.085	0.11		
3.1-3.3	Cooper, alloyed	<600	170	0.015	0.02	0.02	0.03	0.03	0.035	0.035	0.055	0.055	0.075	0.075	0.1		
T			Vc (m/min)														
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.015		0.018		0.025		0.03		0.045		0.055		
S			Vc (m/min)														
1.1-1.3	Super alloys	<1450	25		0.01		0.013		0.02		0.025		0.04		0.05		

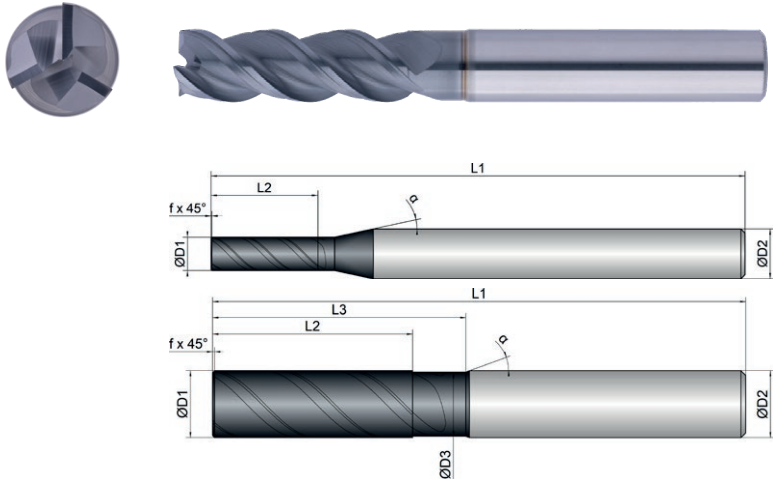
			Dimension	Ø 12		Ø 16		Ø 20					
			Infeed in mm	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD				
				ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD				
				Application									
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz					
P			Vc (m/min)										
1.1-1.3	Steel, unalloyed	<850	170	0.06	0.08	0.07	0.09	0.09	0.11				
2.1-2.2	Steel, low-alloyed	<950	160	0.055	0.075	0.06	0.08	0.08	0.1				
3.1-3.2	Steel, high-alloyed	<1100	150	0.05	0.07	0.055	0.075	0.075	0.09				
K			Vc (m/min)										
1.1-1.2	Grey cast iron	<1000	190	0.055	0.075	0.07	0.08	0.08	0.1				
M			Vc (m/min)										
1.1	Inox, ferritic/martensitic	<850	75	0.07		0.075		0.09					
2.1	Inox, austenitic	<650	65	0.065		0.07		0.08					
N			Vc (m/min)										
1.1-2.3	Alu, alloyed, casted	<600	360	0.11	0.13	0.12	0.14	0.13	0.15				
3.1-3.3	Cooper, alloyed	<600	170	0.1	0.12	0.11	0.13	0.12	0.14				
T			Vc (m/min)										
2.1-2.2	Titanium, pure, alloyed	<1000	50	0.065		0.07		0.08					
S			Vc (m/min)										
1.1-1.3	Super alloys	<1450	25	0.06		0.065		0.075					

NOTE | The values marked in turquoise are side applications!

Cooling	
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPC	UNI			Basic
Application					
Features	HA	≠			

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing						Finishing				
inappropriateoptimal						inappropriateoptimal				
BCU1-M01-0123	D1	D3	L2	L3	L1	D2	z			α
	mm ø	mm ø	mm	mm	mm	mm ø	#	mm	°	°
4	4.0	0.0	13.0	0.0	65.0	6.0	3	0.10	45	12
5	5.0	0.0	16.0	0.0	65.0	6.0	3	0.20	45	12
6	6.0	5.6	18.0	24.0	65.0	6.0	3	0.20	45	20
8	8.0	7.6	24.0	30.0	70.0	8.0	3	0.20	45	20
10	10.0	9.6	30.0	38.0	80.0	10.0	3	0.20	45	20
12	12.0	11.4	36.0	46.0	93.0	12.0	3	0.20	45	20
16	16.0	15.4	48.0	58.0	110.0	16.0	3	0.30	45	20
20	20.0	19.4	60.0	74.0	126.0	20.0	3	0.30	45	20



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Dimension		Ø 4		Ø 5		Ø 6		Ø 8		Ø 10		Ø 12			
Infeed in mm		ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD		
		ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD			
Application															
Material		Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz		
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	160	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065	0.055	0.075
2.1-2.2	Steel, low-alloyed	<950	150	0.012	0.018	0.022	0.028	0.032	0.035	0.04	0.05	0.045	0.06	0.05	0.07
3.1-3.2	Steel, high-alloyed	<1100	140	0.01	0.015	0.02	0.025	0.03	0.032	0.038	0.048	0.04	0.055	0.045	0.065
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	175	0.012	0.018	0.025	0.028	0.032	0.035	0.04	0.05	0.045	0.06	0.05	0.07
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	70		0.015		0.025		0.032		0.048		0.055		0.065
2.1	Inox, austenitic	<650	55		0.012		0.022		0.03		0.045		0.05		0.06
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	340	0.025	0.04	0.04	0.045	0.045	0.065	0.065	0.085	0.085	0.11	0.11	0.13
3.1-3.3	Cooper, alloyed	<600	160	0.02	0.03	0.03	0.035	0.035	0.055	0.055	0.075	0.075	0.1	0.1	0.12
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	45		0.012		0.022		0.03		0.045		0.05		0.06
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	20		0.01		0.018		0.025		0.04		0.045		0.055

Dimension		Ø 16		Ø 20										
Infeed in mm		ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD									
		ap=1xD	ap=1xD	ap=1xD	ap=1xD									
Application														
Material		Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz							
P		Vc (m/min)												
1.1-1.3	Steel, unalloyed	<850	160	0.065	0.085	0.085	0.1							
2.1-2.2	Steel, low-alloyed	<950	150	0.055	0.075	0.075	0.09							
3.1-3.2	Steel, high-alloyed	<1100	140	0.05	0.07	0.07	0.08							
K		Vc (m/min)												
1.1-1.2	Grey cast iron	<1000	175	0.055	0.075	0.075	0.09							
M		Vc (m/min)												
1.1	Inox, ferritic/martensitic	<850	70		0.07		0.08							
2.1	Inox, austenitic	<650	55		0.06		0.07							
N		Vc (m/min)												
1.1-2.3	Alu, alloyed, casted	<600	340	0.12	0.14	0.13	0.15							
3.1-3.3	Cooper, alloyed	<600	160	0.11	0.13	0.12	0.14							
T		Vc (m/min)												
2.1-2.2	Titanium, pure, alloyed	<1000	45		0.06		0.07							
S		Vc (m/min)												
1.1-1.3	Super alloys	<1450	20		0.055		0.065							

NOTE | The values marked in turquoise are side applications!

NOTE | The values marked in turquoise are side applications!

30 | BCU1 SERIES

BCU1 SERIES | 31

Cooling	   
Tolerance	e8
Coating	BetaUni Iron

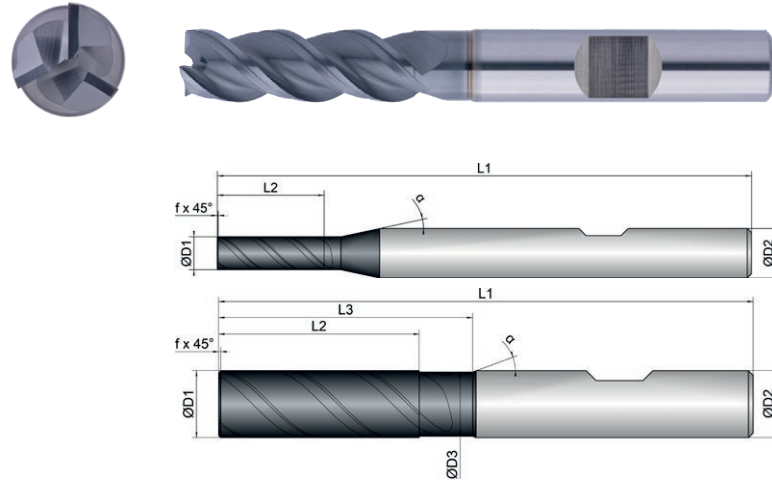
Strategy	HPC	UNI		
Application				
Features	HB	≠		

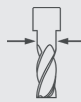
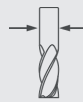


Basic



- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing						Finishing					
inappropriateoptimal						inappropriateoptimal					
BCU1-M01-0124	D1	D3	L2	L3	L1	D2	z				
											
	mm ø	mm ø	mm	mm	mm	mm ø	#	mm	°	°	
	4	4.0	0.0	13.0	0.0	65.0	6.0	3	0.10	45	12
	5	5.0	0.0	16.0	0.0	65.0	6.0	3	0.20	45	12
	6	6.0	5.6	18.0	24.0	65.0	6.0	3	0.20	45	20
	8	8.0	7.6	24.0	30.0	70.0	8.0	3	0.20	45	20
	10	10.0	9.6	30.0	38.0	80.0	10.0	3	0.20	45	20
	12	12.0	11.4	36.0	46.0	93.0	12.0	3	0.20	45	20
	16	16.0	15.4	48.0	58.0	110.0	16.0	3	0.30	45	20
20	20.0	19.4	60.0	74.0	126.0	20.0	3	0.30	45	20	



Download Catalog
Pages (PDF)

	Download Catalog Pages (PDF)		Dimension	Infeed in mm	Ø4		Ø5		Ø6		Ø8		Ø10		Ø12	
					ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD
					ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD
Material	Strength (N/mm²)	Application	Feed (mm/Z)													
				fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz
P			Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	160	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065	0.055	0.075	
2.1-2.2	Steel, low-alloyed	<950	150	0.012	0.018	0.022	0.028	0.032	0.035	0.04	0.05	0.045	0.06	0.05	0.07	
3.1-3.2	Steel, high-alloyed	<1100	140	0.01	0.015	0.02	0.025	0.03	0.032	0.038	0.048	0.04	0.055	0.045	0.065	
K			Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	175	0.012	0.018	0.025	0.028	0.032	0.035	0.04	0.05	0.045	0.06	0.05	0.07	
M			Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	70		0.015		0.025		0.032		0.048		0.055		0.065	
2.1	Inox, austenitic	<650	55		0.012		0.022		0.03		0.045		0.05		0.06	
N			Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	340	0.025	0.04	0.04	0.045	0.045	0.065	0.065	0.085	0.085	0.11	0.11	0.13	
3.1-3.3	Cooper, alloyed	<600	160	0.02	0.03	0.03	0.035	0.035	0.055	0.055	0.075	0.075	0.1	0.1	0.12	
T			Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	45		0.012		0.022		0.03		0.045		0.05		0.06	
S			Vc (m/min)													
1.1-1.3	Super alloys	<1450	20		0.01		0.018		0.025		0.04		0.045		0.055	

			Dimension	Ø 16		Ø 20					
			Infeed in mm	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD				
				ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD				
				Application							
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz					
P			Vc (m/min)								
1.1-1.3	Steel, unalloyed	<850	160	0.065	0.085	0.085	0.1				
2.1-2.2	Steel, low-alloyed	<950	150	0.055	0.075	0.075	0.09				
3.1-3.2	Steel, high-alloyed	<1100	140	0.05	0.07	0.07	0.08				
K			Vc (m/min)								
1.1-1.2	Grey cast iron	<1000	175	0.055	0.075	0.075	0.09				
M			Vc (m/min)								
1.1	Inox, ferritic/martensitic	<850	70		0.07		0.08				
2.1	Inox, austenitic	<650	55		0.06		0.07				
N			Vc (m/min)								
1.1-2.3	Alu, alloyed, casted	<600	340	0.12	0.14	0.13	0.15				
3.1-3.3	Cooper, alloyed	<600	160	0.11	0.13	0.12	0.14				
T			Vc (m/min)								
2.1-2.2	Titanium, pure, alloyed	<1000	45		0.06		0.07				
S			Vc (m/min)								
1.1-1.3	Super alloys	<1450	20		0.055		0.065				

NOTE | The values marked in turquoise are side applications!

Cooling

Tolerance

e8

Coating

BetaUni Iron

Strategy

HPCUNI

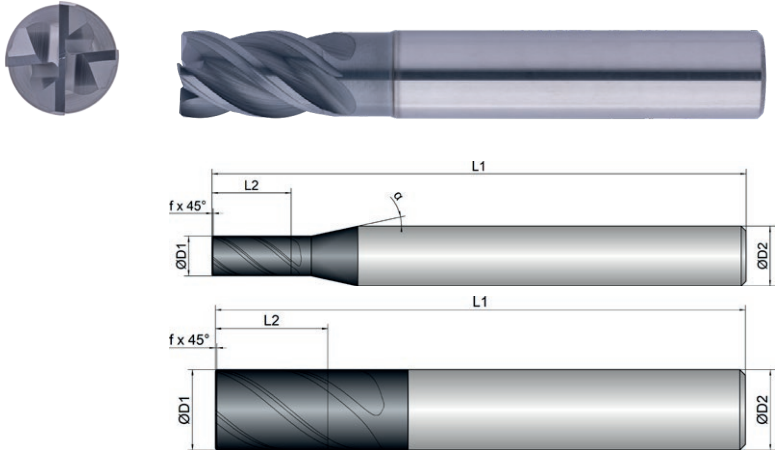
Application

Features

HA≠

Basic

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing					Finishing			
inappropriateoptimal					inappropriateoptimal			
BCU1-M01-0203	D1 mm ø	L2 mm	L1 mm	D2 mm ø	z #	 mm	 °	α °
3	3.0	6.0	54.0	6.0	4	0.10	40	12
4	4.0	8.0	54.0	6.0	4	0.10	40	12
5	5.0	9.0	54.0	6.0	4	0.20	40	12
6	6.0	10.0	54.0	6.0	4	0.20	40	0
8	8.0	12.0	58.0	8.0	4	0.20	40	0
10	10.0	14.0	66.0	10.0	4	0.20	40	0
12	12.0	16.0	73.0	12.0	4	0.20	40	0
16	16.0	22.0	82.0	16.0	4	0.30	40	0
20	20.0	26.0	92.0	20.0	4	0.30	40	0

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		Dimension	Ø3		Ø4		Ø5		Ø6		Ø8		Ø10		
Infeed in mm			ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	
			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	
Application															
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	170	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
2.1-2.2	Steel, low-alloyed	<950	160	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
3.1-3.2	Steel, high-alloyed	<1100	150	0.01	0.012	0.01	0.012	0.02	0.025	0.028	0.032	0.038	0.048	0.042	0.055
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	190	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	75		0.015		0.018		0.025		0.032		0.048		0.055
2.1	Inox, austenitic	<650	65		0.012		0.015		0.022		0.03		0.045		0.05
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	360	0.015	0.02	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1
3.1-3.3	Cooper, alloyed	<600	170	0.012	0.015	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.012		0.015		0.022		0.028		0.04		0.05
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	25		0.01		0.012		0.018		0.022		0.035		0.045

Dimension

Infeed in mm

Application

		Ø12	Ø16		Ø20				
ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD				
ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD				

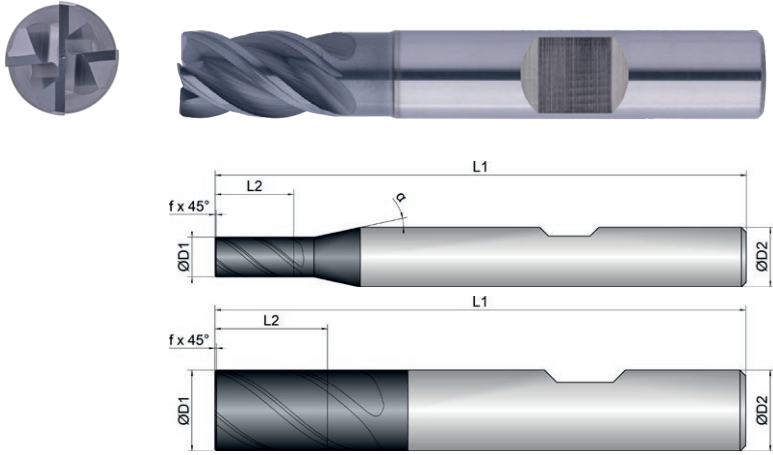
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)							
1.1-1.3	Steel, unalloyed	<850	170	0.055	0.075	0.065	0.085	0.08	0.1
2.1-2.2	Steel, low-alloyed	<950	160	0.05	0.07	0.055	0.075	0.07	0.09
3.1-3.2	Steel, high-alloyed	<1100	150	0.045	0.065	0.05	0.07	0.065	0.08
K		Vc (m/min)							
1.1-1.2	Grey cast iron	<1000	190	0.05	0.07	0.055	0.075	0.07	0.09
M		Vc (m/min)							
1.1	Inox, ferritic/martensitic	<850	75		0.06		0.065		0.08
2.1	Inox, austenitic	<650	65		0.055		0.06		0.07
N		Vc (m/min)							
1.1-2.3	Alu, alloyed, casted	<600	360	0.1	0.12	0.11	0.13	0.12	0.14
3.1-3.3	Cooper, alloyed	<600	170	0.09	0.11	0.1	0.12	0.11	0.13
T		Vc (m/min)							
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.055		0.06		0.07
S		Vc (m/min)							
1.1-1.3	Super alloys	<1450	25		0.05		0.055		0.065

NOTE | The values marked in turquoise are side applications!

Cooling	
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPC	UNI				Basic
Application						
Features	HB	≠				

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing					Finishing			
inappropriateoptimal					inappropriateoptimal			
BCU1-M01-0204	D1 mm ø	L2 mm	L1 mm	D2 mm ø	z #	45° mm	°	α °
3	3.0	6.0	54.0	6.0	4	0.10	40	12
4	4.0	8.0	54.0	6.0	4	0.10	40	12
5	5.0	9.0	54.0	6.0	4	0.20	40	12
6	6.0	10.0	54.0	6.0	4	0.20	40	0
8	8.0	12.0	58.0	8.0	4	0.20	40	0
10	10.0	14.0	66.0	10.0	4	0.20	40	0
12	12.0	16.0	73.0	12.0	4	0.20	40	0
16	16.0	22.0	82.0	16.0	4	0.30	40	0
20	20.0	26.0	92.0	20.0	4	0.30	40	0

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Dimension		Ø3		Ø4		Ø5		Ø6		Ø8		Ø10			
Infeed in mm	Application	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD		
		ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD			
Application															
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz		
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	170	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
2.1-2.2	Steel, low-alloyed	<950	160	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
3.1-3.2	Steel, high-alloyed	<1100	150	0.01	0.012	0.01	0.012	0.02	0.025	0.028	0.032	0.038	0.048	0.042	0.055
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	190	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	75		0.015		0.018		0.025		0.032		0.048		0.055
2.1	Inox, austenitic	<650	65		0.012		0.015		0.022		0.03		0.045		0.05
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	360	0.015	0.02	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1
3.1-3.3	Cooper, alloyed	<600	170	0.012	0.015	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.012		0.015		0.022		0.028		0.04		0.05
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	25		0.01		0.012		0.018		0.022		0.035		0.045

Dimension		Ø12		Ø16		Ø20				
Infeed in mm	Application	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD			
		ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD			
Application										
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz		
P		Vc (m/min)								
1.1-1.3	Steel, unalloyed	<850	170	0.055	0.075	0.065	0.085	0.08	0.1	
2.1-2.2	Steel, low-alloyed	<950	160	0.05	0.07	0.055	0.075	0.07	0.09	
3.1-3.2	Steel, high-alloyed	<1100	150	0.045	0.065	0.05	0.07	0.065	0.08	
K		Vc (m/min)								
1.1-1.2	Grey cast iron	<1000	190	0.05	0.07	0.055	0.075	0.07	0.09	
M		Vc (m/min)								
1.1	Inox, ferritic/martensitic	<850	75		0.06		0.065		0.08	
2.1	Inox, austenitic	<650	65		0.055		0.06		0.07	
N		Vc (m/min)								
1.1-2.3	Alu, alloyed, casted	<600	360	0.1	0.12	0.11	0.13	0.12	0.14	
3.1-3.3	Cooper, alloyed	<600	170	0.09	0.11	0.1	0.12	0.11	0.13	
T		Vc (m/min)								
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.055		0.06		0.07	
S		Vc (m/min)								
1.1-1.3	Super alloys	<1450	25		0.05		0.055		0.065	

NOTE | The values marked in turquoise are side applications!

Cooling









Tolerance

e8

Coating

BetaUni Iron

Strategy

HPC

UNI

Application









Features

HA

≠

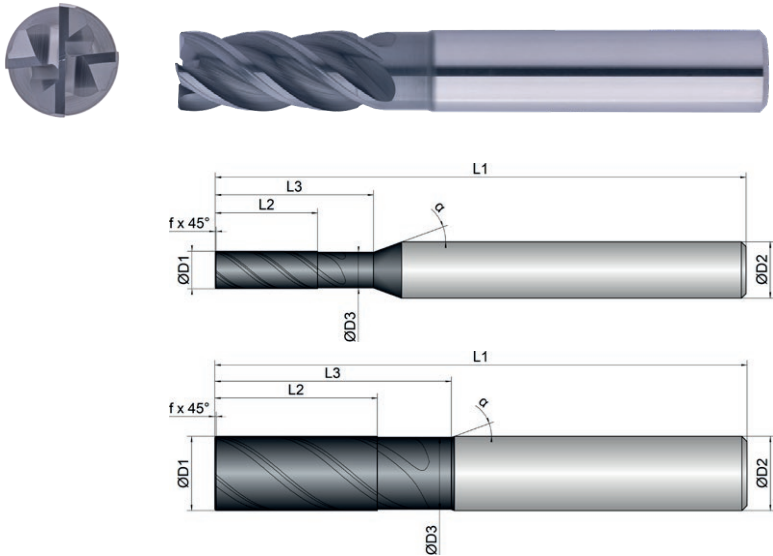




Basic



- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing

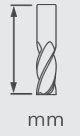
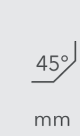
inappropriate

optimal

Finishing

inappropriate

optimal

BCU1-M01-0213	D1	D3	L2	L3	L1	D2	z			α
										
3	3.0	2.8	8.0	13.0	57.0	6.0	4	0.10	40	20
4	4.0	3.8	11.0	17.0	57.0	6.0	4	0.10	40	20
5	5.0	4.8	13.0	20.0	57.0	6.0	4	0.20	40	20
6	6.0	5.8	13.0	20.0	57.0	6.0	4	0.20	40	20
8	8.0	7.7	19.0	25.0	63.0	8.0	4	0.20	40	20
10	10.0	9.7	22.0	32.0	72.0	10.0	4	0.20	40	20
12	12.0	11.6	26.0	38.0	83.0	12.0	4	0.20	40	20
16	16.0	15.5	32.0	44.0	92.0	16.0	4	0.30	40	20
20	20.0	19.5	41.0	54.0	104.0	20.0	4	0.30	40	20



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		Dimension	Ø3		Ø4		Ø5		Ø6		Ø8		Ø10		
Infeed in mm			ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	
Application															
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	170	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
2.1-2.2	Steel, low-alloyed	<950	160	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
3.1-3.2	Steel, high-alloyed	<1100	150	0.01	0.012	0.01	0.012	0.02	0.025	0.028	0.032	0.038	0.048	0.042	0.055
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	190	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	75		0.015		0.018		0.025		0.032		0.048		0.055
2.1	Inox, austenitic	<650	65		0.012		0.015		0.022		0.03		0.045		0.05
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	360	0.015	0.02	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1
3.1-3.3	Cooper, alloyed	<600	170	0.012	0.015	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.012		0.015		0.022		0.028		0.04		0.05
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	25		0.01		0.012		0.018		0.022		0.035		0.045

		Dimension	Ø12		Ø16		Ø20				
Infeed in mm			ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD			
Application											
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz			
P		Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	170	0.055	0.075	0.065	0.085	0.08	0.1		
2.1-2.2	Steel, low-alloyed	<950	160	0.05	0.07	0.055	0.075	0.07	0.09		
3.1-3.2	Steel, high-alloyed	<1100	150	0.045	0.065	0.05	0.07	0.065	0.08		
K		Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	190	0.05	0.07	0.055	0.075	0.07	0.09		
M		Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	75		0.06		0.065		0.08		
2.1	Inox, austenitic	<650	65		0.055		0.06		0.07		
N		Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	360	0.1	0.12	0.11	0.13	0.12	0.14		
3.1-3.3	Cooper, alloyed	<600	170	0.09	0.11	0.1	0.12	0.11	0.13		
T		Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.055		0.06		0.07		
S		Vc (m/min)									
1.1-1.3	Super alloys	<1450	25		0.05		0.055		0.065		

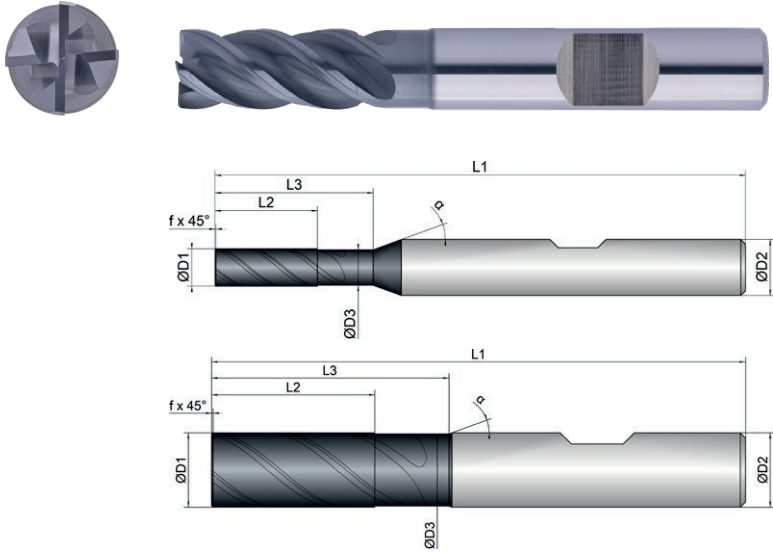
NOTE | The values marked in turquoise are side applications!

Cooling	
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPCUNI	
Application		
Features	HB≠	



- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing					Finishing				
inappropriate					inappropriate				
optimal					optimal				

BCU1-M01-0214	D1 mm ø	D3 mm ø	L2 mm	L3 mm	L1 mm	D2 mm ø	z #	45° mm	°	α °
3	3.0	2.8	8.0	13.0	57.0	6.0	4	0.10	40	20
4	4.0	3.8	11.0	17.0	57.0	6.0	4	0.10	40	20
5	5.0	4.8	13.0	20.0	57.0	6.0	4	0.20	40	20
6	6.0	5.8	13.0	20.0	57.0	6.0	4	0.20	40	20
8	8.0	7.7	19.0	25.0	63.0	8.0	4	0.20	40	20
10	10.0	9.7	22.0	32.0	72.0	10.0	4	0.20	40	20
12	12.0	11.6	26.0	38.0	83.0	12.0	4	0.20	40	20
16	16.0	15.5	32.0	44.0	92.0	16.0	4	0.30	40	20
20	20.0	19.5	41.0	54.0	104.0	20.0	4	0.30	40	20



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		Dimension	Ø3		Ø4		Ø5		Ø6		Ø8		Ø10		
Infeed in mm			ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	
Application			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	
															
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	170	0.015	0.02	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.055	0.05	0.065
2.1-2.2	Steel, low-alloyed	<950	160	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
3.1-3.2	Steel, high-alloyed	<1100	150	0.01	0.012	0.01	0.012	0.02	0.025	0.028	0.032	0.038	0.048	0.042	0.055
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	190	0.012	0.015	0.012	0.015	0.022	0.028	0.03	0.035	0.04	0.05	0.045	0.06
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	75		0.015		0.018		0.025		0.032		0.048		0.055
2.1	Inox, austenitic	<650	65		0.012		0.015		0.022		0.03		0.045		0.05
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	360	0.015	0.02	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1
3.1-3.3	Cooper, alloyed	<600	170	0.012	0.015	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.012		0.015		0.022		0.028		0.04		0.05
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	25		0.01		0.012		0.018		0.022		0.035		0.045

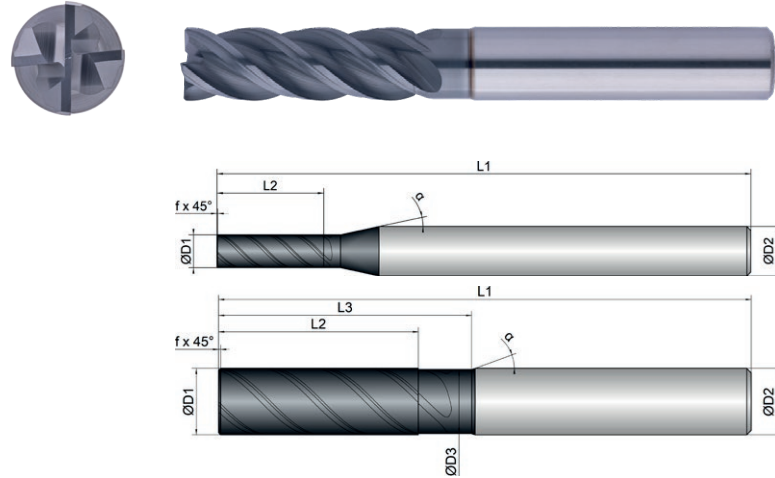
		Dimension	Ø12		Ø16		Ø20				
Infeed in mm			ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD			
Application			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD			
											
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz			
P		Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	170	0.055	0.075	0.065	0.085	0.08	0.1		
2.1-2.2	Steel, low-alloyed	<950	160	0.05	0.07	0.055	0.075	0.07	0.09		
3.1-3.2	Steel, high-alloyed	<1100	150	0.045	0.065	0.05	0.07	0.065	0.08		
K		Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	190	0.05	0.07	0.055	0.075	0.07	0.09		
M		Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	75		0.06		0.065		0.08		
2.1	Inox, austenitic	<650	65		0.055		0.06		0.07		
N		Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	360	0.1	0.12	0.11	0.13	0.12	0.14		
3.1-3.3	Cooper, alloyed	<600	170	0.09	0.11	0.1	0.12	0.11	0.13		
T		Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	50		0.055		0.06		0.07		
S		Vc (m/min)									
1.1-1.3	Super alloys	<1450	25		0.05		0.055		0.065		

NOTE | The values marked in turquoise are side applications!

Cooling	   
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPC	UNI					
Application							Basic
Features	HA	≠					

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation

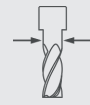
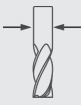


Roughing

inappropriate optimal

Finishing

inappropriate optimal

BCU1-M01-0223	 mm ø	 mm ø	 mm	 mm	 mm	 mm ø	 #	 mm	 °	 °
4	4.0	0.0	13.0	0.0	65.0	6.0	4	0.10	40	12
5	5.0	0.0	16.0	0.0	65.0	6.0	4	0.20	40	12
6	6.0	5.6	18.0	24.0	65.0	6.0	4	0.20	40	20
8	8.0	7.6	24.0	30.0	70.0	8.0	4	0.20	40	20
10	10.0	9.6	30.0	38.0	80.0	10.0	4	0.20	40	20
12	12.0	11.4	36.0	46.0	93.0	12.0	4	0.20	40	20
16	16.0	15.4	48.0	58.0	110.0	16.0	4	0.30	40	20
20	20.0	19.4	60.0	74.0	126.0	20.0	4	0.30	40	20



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Pages (PDF)

 Download Catalog Pages (PDF)	Material	Strength (N/mm ²)	Dimension	Ø4		Ø5		Ø6		Ø8		Ø10		Ø12	
			Infeed in mm	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD
			Application												
			Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz
P			Vc (m/min)												
1.1-1.3	Steel, unalloyed	<850	160	0.012	0.018	0.022	0.028	0.032	0.038	0.042	0.052	0.048	0.06	0.052	0.07
2.1-2.2	Steel, low-alloyed	<950	150	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.048	0.042	0.055	0.048	0.065
3.1-3.2	Steel, high-alloyed	<1100	140	0.008	0.012	0.018	0.022	0.028	0.032	0.038	0.045	0.038	0.052	0.042	0.06
K			Vc (m/min)												
1.1-1.2	Grey cast iron	<1000	175	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.048	0.042	0.055	0.048	0.065
M			Vc (m/min)												
1.1	Inox, ferritic/martensitic	<850	70		0.015		0.022		0.032		0.045		0.052		0.06
2.1	Inox, austenitic	<650	55		0.012		0.02		0.028		0.042		0.05		0.055
N			Vc (m/min)												
1.1-2.3	Alu, alloyed, casted	<600	340	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.12
3.1-3.3	Cooper, alloyed	<600	160	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09	0.09	0.11
T			Vc (m/min)												
2.1-2.2	Titanium, pure, alloyed	<1000	45		0.012		0.02		0.028		0.042		0.048		0.055
S			Vc (m/min)												
1.1-1.3	Super alloys	<1450	20		0.01		0.015		0.023		0.038		0.042		0.05

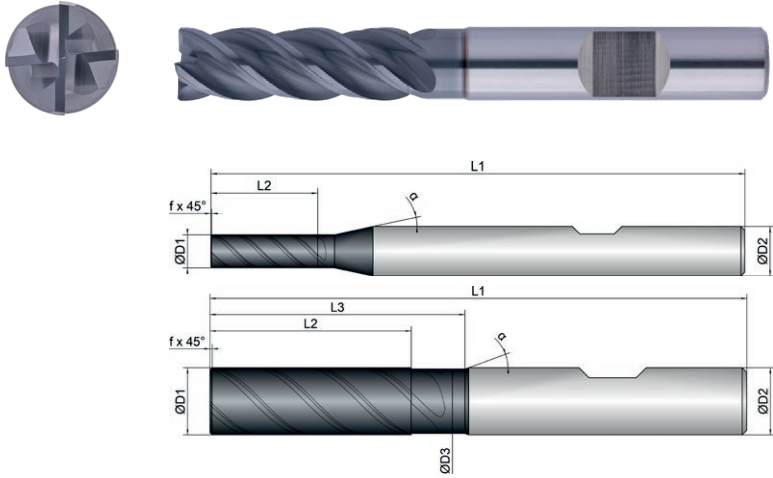
Material			Strength (N/mm²)	Dimension	Ø 16		Ø 20					
				Infeed in mm	ae=	ae=	ae=	ae=				
					1xD	0.3xD	1xD	0.3xD				
					ap=	ap=	ap=	ap=				
			Application									
			Feed (mm/Z)	fz	fz	fz	fz					
P			Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	160	0.06	0.08	0.075	0.09					
2.1-2.2	Steel, low-alloyed	<950	150	0.05	0.07	0.065	0.08					
3.1-3.2	Steel, high-alloyed	<1100	140	0.045	0.065	0.06	0.075					
K			Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	175	0.05	0.07	0.065	0.08					
M			Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	70	0.065		0.075						
2.1	Inox, austenitic	<650	55	0.06		0.065						
N			Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	340	0.11	0.13	0.12	0.14					
3.1-3.3	Cooper, alloyed	<600	160	0.1	0.12	0.11	0.13					
T			Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	45	0.055		0.065						
S			Vc (m/min)									
1.1-1.3	Super alloys	<1450	20	0.05		0.06						

NOTE | The values marked in turquoise are side applications!

Cooling	
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPC	UNI			
Application					
Features	HB	≠			

- Adapted clearance angle for reliable machining
- Unequal tooth pitch for smooth running
- Large chip chambers for good chip evacuation



Roughing					Finishing					
inappropriate					optimal					
BCU1-M01-0224	mm Ø	mm Ø	mm	mm	mm	mm Ø	#	mm	°	°
4	4.0	0.0	13.0	0.0	65.0	6.0	4	0.10	40	12
5	5.0	0.0	16.0	0.0	65.0	6.0	4	0.20	40	12
6	6.0	5.6	18.0	24.0	65.0	6.0	4	0.20	40	20
8	8.0	7.6	24.0	30.0	70.0	8.0	4	0.20	40	20
10	10.0	9.6	30.0	38.0	80.0	10.0	4	0.20	45	20
12	12.0	11.4	36.0	46.0	93.0	12.0	4	0.20	40	20
16	16.0	15.4	48.0	58.0	110.0	16.0	4	0.30	40	20
20	20.0	19.4	60.0	74.0	126.0	20.0	4	0.30	40	20



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Dimension		Ø4		Ø5		Ø6		Ø8		Ø10		Ø12			
Infeed in mm	Application	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD		
		ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD		
Application															
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz		
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	160	0.012	0.018	0.022	0.028	0.032	0.038	0.042	0.052	0.048	0.06	0.052	0.07
2.1-2.2	Steel, low-alloyed	<950	150	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.048	0.042	0.055	0.048	0.065
3.1-3.2	Steel, high-alloyed	<1100	140	0.008	0.012	0.018	0.022	0.028	0.032	0.038	0.045	0.038	0.052	0.042	0.06
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	175	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.048	0.042	0.055	0.048	0.065
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	70		0.015		0.022		0.032		0.045		0.052		0.06
2.1	Inox, austenitic	<650	55		0.012		0.02		0.028		0.042		0.05		0.055
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	340	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.12
3.1-3.3	Cooper, alloyed	<600	160	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09	0.09	0.11
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	45		0.012		0.02		0.028		0.042		0.048		0.055
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450	20		0.01		0.015		0.023		0.038		0.042		0.05

Dimension		Ø16		Ø20					
Infeed in mm	Application	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD				
		ap=1xD	ap=1xD	ap=1xD	ap=1xD				
Application									
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz			
P		Vc (m/min)							
1.1-1.3	Steel, unalloyed	<850	160	0.06	0.08	0.075	0.09		
2.1-2.2	Steel, low-alloyed	<950	150	0.05	0.07	0.065	0.08		
3.1-3.2	Steel, high-alloyed	<1100	140	0.045	0.065	0.06	0.075		
K		Vc (m/min)							
1.1-1.2	Grey cast iron	<1000	175	0.05	0.07	0.065	0.08		
M		Vc (m/min)							
1.1	Inox, ferritic/martensitic	<850	70		0.065		0.075		
2.1	Inox, austenitic	<650	55		0.06		0.065		
N		Vc (m/min)							
1.1-2.3	Alu, alloyed, casted	<600	340	0.11	0.13	0.12	0.14		
3.1-3.3	Cooper, alloyed	<600	160	0.1	0.12	0.11	0.13		
T		Vc (m/min)							
2.1-2.2	Titanium, pure, alloyed	<1000	45		0.055		0.065		
S		Vc (m/min)							
1.1-1.3	Super alloys	<1450	20		0.05		0.06		

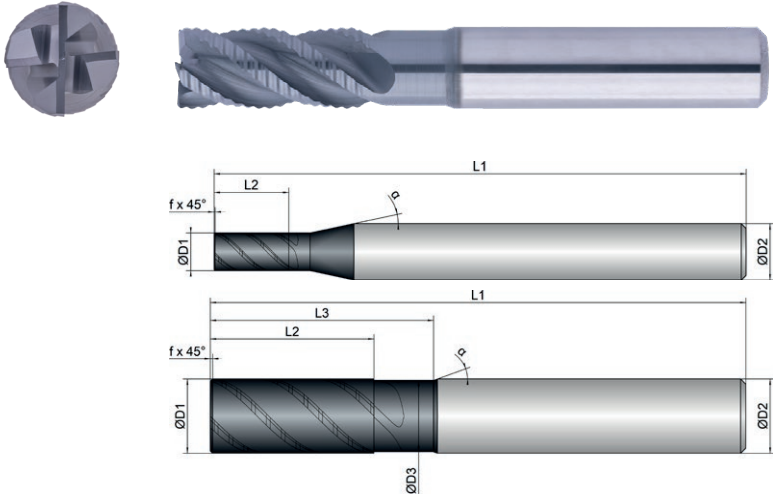
NOTE | The values marked in turquoise are side applications!

Cooling	
Tolerance	e8
Coating	BetaUni Iron

Strategy	HPCUNI	
Application		
Features	HA≠2xD	



- Optimized chip chambers for a large chip volume
- Adapted roughing teeth for small chips

For roughing under HPC conditions

Roughing	Finishing
inappropriateoptimal	inappropriateoptimal

BCU1-M02-0103	D1	D3	L2	L3	L1	D2	z	45°		α
	mm ø	mm ø	mm	mm	mm	mm ø	#	mm	°	°
4	4.0	0.0	8.0	0.0	57.0	6.0	4	0.10	45	12
5	5.0	0.0	9.0	0.0	57.0	6.0	4	0.20	45	12
6	6.0	5.6	13.0	19.0	57.0	6.0	4	0.20	45	20
8	8.0	7.6	19.0	25.0	63.0	8.0	4	0.20	45	20
10	10.0	9.6	22.0	30.0	72.0	10.0	4	0.32	45	20
12	12.0	11.4	26.0	36.0	83.0	12.0	4	0.32	45	20
16	16.0	15.4	31.0	42.0	92.0	16.0	4	0.32	45	20
20	20.0	19.4	41.0	52.0	104.0	20.0	4	0.50	45	20



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			Dimension	Ø4		Ø5		Ø6		Ø8		Ø10		Ø12	
			Infeed in mm	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD
			Application												
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz
P			Vc (m/min)												
1.1-1.3	Steel, unalloyed	<850	155	0.015	0.02	0.02	0.03	0.03	0.04	0.04	0.055	0.06	0.08	0.065	0.09
2.1-2.2	Steel, low-alloyed	<950	145	0.012	0.018	0.018	0.028	0.028	0.037	0.037	0.052	0.055	0.075	0.06	0.085
3.1-3.2	Steel, high-alloyed	<1100	135	0.01	0.015	0.015	0.025	0.025	0.034	0.034	0.048	0.05	0.07	0.055	0.08
K			Vc (m/min)												
1.1-1.2	Grey cast iron	<1000	170	0.012	0.018	0.018	0.028	0.028	0.037	0.037	0.052	0.055	0.075	0.06	0.085
M			Vc (m/min)												
1.1	Inox, ferritic/martensitic	<850	65		0.01		0.015		0.025		0.035		0.05		0.06
2.1	Inox, austenitic	<650	55		0.008		0.012		0.022		0.031		0.045		0.055
N			Vc (m/min)												
1.1-2.3	Alu, alloyed, casted	<600	340	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.12
3.1-3.3	Cooper, alloyed	<600	160	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09	0.09	0.11
T			Vc (m/min)												
2.1-2.2	Titanium, pure, alloyed	<1000	40		0.01		0.015		0.025		0.035		0.045		0.055
S			Vc (m/min)												
1.1-1.3	Super alloys	<1450													

Dimension	Ø16		Ø20					
Infeed in mm	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD				
	ap=1xD	ap=1xD	ap=1xD	ap=1xD				
Application								
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz		
P		Vc (m/min)						
1.1-1.3	Steel, unalloyed	<850	155	0.07	0.095	0.08	0.12	
2.1-2.2	Steel, low-alloyed	<950	145	0.065	0.09	0.075	0.11	
3.1-3.2	Steel, high-alloyed	<1100	135	0.06	0.085	0.07	0.1	
K		Vc (m/min)						
1.1-1.2	Grey cast iron	<1000	170	0.065	0.09	0.075	0.11	
M		Vc (m/min)						
1.1	Inox, ferritic/martensitic	<850	65		0.07		0.08	
2.1	Inox, austenitic	<650	55		0.065		0.07	
N		Vc (m/min)						
1.1-2.3	Alu, alloyed, casted	<600	340	0.11	0.13	0.12	0.14	
3.1-3.3	Cooper, alloyed	<600	160	0.1	0.12	0.11	0.13	
T		Vc (m/min)						
2.1-2.2	Titanium, pure, alloyed	<1000	40		0.065		0.07	
S		Vc (m/min)						
1.1-1.3	Super alloys	<1450						
NOTE The values marked in turquoise are side applications!								

Cooling

Tolerance

e8

Coating

BetaUni Iron

Strategy

HPC

UNI

Application

Features

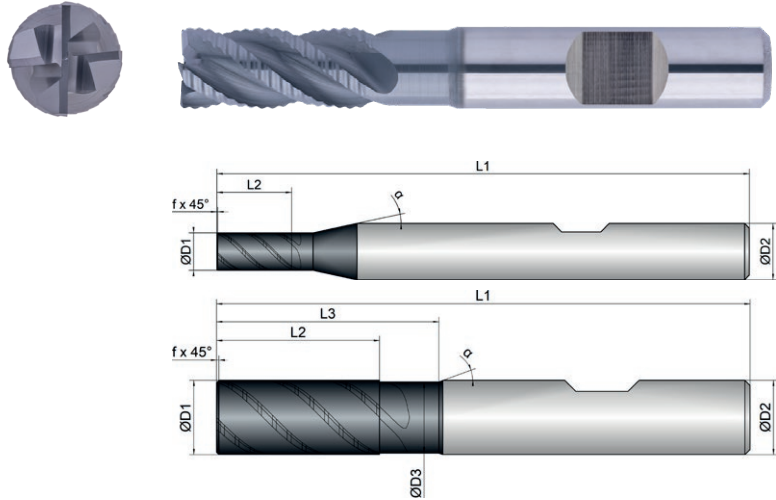
HB

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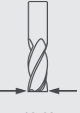
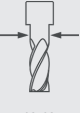
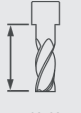
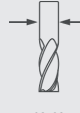
2xD

Basic

- Optimized chip chambers for a large chip volume
- Adapted roughing teeth for small chips

For roughing under HPC conditions

Roughing					Finishing				
inappropriate					inappropriate				
					optimal				

BCU1-M02-0104	D1  mm ø	D3  mm ø	L2  mm	L3  mm	L1  mm	D2  mm ø	z  #	 mm	 °	α  °
4	4.0	0.0	8.0	0.0	57.0	6.0	4	0.10	45	12
5	5.0	0.0	9.0	0.0	57.0	6.0	4	0.20	45	12
6	6.0	5.6	13.0	19.0	57.0	6.0	4	0.20	45	20
8	8.0	7.6	19.0	25.0	63.0	8.0	4	0.20	45	20
10	10.0	9.6	22.0	30.0	72.0	10.0	4	0.32	45	20
12	12.0	11.4	26.0	36.0	83.0	12.0	4	0.32	45	20
16	16.0	15.4	31.0	42.0	92.0	16.0	4	0.32	45	20
20	20.0	19.4	41.0	52.0	104.0	20.0	4	0.50	45	20



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		Strength (N/mm²)	Dimension	Ø4		Ø5		Ø6		Ø8		Ø10		Ø12	
			Infeed in mm	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD
			Application												
Material			Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz
P			Vc (m/min)												
1.1-1.3	Steel, unalloyed	<850	155	0.015	0.02	0.02	0.03	0.03	0.04	0.04	0.055	0.06	0.08	0.065	0.09
2.1-2.2	Steel, low-alloyed	<950	145	0.012	0.018	0.018	0.028	0.028	0.037	0.037	0.052	0.055	0.075	0.06	0.085
3.1-3.2	Steel, high-alloyed	<1100	135	0.01	0.015	0.015	0.025	0.025	0.034	0.034	0.048	0.05	0.07	0.055	0.08
K			Vc (m/min)												
1.1-1.2	Grey cast iron	<1000	170	0.012	0.018	0.018	0.028	0.028	0.037	0.037	0.052	0.055	0.075	0.06	0.085
M			Vc (m/min)												
1.1	Inox, ferritic/martensitic	<850	65		0.01		0.015		0.025		0.035		0.05		0.06
2.1	Inox, austenitic	<650	55		0.008		0.012		0.022		0.031		0.045		0.055
N			Vc (m/min)												
1.1-2.3	Alu, alloyed, casted	<600	340	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.12
3.1-3.3	Cooper, alloyed	<600	160	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09	0.09	0.11
T			Vc (m/min)												
2.1-2.2	Titanium, pure, alloyed	<1000	40		0.01		0.015		0.025		0.035		0.045		0.055
S			Vc (m/min)												
1.1-1.3	Super alloys	<1450													

		Dimension	Ø16		Ø20					
Infeed in mm			ae=1xD ap=1xD	ae=0.3xD ap=1xD	ae=1xD ap=1xD	ae=0.3xD ap=1xD				
Application										
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz				
P		Vc (m/min)								
1.1-1.3	Steel, unalloyed	<850	155	0.07	0.095	0.08	0.12			
2.1-2.2	Steel, low-alloyed	<950	145	0.065	0.09	0.075	0.11			
3.1-3.2	Steel, high-alloyed	<1100	135	0.06	0.085	0.07	0.1			
K		Vc (m/min)								
1.1-1.2	Grey cast iron	<1000	170	0.065	0.09	0.075	0.11			
M		Vc (m/min)								
1.1	Inox, ferritic/martensitic	<850	65		0.07		0.08			
2.1	Inox, austenitic	<650	55		0.065		0.07			
N		Vc (m/min)								
1.1-2.3	Alu, alloyed, casted	<600	340	0.11	0.13	0.12	0.14			
3.1-3.3	Cooper, alloyed	<600	160	0.1	0.12	0.11	0.13			
T		Vc (m/min)								
2.1-2.2	Titanium, pure, alloyed	<1000	40		0.065		0.07			
S		Vc (m/min)								
1.1-1.3	Super alloys	<1450								

NOTE | The values marked in turquoise are side applications!

Cooling

Tolerance

e8

Coating

BetaUni Iron

Strategy

HPC

UNI

Application

Features

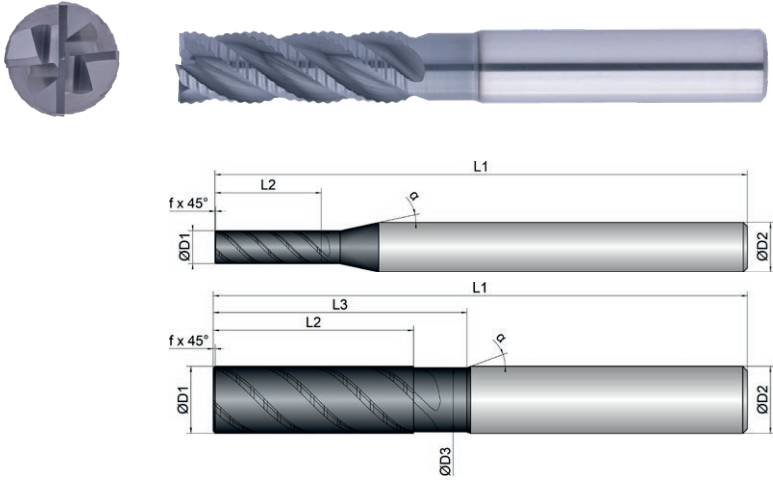
HA

≠

3xD

Basic

- Optimized chip chambers for a large chip volume
- Adapted roughing teeth for small chips

For roughing under HPC conditions

Roughing					Finishing				
inappropriate					inappropriate				
					optimal				

BCU1-M02-0113	D1 mm ø	D3 mm ø	L2 mm	L3 mm	L1 mm	D2 mm ø	z #	 mm	 °	α °
4	4.0	0.0	13.0	0.0	65.0	6.0	4	0.10	45	12
5	5.0	0.0	16.0	0.0	65.0	6.0	4	0.20	45	12
6	6.0	5.6	18.0	24.0	65.0	6.0	4	0.20	45	20
8	8.0	7.6	24.0	30.0	70.0	8.0	4	0.20	45	20
10	10.0	9.6	30.0	38.0	80.0	10.0	4	0.32	45	20
12	12.0	11.4	36.0	46.0	93.0	12.0	4	0.32	45	20
16	16.0	15.4	48.0	58.0	110.0	16.0	4	0.32	45	20
20	20.0	19.4	60.0	74.0	126.0	20.0	4	0.50	45	20

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Dimension		Ø4		Ø5		Ø6		Ø8		Ø10		Ø12			
Infeed in mm	Application	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD		
		ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD			
Application															
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz		
P		Vc (m/min)													
1.1-1.3	Steel, unalloyed	<850	145	0.012	0.015	0.015	0.022	0.022	0.032	0.032	0.048	0.05	0.07	0.055	0.08
2.1-2.2	Steel, low-alloyed	<950	135	0.01	0.012	0.012	0.02	0.02	0.03	0.03	0.043	0.045	0.065	0.05	0.075
3.1-3.2	Steel, high-alloyed	<1100	125	0.008	0.01	0.01	0.018	0.018	0.025	0.025	0.04	0.042	0.06	0.045	0.07
K		Vc (m/min)													
1.1-1.2	Grey cast iron	<1000	160	0.01	0.012	0.012	0.02	0.02	0.03	0.03	0.043	0.045	0.065	0.05	0.075
M		Vc (m/min)													
1.1	Inox, ferritic/martensitic	<850	60		0.01		0.015		0.025		0.035		0.05		0.06
2.1	Inox, austenitic	<650	50		0.008		0.012		0.022		0.031		0.045		0.055
N		Vc (m/min)													
1.1-2.3	Alu, alloyed, casted	<600	320	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.12
3.1-3.3	Cooper, alloyed	<600	150	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09	0.09	0.11
T		Vc (m/min)													
2.1-2.2	Titanium, pure, alloyed	<1000	35		0.01		0.015		0.025		0.035		0.045		0.055
S		Vc (m/min)													
1.1-1.3	Super alloys	<1450													

Dimension		Ø16		Ø20					
Infeed in mm	Application	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD				
		ap=1xD	ap=1xD	ap=1xD	ap=1xD				
Application									
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz			
P		Vc (m/min)							
1.1-1.3	Steel, unalloyed	<850	145	0.06	0.085	0.07	0.1		
2.1-2.2	Steel, low-alloyed	<950	135	0.055	0.08	0.065	0.09		
3.1-3.2	Steel, high-alloyed	<1100	125	0.05	0.075	0.06	0.08		
K		Vc (m/min)							
1.1-1.2	Grey cast iron	<1000	160	0.055	0.08	0.065	0.09		
M		Vc (m/min)							
1.1	Inox, ferritic/martensitic	<850	60		0.07		0.08		
2.1	Inox, austenitic	<650	50		0.065		0.07		
N		Vc (m/min)							
1.1-2.3	Alu, alloyed, casted	<600	320	0.11	0.13	0.12	0.14		
3.1-3.3	Cooper, alloyed	<600	150	0.1	0.12	0.11	0.13		
T		Vc (m/min)							
2.1-2.2	Titanium, pure, alloyed	<1000	35		0.065		0.07		
S		Vc (m/min)							
1.1-1.3	Super alloys	<1450							
NOTE The values marked in turquoise are side applications!									

50 | BCU1 SERIES

BCU1 SERIES | 51

Cooling

Tolerance

e8

Coating

BetaUni Iron

Strategy

HPCUNI

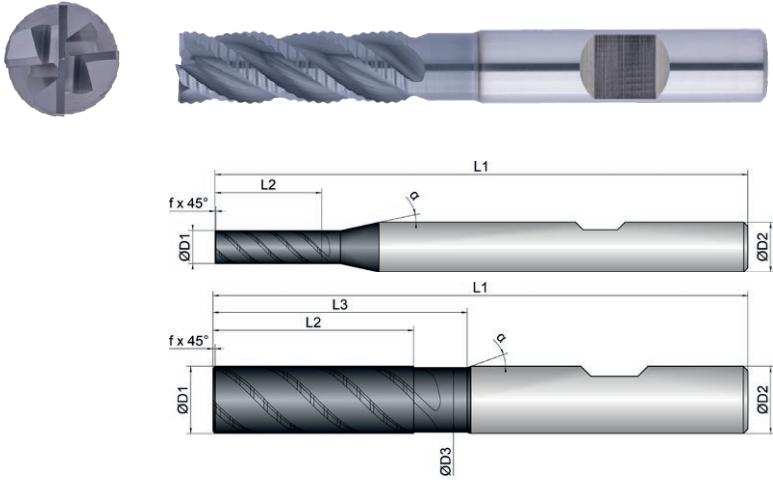
Application

Features

HB≠3xD

Basic

- Optimized chip chambers for a large chip volume
- Adapted roughing teeth for small chips

For roughing under HPC conditions

Roughing						Finishing				
inappropriate						optimal				
BCU1-M02-0114	D1	D3	L2	L3	L1	D2	z	45°		α
	mm ø	mm ø	mm	mm	mm	mm ø	#	mm	°	°
4	4.0	0.0	13.0	0.0	65.0	6.0	4	0.10	45	12
5	5.0	0.0	16.0	0.0	65.0	6.0	4	0.20	45	12
6	6.0	5.6	18.0	24.0	65.0	6.0	4	0.20	45	20
8	8.0	7.6	24.0	30.0	70.0	8.0	4	0.20	45	20
10	10.0	9.6	30.0	38.0	80.0	10.0	4	0.32	45	20
12	12.0	11.4	36.0	46.0	93.0	12.0	4	0.32	45	20
16	16.0	15.4	48.0	58.0	110.0	16.0	4	0.32	45	20
20	20.0	19.4	60.0	74.0	126.0	20.0	4	0.50	45	20

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		Dimension	Ø4		Ø5		Ø6		Ø8		Ø10		Ø12		
Infeed in mm			ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD	
Application			ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	ap=1xD	
		Feed (mm/Z)													
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P			Vc (m/min)												
1.1-1.3	Steel, unalloyed	<850	145	0.012	0.015	0.015	0.022	0.022	0.032	0.032	0.048	0.05	0.07	0.055	0.08
2.1-2.2	Steel, low-alloyed	<950	135	0.01	0.012	0.012	0.02	0.02	0.03	0.03	0.043	0.045	0.065	0.05	0.075
3.1-3.2	Steel, high-alloyed	<1100	125	0.008	0.01	0.01	0.018	0.018	0.025	0.025	0.04	0.042	0.06	0.045	0.07
K			Vc (m/min)												
1.1-1.2	Grey cast iron	<1000	160	0.01	0.012	0.012	0.02	0.02	0.03	0.03	0.043	0.045	0.065	0.05	0.075
M			Vc (m/min)												
1.1	Inox, ferritic/martensitic	<850	60		0.01		0.015		0.025		0.035		0.05		0.06
2.1	Inox, austenitic	<650	50		0.008		0.012		0.022		0.031		0.045		0.055
N			Vc (m/min)												
1.1-2.3	Alu, alloyed, casted	<600	320	0.02	0.035	0.035	0.04	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.12
3.1-3.3	Cooper, alloyed	<600	150	0.015	0.025	0.025	0.03	0.03	0.05	0.05	0.07	0.07	0.09	0.09	0.11
T			Vc (m/min)												
2.1-2.2	Titanium, pure, alloyed	<1000	35		0.01		0.015		0.025		0.035		0.045		0.055
S			Vc (m/min)												
1.1-1.3	Super alloys	<1450													

		Dimension	Ø16		Ø20					
Infeed in mm			ae=1xD	ae=0.3xD	ae=1xD	ae=0.3xD				
Application			ap=1xD	ap=1xD	ap=1xD	ap=1xD				
		Feed (mm/Z)	fz	fz	fz	fz				
Material		Strength (N/mm²)	Vc (m/min)							
P										
1.1-1.3	Steel, unalloyed	<850	145	0.06	0.085	0.07	0.1			
2.1-2.2	Steel, low-alloyed	<950	135	0.055	0.08	0.065	0.09			
3.1-3.2	Steel, high-alloyed	<1100	125	0.05	0.075	0.06	0.08			
K			Vc (m/min)							
1.1-1.2	Grey cast iron	<1000	160	0.055	0.08	0.065	0.09			
M			Vc (m/min)							
1.1	Inox, ferritic/martensitic	<850	60		0.07		0.08			
2.1	Inox, austenitic	<650	50		0.065		0.07			
N			Vc (m/min)							
1.1-2.3	Alu, alloyed, casted	<600	320	0.11	0.13	0.12	0.14			
3.1-3.3	Cooper, alloyed	<600	150	0.1	0.12	0.11	0.13			
T			Vc (m/min)							
2.1-2.2	Titanium, pure, alloyed	<1000	35		0.065		0.07			
S			Vc (m/min)							
1.1-1.3	Super alloys	<1450								
NOTE The values marked in turquoise are side applications!										

Cooling

Tolerance

f8

Coating

BetaUni Iron

Strategy

HSCUNI

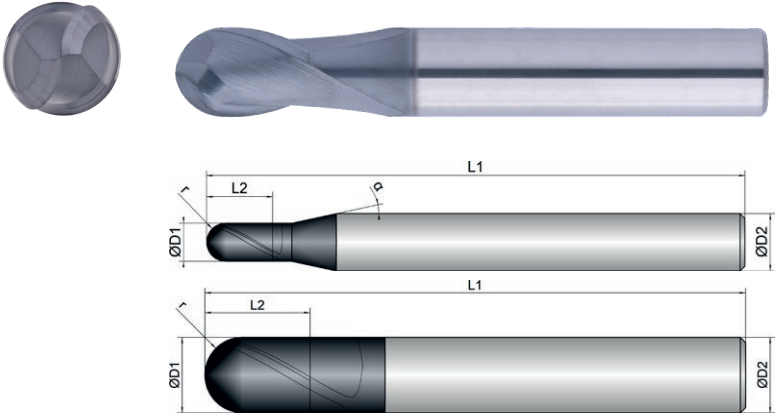
Application

Features

HA

Basic

- Geometry of the face cutting edge designed for a soft and even cut
- Adapted chip chambers for roughing and finishing
- Suitable for wet and dry machining
- Short version



Roughing				Finishing				
inappropriateoptimal				inappropriateoptimal				
BCU1-M08-0053	D1 mm ø	L2 mm	L1 mm	D2 mm ø	z #	r mm	 °	α °
0,5	0.5	1.5	57.0	6.0	2	0.25	30	12
1	1.0	2.0	57.0	6.0	2	0.50	30	12
1,5	1.5	3.0	57.0	6.0	2	0.75	30	12
2	2.0	4.0	57.0	6.0	2	1.00	30	12
2,5	2.5	5.0	57.0	6.0	2	1.25	30	12
3	3.0	6.0	57.0	6.0	2	1.50	30	12
4	4.0	7.0	57.0	6.0	2	2.00	30	12
5	5.0	8.0	57.0	6.0	2	2.50	30	12
6	6.0	10.0	57.0	6.0	2	3.00	30	0
8	8.0	12.0	63.0	8.0	2	4.00	30	0
10	10.0	14.0	72.0	10.0	2	5.00	30	0
12	12.0	16.0	83.0	12.0	2	6.00	30	0

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		Dimension	Ø0.5	Ø1	Ø1.5	Ø2	Ø2.5	Ø3	Ø4	Ø5	Ø6	Ø8	
Infeed in mm			ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	
Application													
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)											
1.1-1.3	Steel, unalloyed	<850	290	0.01	0.02	0.03	0.04	0.045	0.05	0.06	0.07	0.085	0.12
2.1-2.2	Steel, low-alloyed	<950	240	0.008	0.015	0.025	0.035	0.04	0.045	0.055	0.065	0.08	0.11
3.1-3.2	Steel, high-alloyed	<1100	230	0.006	0.012	0.022	0.03	0.035	0.04	0.05	0.06	0.075	0.09
K		Vc (m/min)											
1.1-1.2	Grey cast iron	<1000	300	0.008	0.015	0.025	0.035	0.045	0.05	0.055	0.065	0.08	0.11
M		Vc (m/min)											
1.1	Inox, ferritic/martensitic	<850	100	0.01	0.015	0.02	0.025	0.03	0.035	0.045	0.05	0.06	0.075
2.1	Inox, austenitic	<650	85	0.008	0.012	0.015	0.02	0.025	0.03	0.04	0.045	0.055	0.07
N		Vc (m/min)											
1.1-2.3	Alu, alloyed, casted	<600	500	0.01	0.015	0.018	0.02	0.022	0.025	0.03	0.05	0.06	0.07
3.1-3.3	Cooper, alloyed	<600	220	0.006	0.008	0.012	0.015	0.018	0.02	0.024	0.04	0.05	0.06
T		Vc (m/min)											
2.1-2.2	Titanium, pure, alloyed	<1000	50	0.008	0.012	0.012	0.015	0.015	0.018	0.022	0.025	0.03	0.04
S		Vc (m/min)											
1.1-1.3	Super alloys	<1450	30	0.006	0.01	0.01	0.012	0.012	0.015	0.018	0.02	0.025	0.035

Dimension

Ø10Ø12

Infeed in mm

ae= 0.05xD
ap= 0.05xDae= 0.05xD
ap= 0.05xD

Application

Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz
P		Vc (m/min)		
1.1-1.3	Steel, unalloyed	<850	290	0.130.14
2.1-2.2	Steel, low-alloyed	<950	240	0.120.13
3.1-3.2	Steel, high-alloyed	<1100	230	0.10.11
K		Vc (m/min)		
1.1-1.2	Grey cast iron	<1000	300	0.120.13
M		Vc (m/min)		
1.1	Inox, ferritic/martensitic	<850	100	0.090.1
2.1	Inox, austenitic	<650	85	0.080.09
N		Vc (m/min)		
1.1-2.3	Alu, alloyed, casted	<600	500	0.080.09
3.1-3.3	Cooper, alloyed	<600	220	0.0650.075
T		Vc (m/min)		
2.1-2.2	Titanium, pure, alloyed	<1000	50	0.0550.065
S		Vc (m/min)		
1.1-1.3	Super alloys	<1450	30	0.0450.055

NOTE | The values marked in turquoise are side applications!

Cooling









Tolerance

f8

Coating

BetaUni Iron

Strategy

HSC

UNI

Application







Features

HA

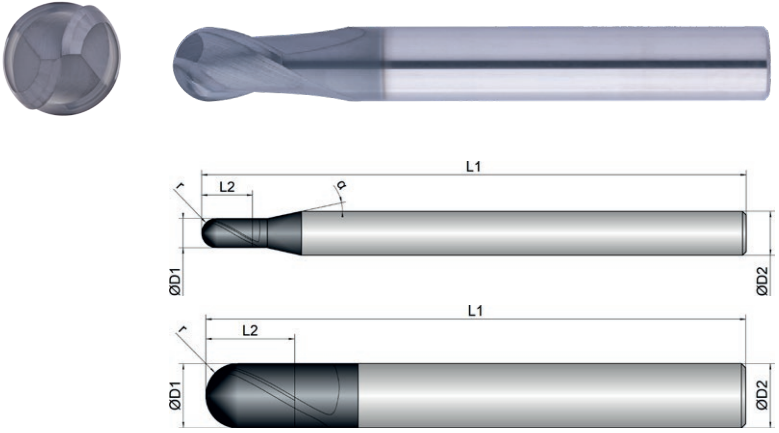


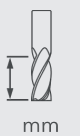
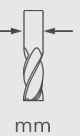
Basic





- Geometry of the face cutting edge designed for a soft and even cut
- Adapted chip chambers for roughing and finishing
- Suitable for wet and dry machining
- Long version



Roughing				Finishing				
inappropriateoptimal				inappropriateoptimal				
BCU1-M08-0063	D1  mm ø	L2  mm	L1  mm	D2  mm ø	z  #	r  mm	 °	α  °
0,5	0.5	1.5	75.0	6.0	2	0.25	30	12
1	1.0	2.0	75.0	6.0	2	0.50	30	12
1,5	1.5	3.0	75.0	6.0	2	0.75	30	12
2	2.0	4.0	75.0	6.0	2	1.00	30	12
2,5	2.5	5.0	75.0	6.0	2	1.25	30	12
3	3.0	6.0	75.0	6.0	2	1.50	30	12
4	4.0	7.0	75.0	6.0	2	2.00	30	12
5	5.0	8.0	75.0	6.0	2	2.50	30	12
6	6.0	10.0	75.0	6.0	2	3.00	30	0
8	8.0	12.0	75.0	8.0	2	4.00	30	0
10	10.0	14.0	85.0	10.0	2	5.00	30	0
12	12.0	16.0	100.0	12.0	2	6.00	30	0



Download Catalog Pages (PDF)

		Dimension	Ø0.5	Ø1	Ø1.5	Ø2	Ø2.5	Ø3	Ø4	Ø5	Ø6	Ø8	
Infeed in mm			ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD	
Application													
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)											
1.1-1.3	Steel, unalloyed	<850	270	0.01	0.02	0.03	0.04	0.045	0.05	0.06	0.07	0.085	0.12
2.1-2.2	Steel, low-alloyed	<950	220	0.008	0.015	0.025	0.035	0.04	0.045	0.055	0.065	0.08	0.11
3.1-3.2	Steel, high-alloyed	<1100	210	0.006	0.012	0.022	0.03	0.035	0.04	0.05	0.06	0.075	0.09
K		Vc (m/min)											
1.1-1.2	Grey cast iron	<1000	280	0.008	0.015	0.025	0.035	0.045	0.05	0.055	0.065	0.08	0.11
M		Vc (m/min)											
1.1	Inox, ferritic/martensitic	<850	90	0.01	0.015	0.02	0.025	0.03	0.035	0.045	0.05	0.06	0.075
2.1	Inox, austenitic	<650	75	0.008	0.012	0.015	0.02	0.025	0.03	0.04	0.045	0.055	0.07
N		Vc (m/min)											
1.1-2.3	Alu, alloyed, casted	<600	470	0.01	0.015	0.018	0.02	0.022	0.025	0.03	0.05	0.06	0.07
3.1-3.3	Cooper, alloyed	<600	200	0.008	0.01	0.012	0.015	0.018	0.02	0.026	0.04	0.05	0.06
T		Vc (m/min)											
2.1-2.2	Titanium, pure, alloyed	<1000	45	0.008	0.012	0.012	0.015	0.015	0.018	0.022	0.025	0.03	0.04
S		Vc (m/min)											
1.1-1.3	Super alloys	<1450	25	0.006	0.01	0.01	0.012	0.012	0.015	0.018	0.02	0.025	0.035

		Dimension	Ø10	Ø12								
Infeed in mm			ae= 0.05xD ap= 0.05xD	ae= 0.05xD ap= 0.05xD								
Application												
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz								
P		Vc (m/min)										
1.1-1.3	Steel, unalloyed	<850	270	0.13	0.14							
2.1-2.2	Steel, low-alloyed	<950	220	0.12	0.13							
3.1-3.2	Steel, high-alloyed	<1100	210	0.1	0.11							
K		Vc (m/min)										
1.1-1.2	Grey cast iron	<1000	280	0.12	0.13							
M		Vc (m/min)										
1.1	Inox, ferritic/martensitic	<850	90	0.09	0.1							
2.1	Inox, austenitic	<650	75	0.08	0.09							
N		Vc (m/min)										
1.1-2.3	Alu, alloyed, casted	<600	470	0.08	0.09							
3.1-3.3	Cooper, alloyed	<600	200	0.065	0.075							
T		Vc (m/min)										
2.1-2.2	Titanium, pure, alloyed	<1000	45	0.055	0.065							
S		Vc (m/min)										
1.1-1.3	Super alloys	<1450	25	0.045	0.055							

NOTE | The values marked in turquoise are side applications!

Cooling









Tolerance

f8

Coating

BetaUni Iron

Strategy

HSC

UNI

Application







Features

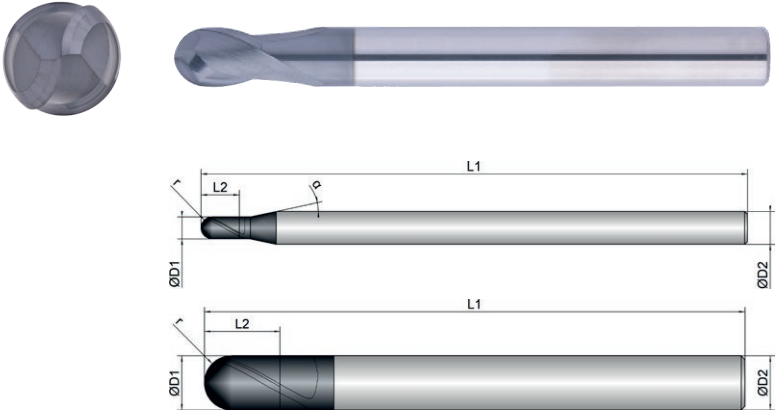
HA

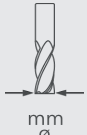
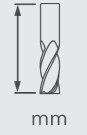


Basic



- Geometry of the face cutting edge designed for a soft and even cut
- Adapted chip chambers for roughing and finishing
- Suitable for wet and dry machining
- Overlong version



Roughing				Finishing				
inappropriateoptimal				inappropriateoptimal				
BCU1-M08-0073	D1  mm Ø	L2  mm	L1  mm	D2  mm Ø	z  #	r  mm	 °	α  °
1	1.0	2.0	100.0	6.0	2	0.50	30	12
1,5	1.5	3.0	100.0	6.0	2	0.75	30	12
2	2.0	4.0	100.0	6.0	2	1.00	30	12
2,5	2.5	5.0	100.0	6.0	2	1.25	30	12
3	3.0	6.0	100.0	6.0	2	1.50	30	12
4	4.0	7.0	100.0	6.0	2	2.00	30	12
5	5.0	8.0	100.0	6.0	2	2.50	30	12
6	6.0	10.0	100.0	6.0	2	3.00	30	0
8	8.0	12.0	100.0	8.0	2	4.00	30	0
10	10.0	14.0	100.0	10.0	2	5.00	30	0
12	12.0	16.0	120.0	12.0	2	6.00	30	0



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		Dimension	Ø1	Ø1.5	Ø2	Ø2.5	Ø3	Ø4	Ø5	Ø6	Ø8	Ø10	
Infeed in mm		ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	ae=0.05xD ap=0.05xD	
Application													
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)											
1.1-1.3	Steel, unalloyed	<850	240	0.015	0.025	0.035	0.04	0.045	0.055	0.065	0.75	0.11	0.12
2.1-2.2	Steel, low-alloyed	<950	200	0.012	0.02	0.03	0.035	0.04	0.05	0.06	0.07	0.1	0.11
3.1-3.2	Steel, high-alloyed	<1100	195	0.01	0.015	0.025	0.03	0.035	0.045	0.055	0.065	0.08	0.09
K		Vc (m/min)											
1.1-1.2	Grey cast iron	<1000	260	0.012	0.02	0.03	0.035	0.04	0.05	0.06	0.07	0.1	0.11
M		Vc (m/min)											
1.1	Inox, ferritic/martensitic	<850	80	0.012	0.015	0.02	0.025	0.03	0.04	0.045	0.055	0.065	0.08
2.1	Inox, austenitic	<650	68	0.01	0.012	0.015	0.02	0.025	0.035	0.04	0.05	0.06	0.07
N		Vc (m/min)											
1.1-2.3	Alu, alloyed, casted	<600	440	0.012	0.015	0.018	0.02	0.025	0.03	0.045	0.055	0.065	0.075
3.1-3.3	Cooper, alloyed	<600	180	0.008	0.01	0.012	0.015	0.018	0.022	0.035	0.045	0.055	0.06
T		Vc (m/min)											
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.01	0.01	0.012	0.012	0.015	0.02	0.022	0.025	0.035	0.05
S		Vc (m/min)											
1.1-1.3	Super alloys	<1450	20	0.008	0.008	0.01	0.01	0.012	0.015	0.018	0.022	0.03	0.045

		Dimension	Ø12									
Infeed in mm		ae=0.05xD ap=0.05xD										
Application												
Material	Strength (N/mm²)	Feed (mm/Z)	fz									
P		Vc (m/min)										
1.1-1.3	Steel, unalloyed	<850	240	0.13								
2.1-2.2	Steel, low-alloyed	<950	200	0.12								
3.1-3.2	Steel, high-alloyed	<1100	195	0.1								
K		Vc (m/min)										
1.1-1.2	Grey cast iron	<1000	260	0.12								
M		Vc (m/min)										
1.1	Inox, ferritic/martensitic	<850	80	0.09								
2.1	Inox, austenitic	<650	68	0.08								
N		Vc (m/min)										
1.1-2.3	Alu, alloyed, casted	<600	440	0.085								
3.1-3.3	Cooper, alloyed	<600	180	0.07								
T		Vc (m/min)										
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.06								
S		Vc (m/min)										
1.1-1.3	Super alloys	<1450	20	0.05								

NOTE | The values marked in turquoise are side applications!

Cooling

Tolerance

-

Coating

BetaUni Iron

Strategy

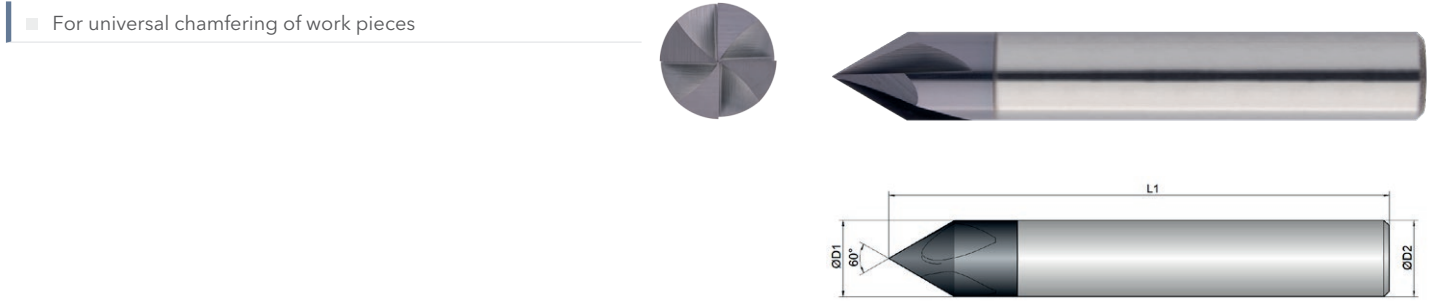
UNI

Application

Features

HA

Basic



Roughing		Finishing		
inappropriateoptimal		inappropriateoptimal		
BCU1-M09-0103	D1 mm Ø	L1 mm	D2 mm Ø	z #
3	3.0	50.0	3.0	3
4	4.0	50.0	4.0	4
6	6.0	50.0	6.0	4
8	8.0	58.0	8.0	4
10	10.0	66.0	10.0	4
12	12.0	73.0	12.0	4

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Dimension		Ø3	Ø4	Ø6	Ø8	Ø10	Ø12				
Infeed in mm		ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max				
Application											
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz			
P		Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	110	0.018	0.024	0.035	0.045	0.055	0.065		
2.1-2.2	Steel, low-alloyed	<950	100	0.015	0.02	0.03	0.04	0.05	0.06		
3.1-3.2	Steel, high-alloyed	<1100	70	0.012	0.016	0.025	0.035	0.045	0.055		
K		Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	95	0.015	0.02	0.03	0.04	0.05	0.06		
M		Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	75	0.011	0.015	0.023	0.032	0.042	0.05		
2.1	Inox, austenitic	<650	55	0.01	0.014	0.021	0.03	0.04	0.048		
N		Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	280	0.025	0.03	0.04	0.05	0.06	0.07		
3.1-3.3	Cooper, alloyed	<600	150	0.015	0.02	0.03	0.04	0.05	0.06		
T		Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.01	0.014	0.021	0.03	0.04	0.048		
S		Vc (m/min)									
1.1-1.3	Super alloys	<1450	30	0.008	0.012	0.018	0.026	0.035	0.042		
NOTE The values marked in turquoise are side applications!											

Cooling

Tolerance

-

Coating

BetaUni Iron

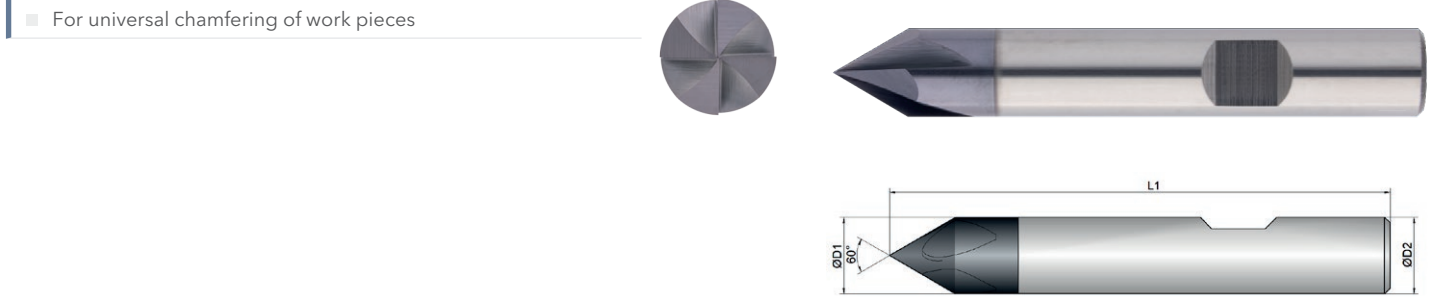
Strategy

UNI

Application

Features

HB



Roughing		Finishing		
inappropriateoptimal		inappropriateoptimal		
BCU1-M09-0104	D1 mm ø	L1 mm	D2 mm ø	z #
6	6.0	50.0	6.0	4
8	8.0	58.0	8.0	4
10	10.0	66.0	10.0	4
12	12.0	73.0	12.0	4

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Dimension		Ø6	Ø8	Ø10	Ø12						
Infeed in mm		ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max						
Application											
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz					
P		Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	110	0.035	0.045	0.055	0.065				
2.1-2.2	Steel, low-alloyed	<950	100	0.03	0.04	0.05	0.06				
3.1-3.2	Steel, high-alloyed	<1100	70	0.025	0.035	0.045	0.055				
K		Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	95	0.03	0.04	0.05	0.06				
M		Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	75	0.023	0.032	0.042	0.05				
2.1	Inox, austenitic	<650	55	0.021	0.03	0.04	0.048				
N		Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	280	0.04	0.05	0.06	0.07				
3.1-3.3	Cooper, alloyed	<600	150	0.03	0.04	0.05	0.06				
T		Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.021	0.03	0.04	0.048				
S		Vc (m/min)									
1.1-1.3	Super alloys	<1450	30	0.018	0.026	0.035	0.042				
NOTE The values marked in turquoise are side applications!											

STILL CAN'T FIND A SUITABLE MILLING CUTTER?

No problem – simply customize an existing tool. Using our configurator for special milling cutters, you can customize existing tools to your needs in an instant or create your own tools based on predefined types.

WE WILL RESPOND TO ALL REQUESTS SUBMITTED VIA THE CONFIGURATOR WITHIN ONE WORKING DAY AT THE LATEST



Cooling

Tolerance

-

Coating

BetaUni Iron

Strategy

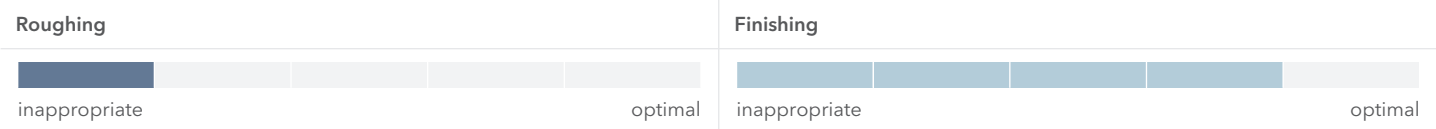
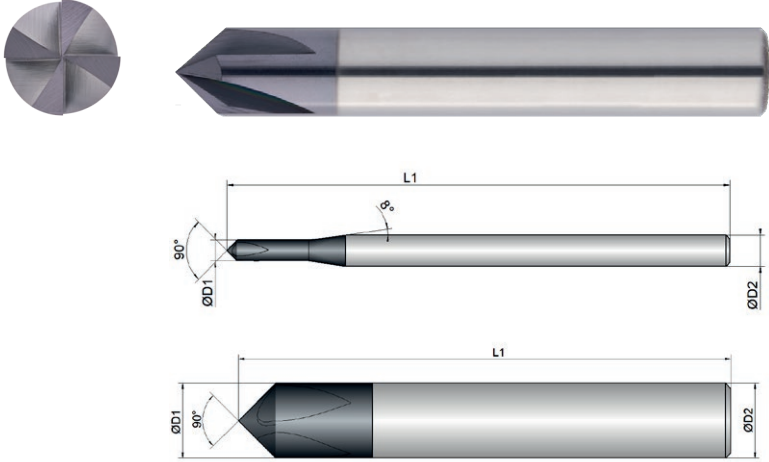
UNI

Application

Features

HA

■ For universal chamfering of work pieces



	D1 mm ø	L1 mm	D2 mm ø	z #
BCU1-M09-0153				
2	2.0	50.0	3.0	3
3	3.0	50.0	3.0	3
4	4.0	50.0	4.0	4
6	6.0	50.0	6.0	4
8	8.0	58.0	8.0	4
10	10.0	66.0	10.0	4
12	12.0	73.0	12.0	4
16	16.0	82.0	16.0	4



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Dimension	Ø2	Ø3	Ø4	Ø6	Ø8	Ø10	Ø12	Ø16			
Infeed in mm	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max			
Application											
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz		
P	Vc (m/min)										
1.1-1.3	Steel, unalloyed	<850	110	0.014	0.018	0.024	0.035	0.045	0.055	0.065	0.09
2.1-2.2	Steel, low-alloyed	<950	100	0.012	0.015	0.02	0.03	0.04	0.05	0.06	0.08
3.1-3.2	Steel, high-alloyed	<1100	70	0.01	0.012	0.016	0.025	0.035	0.045	0.055	0.07
K	Vc (m/min)										
1.1-1.2	Grey cast iron	<1000	95	0.012	0.015	0.02	0.03	0.04	0.05	0.06	0.08
M	Vc (m/min)										
1.1	Inox, ferritic/martensitic	<850	75	0.01	0.011	0.015	0.023	0.032	0.042	0.05	0.065
2.1	Inox, austenitic	<650	55	0.009	0.01	0.014	0.021	0.03	0.04	0.048	0.062
N	Vc (m/min)										
1.1-2.3	Alu, alloyed, casted	<600	280	0.022	0.025	0.03	0.04	0.05	0.06	0.07	0.1
3.1-3.3	Cooper, alloyed	<600	150	0.012	0.015	0.02	0.03	0.04	0.05	0.06	0.08
T	Vc (m/min)										
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.009	0.01	0.014	0.021	0.03	0.04	0.048	0.062
S	Vc (m/min)										
1.1-1.3	Super alloys	<1450	30	0.007	0.008	0.012	0.018	0.026	0.035	0.042	0.055
NOTE The values marked in turquoise are side applications!											

Cooling

Tolerance

-

Coating

BetaUni Iron

Strategy

UNI

Application

Features

HB

Basic



Roughing		Finishing		
inappropriate optimal		inappropriate optimal		
BCU1-M09-0154	D1 mm ø	L1 mm	D2 mm ø	z #
6	6.0	50.0	6.0	4
8	8.0	58.0	8.0	4
10	10.0	66.0	10.0	4
12	12.0	73.0	12.0	4
16	16.0	82.0	16.0	4

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Dimension	Ø6	Ø8	Ø10	Ø12	Ø16					
Infeed in mm	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max	ae= 0.1xD ap= L2 max					
Application										
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz			
P		Vc (m/min)								
1.1-1.3	Steel, unalloyed	<850	110	0.035	0.045	0.055	0.065	0.09		
2.1-2.2	Steel, low-alloyed	<950	100	0.03	0.04	0.05	0.06	0.08		
3.1-3.2	Steel, high-alloyed	<1100	70	0.025	0.035	0.045	0.055	0.07		
K		Vc (m/min)								
1.1-1.2	Grey cast iron	<1000	95	0.03	0.04	0.05	0.06	0.08		
M		Vc (m/min)								
1.1	Inox, ferritic/martensitic	<850	75	0.023	0.032	0.042	0.05	0.065		
2.1	Inox, austenitic	<650	55	0.021	0.03	0.04	0.048	0.062		
N		Vc (m/min)								
1.1-2.3	Alu, alloyed, casted	<600	280	0.04	0.05	0.06	0.07	0.1		
3.1-3.3	Cooper, alloyed	<600	150	0.03	0.04	0.05	0.06	0.08		
T		Vc (m/min)								
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.021	0.03	0.04	0.048	0.062		
S		Vc (m/min)								
1.1-1.3	Super alloys	<1450	30	0.018	0.026	0.035	0.042	0.055		
NOTE The values marked in turquoise are side applications!										

Cooling

Tolerance

-

Coating

BetaUni Iron

Strategy

UNI

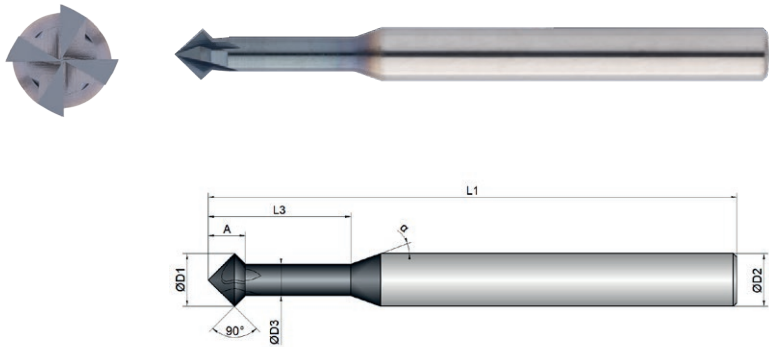
Application

Features

HA

Basic

- For universal chamfering of work pieces
- Forwards and backwards cutting



Roughing					Finishing			
inappropriateoptimal					inappropriateoptimal			
BCU1-M10-0023	D1 mm ø	D3 mm ø	A mm	L3 mm	L1 mm	D2 mm ø	z #	α °
3	3.0	2.2	2.0	10.0	50.0	4.0	4	20
4	4.0	2.9	2.5	10.0	50.0	4.0	4	20
5	5.0	3.9	3.0	15.0	65.0	6.0	4	20
6	6.0	3.9	4.0	15.0	65.0	6.0	4	20
8	8.0	5.9	2.5	20.0	70.0	8.0	4	20
10	10.0	5.9	4.0	23.0	72.0	10.0	4	20
12	12.0	5.9	6.0	23.0	73.0	12.0	4	20



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Dimension		Ø3	Ø4	Ø5	Ø6	Ø8	Ø10	Ø12			
Infeed in mm	ae= 0.1xD ap= 0.1xD	ae= 0.1xD	ae= 0.1xD	ae= 0.1xD	ae= 0.1xD	ae= 0.1xD	ae= 0.1xD	ae= 0.1xD			
		ap= 0.1xD	ap= 0.1xD	ap= 0.1xD	ap= 0.1xD	ap= 0.1xD	ap= 0.1xD	ap= 0.1xD			
Application											
Material		Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz		
P		Vc (m/min)									
1.1-1.3	Steel, unalloyed	<850	75	0.015	0.018	0.02	0.025	0.03	0.035	0.04	
2.1-2.2	Steel, low-alloyed	<950	55	0.012	0.016	0.018	0.023	0.028	0.033	0.038	
3.1-3.2	Steel, high-alloyed	<1100	40	0.01	0.014	0.015	0.02	0.025	0.03	0.035	
K		Vc (m/min)									
1.1-1.2	Grey cast iron	<1000	45	0.012	0.016	0.018	0.023	0.028	0.033	0.038	
M		Vc (m/min)									
1.1	Inox, ferritic/martensitic	<850	35	0.01	0.014	0.016	0.02	0.024	0.028	0.034	
2.1	Inox, austenitic	<650	30	0.008	0.012	0.014	0.018	0.022	0.026	0.032	
N		Vc (m/min)									
1.1-2.3	Alu, alloyed, casted	<600	150	0.02	0.023	0.025	0.03	0.035	0.04	0.045	
3.1-3.3	Cooper, alloyed	<600	80	0.012	0.014	0.015	0.02	0.025	0.03	0.035	
T		Vc (m/min)									
2.1-2.2	Titanium, pure, alloyed	<1000	30	0.008	0.012	0.014	0.018	0.022	0.026	0.032	
S		Vc (m/min)									
1.1-1.3	Super alloys	<1450	20	0.007	0.01	0.012	0.016	0.02	0.024	0.03	
NOTE The values marked in turquoise are side applications!											

STILL CAN'T FIND A SUITABLE MILLING CUTTER?

No problem – simply customize an existing tool. Using our configurator for special milling cutters, you can customize existing tools to your needs in an instant or create your own tools based on predefined types.

WE WILL RESPOND TO ALL REQUESTS SUBMITTED VIA THE CONFIGURATOR WITHIN ONE WORKING DAY AT THE LATEST



Cooling

Tolerance

V1

Coating

BetaUni Iron

Strategy

UNI

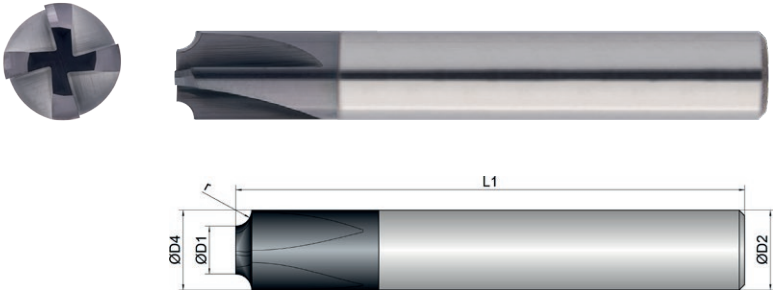
Application

Features

HA

Basic

■ For the universal manufacturing of radii to components



Roughing

inappropriate

optimal

Finishing

inappropriate

optimal

BCU1-M11-0023	D1 mm ø	D4 mm ø	L1 mm	D2 mm ø	z #	r mm
3/0,5	3.0	4	50.0	4.0	4	0.50
3,2/0,4	3.2	4	50.0	4.0	4	0.40
3,4/0,3	3.4	4	50.0	4.0	4	0.30
3,6/0,2	3.6	4	50.0	4.0	4	0.20
4/1	4.0	6	50.0	6.0	4	1.00
4,4/0,8	4.4	6	50.0	6.0	4	0.80
4,8/0,6	4.8	6	50.0	6.0	4	0.60
5/1,5	5.0	10	66.0	10.0	4	1.50
5/10	5.0	25	100.0	25.0	4	10.00
6/2	6.0	10	66.0	10.0	4	2.00
6/3	6.0	12	73.0	12.0	4	3.00
7/2,5	7.0	12	73.0	12.0	4	2.50
7/4,5	7.0	16	82.0	16.0	4	4.50
8/4	8.0	16	82.0	16.0	4	4.00
8/6	8.0	20	80.0	20.0	4	6.00
9/3,5	9.0	16	82.0	16.0	4	3.50
9/8	9.0	25	100.0	25.0	4	8.00
10/5	10.0	20	80.0	20.0	4	5.00

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Dimension	Ø3.6 R0.2	Ø3.4 R0.3	Ø3.2 R0.4	Ø3 R0.5	Ø4.8 R0.6	Ø4.4 R0.8	Ø4 R1	Ø5 R1.5	Ø6 R2	Ø7 R2.5			
Infeed in mm	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax			
Application													
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz			
P	Vc (m/min)												
1.1-1.3	Steel, unalloyed	<850	170	0.024	0.024	0.024	0.024	0.028	0.028	0.028	0.03	0.034	0.038
2.1-2.2	Steel, low-alloyed	<950	150	0.02	0.02	0.02	0.02	0.024	0.024	0.024	0.026	0.03	0.034
3.1-3.2	Steel, high-alloyed	<1100	100	0.016	0.016	0.016	0.016	0.02	0.02	0.02	0.022	0.026	0.03
K	Vc (m/min)												
1.1-1.2	Grey cast iron	<1000	125	0.016	0.016	0.016	0.016	0.02	0.02	0.02	0.022	0.026	0.03
M	Vc (m/min)												
1.1	Inox, ferritic/martensitic	<850	85	0.012	0.012	0.012	0.012	0.016	0.016	0.016	0.018	0.022	0.026
2.1	Inox, austenitic	<650	75	0.01	0.01	0.01	0.01	0.014	0.014	0.014	0.016	0.02	0.024
N	Vc (m/min)												
1.1-2.3	Alu, alloyed, casted	<600	500	0.029	0.029	0.029	0.029	0.033	0.033	0.033	0.035	0.039	0.043
3.1-3.3	Cooper, alloyed	<600	180	0.02	0.02	0.02	0.02	0.024	0.024	0.024	0.026	0.03	0.034
T	Vc (m/min)												
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.012	0.012	0.012	0.012	0.016	0.016	0.016	0.018	0.022	0.026
S	Vc (m/min)												
1.1-1.3	Super alloys	<1450	25	0.01	0.01	0.01	0.01	0.014	0.014	0.014	0.016	0.02	0.024

Dimension	Ø6 R3	Ø9 R3.5	Ø8 R4	Ø7 4.5	Ø10 R5	Ø8 R6	Ø9 R8	Ø5 R10			
Infeed in mm	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax			
Application											
Material	Strength (N/mm²)	Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz		
P	Vc (m/min)										
1.1-1.3	Steel, unalloyed	<850	170	0.038	0.04	0.04	0.04	0.041	0.041	0.045	0.045
2.1-2.2	Steel, low-alloyed	<950	150	0.034	0.036	0.036	0.036	0.037	0.037	0.04	0.04
3.1-3.2	Steel, high-alloyed	<1100	100	0.03	0.032	0.032	0.032	0.033	0.033	0.035	0.035
K	Vc (m/min)										
1.1-1.2	Grey cast iron	<1000	125	0.03	0.032	0.032	0.032	0.033	0.033	0.035	0.035
M	Vc (m/min)										
1.1	Inox, ferritic/martensitic	<850	85	0.026	0.028	0.028	0.028	0.029	0.029	0.03	0.03
2.1	Inox, austenitic	<650	75	0.024	0.026	0.026	0.026	0.027	0.027	0.028	0.028
N	Vc (m/min)										
1.1-2.3	Alu, alloyed, casted	<600	500	0.043	0.045	0.045	0.045	0.046	0.046	0.05	0.05
3.1-3.3	Cooper, alloyed	<600	180	0.034	0.036	0.036	0.036	0.037	0.037	0.04	0.04
T	Vc (m/min)										
2.1-2.2	Titanium, pure, alloyed	<1000	40	0.026	0.028	0.028	0.028	0.029	0.029	0.03	0.03
S	Vc (m/min)										
1.1-1.3	Super alloys	<1450	25	0.024	0.026	0.026	0.026	0.027	0.027	0.028	0.028

NOTE | The values marked in turquoise are side applications!

70 | BCU1 SERIES

Please use the arithmetic average from D2 and D1 to calculate cutting datas. For example tool Ø5 R10, D1=Ø5; R=10
calculated diameter = Ø15 Formula: D1+R= Result Example: 5mm+10mm=15mm

BCU1 SERIES | 71

Cooling









Tolerance

V1

Coating

BetaUni Iron

Strategy

UNI

Application



Features

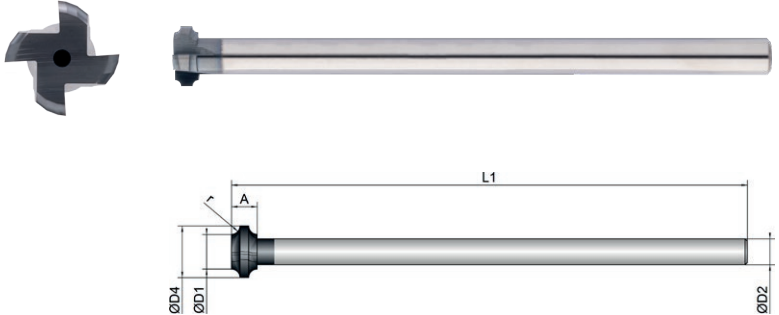
HA



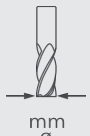
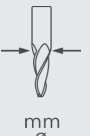
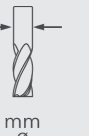
Basic



- For the universal manufacturing of radii to components
- Forwards and backwards cutting



Roughing					Finishing			
inappropriate					inappropriate			
optimal					optimal			

BCU1-M12-0023	D1  mm ø	D4  mm ø	A  mm	L1  mm	D2  mm ø	z  #	r  mm
5/0,5	5.0	6	2.0	75.0	4.0	4	0.50
5,2/0,4	5.2	6	2.0	75.0	4.0	4	0.40
5,4/0,3	5.4	6	2.0	75.0	4.0	4	0.30
5,6/0,2	0.0	6	2.0	75.0	4.0	4	0.20
7/0,5	7.0	8	2.0	100.0	6.0	4	0.50
7/1,5	7.0	10	5.0	100.0	6.0	4	1.50
7/2,5	7.0	12	8.0	100.0	6.0	4	2.50
7,2/0,4	7.2	8	2.0	100.0	6.0	4	0.40
7,4/0,3	7.4	8	2.0	100.0	6.0	4	0.30
7,6/0,2	7.6	8	2.0	100.0	6.0	4	0.20
7,6/1,2	7.6	10	5.0	100.0	6.0	4	1.20
8/1	8.0	10	4.0	100.0	6.0	4	1.00
8/2	8.0	12	7.0	100.0	6.0	4	2.00
8,4/0,8	8.4	10	4.0	100.0	6.0	4	0.80
8,4/1,8	8.4	12	6.0	100.0	6.0	4	1.80



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Material	Strength (N/mm²)	Dimension	Ø5.6 R0.2	Ø7.6 R0.2	Ø5.4 R0.3	Ø7.4 R0.3	Ø5.2 R0.4	Ø7.2 R0.4	Ø5 R0.5	Ø7 R0.5	Ø8.4 R0.8	Ø8 R1	
		Infeed in mm	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	
		Application											
		Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	
P		Vc (m/min)											
1.1-1.3	Steel, unalloyed	<850	70	0.012	0.015	0.012	0.015	0.012	0.015	0.012	0.015	0.018	
2.1-2.2	Steel, low-alloyed	<950	40	0.01	0.013	0.01	0.013	0.01	0.013	0.01	0.013	0.016	
3.1-3.2	Steel, high-alloyed	<1100	35	0.008	0.011	0.008	0.011	0.008	0.011	0.008	0.011	0.014	
K		Vc (m/min)											
1.1-1.2	Grey cast iron	<1000	40	0.01	0.013	0.01	0.013	0.01	0.013	0.01	0.013	0.016	
M		Vc (m/min)											
1.1	Inox, ferritic/martensitic	<850	35	0.008	0.011	0.008	0.011	0.008	0.011	0.008	0.011	0.014	
2.1	Inox, austenitic	<650	30	0.007	0.01	0.007	0.01	0.007	0.01	0.007	0.01	0.013	
N		Vc (m/min)											
1.1-2.3	Alu, alloyed, casted	<600	120	0.014	0.018	0.014	0.018	0.014	0.018	0.014	0.018	0.021	
3.1-3.3	Cooper, alloyed	<600	60	0.01	0.013	0.01	0.013	0.01	0.013	0.01	0.013	0.016	
T		Vc (m/min)											
2.1-2.2	Titanium, pure, alloyed	<1000	20	0.008	0.011	0.008	0.011	0.008	0.011	0.008	0.011	0.014	
S		Vc (m/min)											
1.1-1.3	Super alloys	<1450	12	0.007	0.01	0.007	0.01	0.007	0.01	0.007	0.01	0.013	

Material	Strength (N/mm²)	Dimension	Ø7.6 R1.2	Ø7 R1.5	Ø8.4 R1.8	Ø8 R2	Ø7 R2.5						
		Infeed in mm	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax	ae= rmax ap= rmax						
		Application											
		Feed (mm/Z)	fz	fz	fz	fz	fz						
P		Vc (m/min)											
1.1-1.3	Steel, unalloyed	<850	70	0.018	0.018	0.02	0.02	0.02					
2.1-2.2	Steel, low-alloyed	<950	40	0.016	0.016	0.018	0.018	0.018					
3.1-3.2	Steel, high-alloyed	<1100	35	0.014	0.014	0.016	0.016	0.016					
K		Vc (m/min)											
1.1-1.2	Grey cast iron	<1000	40	0.016	0.016	0.018	0.018	0.018					
M		Vc (m/min)											
1.1	Inox, ferritic/martensitic	<850	35	0.014	0.014	0.016	0.016	0.016					
2.1	Inox, austenitic	<650	30	0.013	0.013	0.015	0.015	0.015					
N		Vc (m/min)											
1.1-2.3	Alu, alloyed, casted	<600	120	0.021	0.021	0.024	0.024	0.024					
3.1-3.3	Cooper, alloyed	<600	60	0.016	0.016	0.018	0.018	0.018					
T		Vc (m/min)											
2.1-2.2	Titanium, pure, alloyed	<1000	20	0.014	0.014	0.016	0.016	0.016					
S		Vc (m/min)											
1.1-1.3	Super alloys	<1450	12	0.013	0.013	0.015	0.015	0.015					

NOTE |

The values marked in turquoise are side applications!

Please use the arithmetic average from D2 and D1 to calculate cutting datas. For example tool Ø8 R2, D1=Ø8; R=2
calculated diameter = Ø10 Formula: D1+R= Result Example: 8mm+2mm=10mm

EXPLANATION

APPLICATIONS

 Multipass milling	 Trimming	 Deburring	 Engraving
 Corner rounding	 Full slot milling	 Forward and backward deburring	

COOLINGS

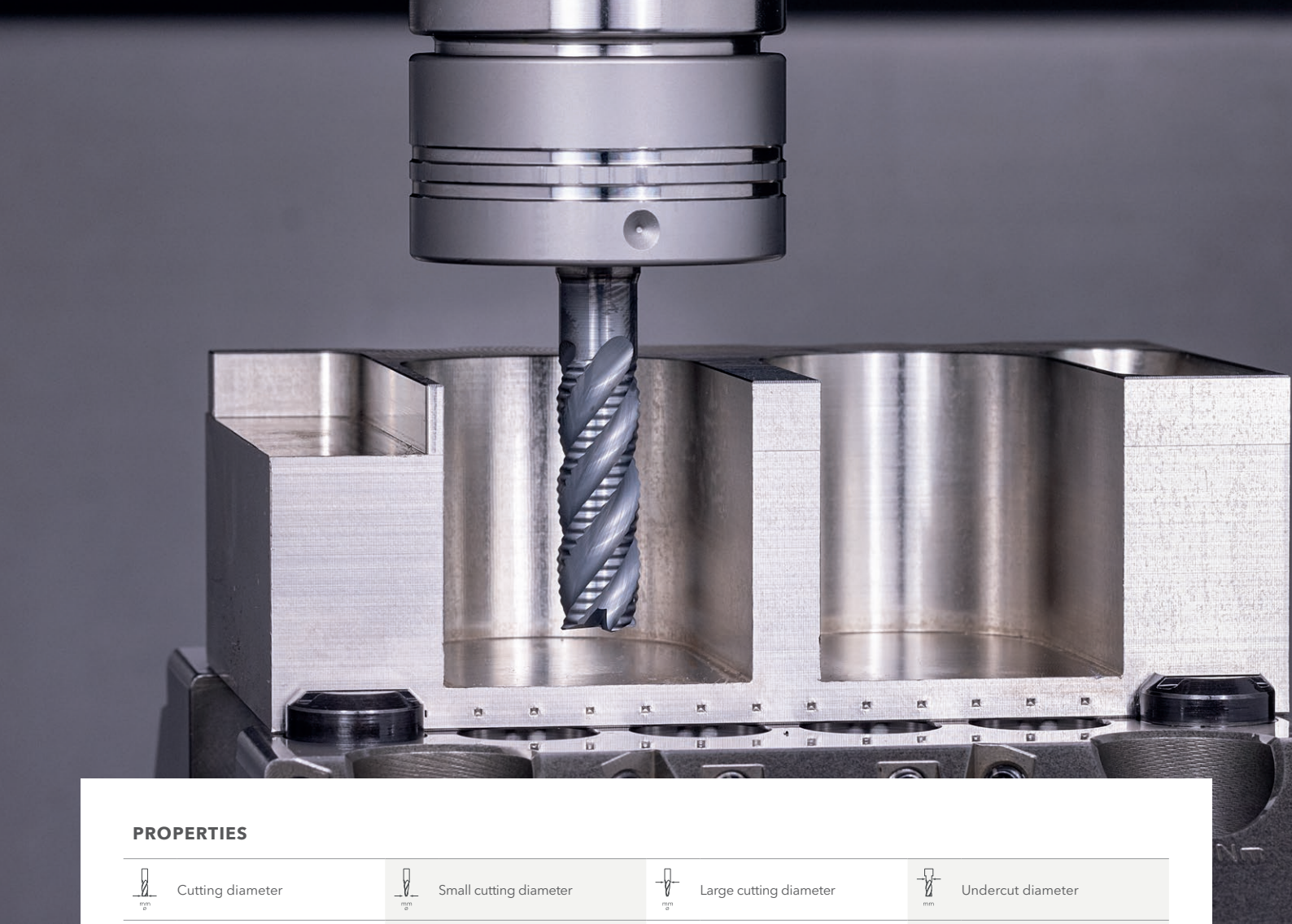
 Air-cooling	 Dry machining	 Oil cooling	 Cooling Lubricant
 Minimum quantity lubrication			

FEATURES

 2xD	 3xD	 4xD	 5xD
 Center cutting	 Non-center cutting	 Without Weldon	 With Weldon
 Internal cooling	 Dynamic helical pitch	 Chip breaker	 Unequal tooth pitch
 Roughing teeth	 Helical immersion	 Feed directions x,y	 Feed directions x, y, z
 Feed directions x, y, (z)			

STRATEGY

 Extended Trochoidal Cutting	 High Performance Cutting	 High Speed Cutting	 Multi Task Cutting
 Universal Machining			



PROPERTIES

 Cutting diameter	 Small cutting diameter	 Large cutting diameter	 Undercut diameter
 Length of cut	 Total bevel length	 Undercut length	 Total length
 Shank diameter	 Number of teeth	 Corner radius	 Corner bevel
 Programming radius	 Maximum depth of cut	 Helical angle	 Alpha angle

APPLICATION TABLE

The values given in the application table are only guidelines. These values are largely dependent on the machining situation and application.

FIGURES

All technical drawings and photographs are given as an example. The product may deviate from the original in terms of colour and dimensions.

P 1.1 STEEL | unalloyed <500 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.0254	St37.0	P235T1						STPG 38	
1.1120	GS20Mn5							SMnC 420	
1.1121	Ck10	2 C 10	XC 10	040 A 10	C 10	1265	C 10 k	S 10 C	1010
1.1131	GS15Mn5								
1.8961	WTSt373				Fe 360 D FF			SMA 50 A	
1.0715	9SMn28	11 SMn 28	S 250	230 M 07	CF 9 SMn 28	1912	11 SMn 28	SUM 22	1213
1.0718	9SMnPb28	11 SMnPb28	S 250 Pb		CF 9SMnPb 28	1914	11 SMnPb 28	SUM 22 L	12 L 13
1.0736	9SMn36		S300	240 M 07	CF 9 SMn 36		12 SMn 35	SUM 25	1215

P 1.2 STEEL | unalloyed <700 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.0116	ST373		E 24-3	4360-40 C	Fe 37-3	1312	A 360 C		A 570 Gr. 36
1.0144	ST443		E 28-3	4360-43 C	Fe 430 D FF	1414	AE 275-D	SM 41 B	A 573 Gr. 70
1.0401	C15		CC12	080 M 15	C 15	1350	F.111	S 15 C	1015
1.0402	C22	1 C 22	CC 22	070 M 20	C 22		C 22 k	SFVC 1	
1.0406	C25	1 C 25	CC 25	070 M 26	C 25		C 25 k	S 22 C	1025
1.0482	19Mn5		A 52 CP	224-460				SG 37	
1.0486	STE285				FE E 285 KG		AE 285 KG	SM 41 A	
1.0501	C35	1 C 35	CC 35	060 A 35	C 35	1550	F.113	S 35 C	1035
1.0503	C45	1 C 45	CC 45	080 M 46	C 45	1650	C 45 k	S 45 C	1045
1.0528	C30	1 C 30	CC 32	080 M 30	C 30			SUP 7	1030
1.0562	STE355		E 355 R/FP		Fe E 355 KG	2132	AE 355 KG	SM 50 YB	A 633 Gr. C
1.0711	9S20			220 M 07	CF 9 S 22			G 11120	1212
1.1127	36Mn6			212 M 36				SMn 443	1141
1.1133	20Mn5			120 M 19	G 22 Mn3		20 Mn 6	SMn 420	1022
1.5637	10Ni14			503	18 Ni 14 KT				A 350-LF 5
1.8962	9CrNiCuP324			WR 50 A				SPA-H	
1.0726	35S20	35 S 20	35 MF 4	212 M 36		1957	F.210G		1140
1.0760	38SMn28	38SMn28	38SMn28	38SMn28			38SMn28		
1.5423	16Mo5			1503-245-420	16 Mo 5		16 Mo 5	SBC 690	4520

P 1.3 STEEL | unalloyed <850 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.1525	C80W1	C 80 U	Y1 90		C 80 KU	1880	F.513		W 108
1.1545	C105W1	C 105 U	Y1 105	BW 1A	C 100 KU	1880	F.515		W 110
1.1620	C70W2	C 70 U							
1.1625	C80W2		Y1 80	BW 1B	C 80 KU		C 80	SKC 3	W 1
1.1645	C105W2						C 102	SK 3	
1.1663	C125W	C 120 U	Y2 120		C 120 KU		C 120	SK 2	W 112
1.1673	C135W		Y2 140		C 140 KU			SK 1	
1.1740	C60W		Y3 55					SK 7	
1.1830	C85W	C 90 U	Y3 90					SK 5	1084
1.1744	C67W		Y1 70				F.512		A-6
1.5406	17MoV84								
1.5633	24Ni8	G 9 Ni 10	22 N 8		G 9 Ni 10			SCPL 21	
1.6311	20MnMoNi45	20 MnMoNi 4 5						SQV 2 B	
1.7242	16CrMo4	18 CrMo 4	15 CD 3.5		18 CrMo 4		18 CrMo 4	SCM 418 H	
1.7350	22CrMo44								
1.7362	12CrMo195	X 12 CrMo 5	Z 10 CD 5.05	3606-625	16 CrMo 20 5			SCMV 6	
1.7709	21CrMoV57	21 CrMoV 5 7	20 CDV 5.07						

P 2.1 STEEL | low alloyed <750 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.0961	60SiCr7	60 SiCr 8	60 SC 7	250 A 61	60 SiCr 8		60 SiCr 8	SUP 7	9262
1.2162	21MnCr5	21 MnCr 5	20 NC 5					SCR 420 H	
1.2210	115CrV3	107 CrV 3 KU	100 C 3		107 CrV 3 KU		F.520.L		L2
1.2235	80CrV2						F.520.J		
1.2241	51CrV4	51 CRMnV 4			51 CrMnV 4 KU				S6
1.2382	GX155CrVMo121								
1.2542	45WCrV7	45 WCrV 8		BS 1	45 WCrV 8 KU	2710	45 WCrSi 8		S1
1.2552	80WCrV8						60 WCrSi 8		
1.2842	90MnCrV8	90 MnV 8	90 MV 8	BO 2	90 MnVCr 8 KU				0 2
1.7003	38Cr2	38 Cr 2 KD	38 C 2	120 M 36	38 Cr 3		38 Cr 3	SMn 438	50 B40
1.7131	16MnCr5	16 MnCr 5 KD	16 MC 5	527 M 17	16 MnCr 5	2173	16 MnCr 5	SCR 415	5115
1.7715	14MoV63	14 MoV 6-3		1503-660-440			13 MoCrV 6		

P 2.2 STEEL | low alloyed <950 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.0902	46Si7		45 S7				46 Si 7		
1.1157	40Mn4		35 M 5	150 M 36					1039
1.1167	36Mn5		40 M 5	150 M 36		2120	36 Mn 5		1335
1.1170	28Mn6	28 Mn 6	35 M 5	150 M 17	C 28 Mn		36 Mn 6	SCMn 1	1330
1.1199	49MnV53			280 M 01					
1.2002	125Cr1		Y2 120 C						
1.2003	75Cr1		35 M 5	150 M 36					
1.2004	85Cr1		Y1 100 C 2						
1.2008	140Cr3		Y2 140 C					SKS 8	
1.2108	90CrSi5	P 280 GH			C 100 KU	2092		SFVC 2A	
1.2127	105MnCr4				100 CrMn 4 KU			SUJ 3	
1.2303	100CrMo5						F.520.F		L 7
1.2312	40CrMnMoS86		40 CMD 8						
1.2519	110WCrV5						102 WCrV 5		
1.3501	100Cr2		100 C 2						E 50100
1.3505	100Cr6	100 Cr 6	100 C 6	535 A 99	100 Cr 6	2258	100 Cr 6	SUJ 2	E52100
1.3520	100CrMn6	100 Cr Mn 6	100 CM 6				100 CrMn 6		

P 3.1 STEEL | high alloyed <800 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.2363	X100CrMoV51	X 100 CrMoV 5 1	Z 100 CDV 5	BA 2	X 100 CrMoV 5 1 KU	2260	X 100 CrMoV 5	SKD 12	A 2
1.2367	X38CrMoV53		Z 38 CDV 5 3						
1.2379	X155CrVMo121	X 153 CrMoV 12	Z 160 CDV 12	BD 2	X 155 CrVMo 12 1.KU	2310		SKD 11	D 2
1.2453	X130W5								
1.2564	X30WCrV41	30 WCrV 15 1					F.527		
1.2567	X30WCrV53	X 30 WCrV 5 3	Z 32 WCV 5		X 30 WCrV 5 3 KU			SKD 4	
1.2606	X37CrMoW51		Z 35 CWDV 5	BH 12	X 35 CrMoW 05 KU		F.537	SKD 62	H 12

P 3.2 STEEL | high alloyed <1100 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.2083	X42Cr13	X 42 Cr 13	Z 40 C 14		X 41 Cr 13 KU	2314		SUS 420 J2	420
1.2316	X36CrMo17	X 36 CrMo 17	X38CrMo 16 1		X 38 CrMo 16 1 KU		X 38 CrMo 16		D-4
1.2343	X38CrMoVH1	X 38 CrMoV 5 1	Z 38 CDV 5	BH 11	X 37 CrMoV 5 1 KU		X 37 CrMoV 5	SKD 6	H 11
1.2344	X40CrMoV51	X 40 CrMoV 5 1	Z 40 CDV 5	BH 13	X 40 CrMoV 5 1 1 KU 2242		X 40 CrMoV 5	SKD 61	H 13
1.2436	X210CrW12	X 210 CrW 12	Z 210 CW1 2		X 215 CrW 12 1 KU 2312		X 210 CrW 12	SKD 2	
1.2581	X30WCrV93	X 30 WCrV 9 3	Z 30 WCV 9	BH 21	X 30 WCrV 9 3 KU		X 30 WCrV 9	SKD 5	H 21
1.2601	X165CrMoV12	X 165 CrMoV 12			X 165 CrMoW 12 KU 2310		X 160 CrMoV 12		
1.2767	X45NiCrMo4	40 NiCrMo 4	Y 35 NCD 16		42 NiCrMo 15 7 KU				A 9
1.2779	X6NiCrTi2615			S 66286					660
1.3302	S1214	HS 12 1 4			X 150 WV 1305 KU				A 7
1.3318	S1212	HS 02.01.12							
1.3401	X120Mn12	X 120 Mn 12	Z 120 M 12	BW 10	X G 120 Mn 12 2183		AM-X 120 Mn 12	SCMnH 1	A 128
1.3543	X102CrMo17	X 102 CrMo 17	X100CrMo17		X 105 CrMo 17		X 100 CrMo 17		
1.3549	X89CrMoV81								
1.3551	80MoCrV4216		80 DCV 40	T 11350	X 80 MoCrV 4 4		80 MoCrV 40-16		M 50
1.7225	42CrMo4.M4S	42 CrMo 4	42 CD 4	708 A 42	42 CrMo 4 2244			SCM 440 H	4140

K 1.1 GREY CAST IRON <600 N/mm² (180 HB)

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
0.6010	GG10	GJL-100	FGL 100	Grade 100	G 10	0110-00	FG 10	FC 100	A48-20 B
0.6012	GG150 HB	GJL-HB 170							
0.6015	GG15	GJL-150	FGL 150	Grade 150	G 15	0115-00	FG 15	FC 150	A48-25 B
0.6017	GG170 HB	GJL-HB 205							

K 1.2 GREY CAST IRON <1000 N/mm² (300 HB)

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
0.6020	GG20	GJL-200	FGL 200	Grade 220	G 20	0120-00	FG 20	FC 200	A48-30 B
0.6022	GG190 HB	GJL-HB 230							
0.6025	GG25	GJL-250	FGL 250	Grade 260	G 25	0125-00	FG 25	FC 250	A48-40 B
0.6027	GG220 HB	GJL-HB 250	FGL 250						
0.6030	GG30	GJL-300	FGL 300	Grade 300	G 30	0130-00	FG 30	FC 300	A48-45 B
0.6032	GG240 HB	GJL-HB 275							
0.6035	GG35	GJL-350	FGL 350	Grade 350	G 35	0135-00	FG 35	FC 350	A48-50 B
0.6037	GG260 HB	GJL-HB 275							
0.6040	GG40	GJL-400	FGL 400	Grade 400		0140-00			A48-60 B

M 1.1 STAINLESS STEEL FERRITIC/MARTENSITIC <850 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.4000	X6Cr13	X 6 Cr 13	Z 6 C 13	403 S 17	X 6 Cr 13	2301	X 6 Cr 13	SUS 403	403
1.4002	X6CrAl13	X 6 CrAl 13	Z 6 CA 13	405 S 17	X 6 CrAl 13	2302	X 6 CrAl 13	SUS 405	405
1.4005	X12CrS13	X 12 CrS 13	Z 12 CF 13	416 S 21	X 12 CrS 13	2380	X12 CrS 13	SUS 416	416
1.4006	X10Cr13	X 12 Cr 13 KD	Z 12 C 13	410 S 21	X 12 Cr 13	2302	X 12 Cr 13	SUS 410	410
1.4008	GX8CrNi13	GX 7 CrNiMo 12 1	Z 12 CN 13 M	410 C 21	GX 12 Cr 13			SCS 1	414
1.4016	X6Cr17	X 8 Cr 17	Z 8 C 17	430 S 15	X 8 Cr 17 KD	2320	X 8 Cr 17	SUS 430	430
1.4021	X20Cr13	X 20 Cr 13	Z 20 C 13	420 S 37	X 20 Cr 13	2303	X 20 Cr 13	SUS 420 J1	420
1.4024	X15Cr13	X 15 Cr 13	Z 12 C 13 M	420 S 29	X 12 Cr 13			SUS 410 J1	
1.4027	GX20Cr14		Z 20 C 13 M	420 C 29				SCS 2	
1.4028	X30Cr13	X 30 Cr 13	Z 30 Cr 13	420 S 45	X 30 Cr 13	2304	X 30 Cr 13	SUS 420 J2	420
1.4034	X45Cr13	X 45 Cr 13	Z 40 C 14	420 S 45	X 40 Cr 14		X 46 Cr 13		420
1.4057	X19CrNi172	X 19 CrNi 17 2	Z 15 CN 16.02	431 S 29	X 16 CrNi 16	2321	X 15 CrNi 16	SUS 431	431
1.4104	X12CrMoS17	X 14 CrMoS 17	Z 10 CF 17	441 S 29	X 10 CrS 17	2383	X 10 CrS 17	SUS 430 F	430 F
1.4105	X4CrMoS18	X 6 CRMoS 17	Z 6 CDF 18-02					SUS 430 F	430
1.4107	GX8CrNi12	GX 8 CrNi 12	GX 8 CrNi 12		GX 8 CrNi 12				
1.4109	X65CrMo14	X 70 CrMo 15	Z 70 CD 14					SUS 440 A	440 A
1.4110	X55CrMo14		Z 50 CD 13						
1.4112	X90CrMoV18	X 90 CrMoV 18	Z 3 CT 1 2	409 S 1 9	X 6 Cr Ti 1 2			SUS 440 B	440 B
1.4113	X6CrMo171	X 8 CrMo 17	Z 8 CD 17.02	434 S 17	X 8 CrMO 17	2325		SUS 434	434
1.4116	X45CrMoV15	X 50 CrMoV 15	Z 50 CD 15		X50 CrMoV 15		X 46 CrMo 16		
1.4122	X35CrMo17	X 39 CrMo 17 1	X39CrMo17-1		X 35 CrMo 17				
1.4125	X105CrMo17	X 105 CrMo 17	Z 100 CD 17		X 105 CrMo 17			SUS 440 C	440 C
1.4136	GX70CrMo292		Z 60 CD 29.2 M						
1.4313	X5CrNi134	X 3 CrNiMo 13 4	Z 4 CDN 13.4	425 C 11	X 3 CrNiMo 13 4	2385		SCS 5	CA 6-NM
1.4317	GX4CrNi134	GX 4 CrNi 13 4	GX 4 CrNi 13 4		GX 4 CrNi 13 4				
1.4351	X3CrNi134	X 3 CrNi 14 04 KE							
1.4405	GX5CrNiMo165	GX 4 CrNiMo 16 5 1	GX 4 CrNiMo 16 5 1		GX 4 CrNiMo 16 5 1				
1.4510	X6CrTi17	X 8 CrTi 17	Z 8 CT 17		X 6 CrTi 17		X 8 CrTi 17	SUS 430 LX	430 Ti
1.4511	X6CrNb17	X 3 CrNb 17	Z 8 CNb 17		X 6 CrNb 17			SUS 430 LX	430 Nb
1.4512	X6CrTi12	X 5 CrTi 12	Z 6 CT 12	409 S 19	X 6 CrTi12			SUH 409	409
1.4523	X8CrMoTi17	X 2 CrMoTiS 18 2	X 2 CrMoTiS 18 2						
1.4704	X45SiCr4	45SiCr16-11							HNV 2
1.4718	X45CrSi93	X 45 CrSi 8	Z 45 CS 9	401 S 45	X 45 CrSi 8		F.3220	SUH 1	HNV 3
1.4722	X10CrSi13						X 10 CrSi 13		
1.4724	X10CrAl13	X 10 CrAl 13	Z 10 C 13	BH 12	X 10 CrAl 12		X 10 CrAl 13	SUS 405	H-12
1.4725	X8CrAl144	CrAl 14 4	K 91670						
1.4747	X80CrNiSi20	X 80 CrNiSi 20	Z 80 CSN 20.02	433 S 65	X 80 CrSiNi 20		X 80 CrSiNi20-02	SUH 4	HNV 6
1.4762	X10CrAl24	X 10 CrAl 24	Z 10 CAS 24		X 16 Cr 26	2322	X 10 CrAl 24	SUH 442	446
1.4767	X8CrAl205	CrAl 20 5							

M 2.1 STAINLESS STEEL | austenitic <650 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.4300	X12CrNi188			302					
1.4301	X5CrNi1810	X 6 CrNi 18 10 KD	Z 6 CN 18.09	304 S 15	X 5 CrNi 18 10	2332	X 5 CrNi 18 11	SUS 304	304 H
1.4302	X5CrNi199	X 6 CrNi 20 10 KE		308 S 96					
1.4303	X5CrNi1812	X 8 CrNi 18 12 KD	Z 8 CN 17.07	305 S 19	X 8 CrNi 19 10		X 8 CrNi 18 12	SUS 305	308
1.4305	X10CrNiS189	X 8 CrNiS 19 9	Z 8 CNF 18.09	303 S 31	X 8 CrNiS 18 9	2346	F.310.C	SUS 303	303
1.4307	X2CrNi189	X 2 CrNi 18 9	CLC 18.9.L	304 S 11	X 2 CrNi 18 9			SUS 304 L	304 L
1.4308	GX6CrNi189	X 2 CrNi 18 7	Z 6 CN 18.10 M	304 C 15	GX 5 CrNi 19 10	2333		SCS 13	CF-8
1.4310	X12CrNi177	X 12 CrNi 17 7	Z 12 CN 17.07	301 S 21	X 12 CrNi 17 07		X 12 CrNi 17 07	SUS 301	301
1.4311	X2CrNiN1810	X 2 CrNiN 18 10	Z 8 CN 18.12	304 S 62	X 8 CrNi 19 10	2371	X 8 CrNi 18 12	SUS 304 LN	304 LN
1.4312	GX10CrNi188		Z 10 CN 18.9 M	302 C 25				SCS 12	
1.4318	X 2 CrNiN 18 7	X 2 CrNiN 18 7	18-7L		18-7L				
1.4401	X5CrNiMo17122	X 6 CrNiMo 17 12 2 KD	Z 6 CND 17.11	316 S 16	X 5 CrNiMo 17 12	2347	X 5 CrNiMo 17 12	SUS 316	316
1.4404	X2CrNiMo17132	GX 3 CrNiMo 17 12 2 KD	Z 3 CND 19.10 M	316 S 12	GX 2 CrNiMo 19 11	2348	X 2 CrNiMo	SUS 316 L	316 L
1.4406	X2CrNiMoN17122	X 3 CrNiMoN 17 12 2	Z 2 CND 17.12 Az	316 S 61	X 2 CrNiMoN 17 12			SUS 316 LN	316 LN
1.4408	GX6CrNiMo1810	GX 5 CrNiMo 19 11 2	GX 5 CrNiMo 19 11 2	316 C 16	GX 5 CrNiMo 19 11 2	2343	X 7 CrNiMo 20 10	SCS 14	CF-8M
1.4435	X2CrNiMo18143	X 2 CrNiMo 18 16	Z 2 CDN 17.13	316 S 11	X 2 CrNiMo 17 13	2353		SVS 16	316 L
1.4436	X5CrNiMo17133	X 6 CrNiMo 18 13 3 KD	Z 6 CND 17.12	316 S 16	X 5 CrNiMo 17 13	2343	X 6 CrNiMo 17 12 03	SUS 316	316
1.4438	X2CrNiMo18164	X 3 CrNiMo 18 16 4	Z 2 CND 19.15	317 S 12	X 2 CrNiMo 18 15	2367		SUS 317 L	317 L
1.4442	X2CrNiMo18154		X 3 CrNiMoN 18 14						



N 1.1 ALUMINIUM | alloyed <500 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
3.1255	AlCu 4 SiMg	AW-2014	A-U4SG	H 15	P-AlCu 4.4 SiMnMg		L-3130	A2014	AA2014
3.1305	AlCu 2.5 Mg	AW-2117	A-U2G	L 86	P-AlCu 2.5 MgSi		L-3180	A2117	AA2117
3.1324	AlCu 4 MgSi	AW-2017 A							
3.1325	AlCuMg1	AW-2017 A	A-U4G	H 14	P-AlCu 4.5 MgMn	GA631	L-3120	A2017	AA2017 A
3.1355	AlCuMg2	AW-2024	A-U4G1	L 97 / L 98	P-AlCu 4.5 MgMn	5	L-3140	A2024	AA2024
3.2315	AlMgSi 1	AW-6082	A-SGM0,7	H 30	P-AlMgSi	4212	L-3453		AA6082
3.3206	AlMgSi 0.5	AW-6060	A-GS	H 9	P-AlMgSi	4140	L-3442		AA6060
3.3208	Al99.9 MgSi	AW-6401							
3.3210	AlMgSi 0.7	AW-6005 A							
3.3211	AlMg 1 SiCu	AW-6061	A-GSUC	H 20	P-AlMg 1 SiCu		L-3420	A6061	AA6061
3.3315	AlMg1	AW-5005 A	A-G0,6	N 41	P-AlMg 0.9	4106	L-3350	A5005	AA5005 A
3.3316	AlMg 1.5	AW-5050	A-G1.5	3L 44	P-AlMg 1.5		L-3380		AA5050 B
3.3317	Al99.85 Mg 1	AW-5305							
3.3318	Al99.9 Mg 1	AW-5505							
3.3326	AlMg 1.8	AW-5051 A							
3.3345	AlMg 4.5	AW-5082	A-G4,5		P-AlMg 4.4			A5082	AA5082
3.3523	AlMg 2.5	AW-5052	A-G2,5C	L 80 / L 81	P-AlMg 2.5	4120	L-3360	A5052	AA5052
3.3525	AlMg 2 Mn 0.3	AW-5251	A-G2M	N4	P-AlMg 2 Mn		L-3361		AA5251
3.3527	AlMg 2 Mn 0.8	AW-5049	A-G2,5MC					A5049	AA5049
3.3535	AlMg 3	AW-5754	A-G3M		P-AlMg 3.5	4130	L-3390		AA5754
3.3537	AlMg 2.7 Mn	AW-5454	A-G2,5MC		P-AlMg 2.7 Mn	4130	L-3391		AA5454
3.3541	G-AlMg 3	AC-51100							
3.3545	AlMg 4 Mn	AW-5086	A-G4MC		P-AlMg 4.4		L-3382		AA5086
3.3547	AlMg 4 Mn	AW-5086	A-G4MC	N8	P-AlMg 4.5	4140	L-3321	A5083	AA5083

N 1.2 ALUMINIUM | alloyed <600 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
3.0615	AlMgSiPb	AW-6012	A-SGPb		P-AlSiMgMn		L-3452		AA6012
3.1645	AlCu 4 PbMgMn	AW-2007				4355	L-3121	A2007	AA2007
3.1655	AlCu 6 BiPb	AW-2011	A-U5PbBi	FC 1	P-AlCu 5.5 PbBi	4338	L-3192	A2011	AA2011
3.4335	AlZn 4.5 Mg 1	AW-7020	A-Z5G	H 17		4425	L-3741		AA7020
3.4345	AlZnMgCu 0.5	AW-7022	A-Z4GU						AA7022
3.4365	AlZnMgCu 1.5	AW-7075	A-Z5GU	2L 95	P-AlZn 5.8 MgCu		L-3710	A7075	AA7075

N 2.1 - 2.3 ALUMINIUM | casted <600 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
3.2151	G-AlSi 6 Cu 4	AC-45000	A-S5UZ	LM 4				AC4B	A 319.0
3.2161	G-AlSi 8 Cu 3	AC-46200	A-S9U3A-Y4	LM 24	5075			AC4D	A 328.0
3.2371	G-AlSi 7 Mg 0,3	AC-42100						AC4CH	A 356.0
3.2373	G-AlSi 9 Mg	AC-43300							
3.2381	G-AlSi 10 Mg	AC-43100							
3.2383	G-AlSi 10 Mg(Cu)	AC-43400	A-S10G	LM 9	3049	4253		ADC3	A 360.2
3.2581	G-AlSi 12	AC-47100	A-S13	LM 6	4514	4261		AC3A	A 413.2
3.2583	G-AlSi 12 Cu	AC-44300	A-S12-Y4	LM 20	5079	4260		ADC1	A 413.1

N 3.1 - 3.3 COOPER | alloyed <600 N/mm²

Materialnumber	Germany DIN	Europe EN	France AFNOR	Great Britain BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
2.0240	CuZn 15	CW-502L	CuZn 15	CZ 102				C 2300	C 23000
2.0265	CuZn 30	CW-505L	CuZn 30	CZ 102				C 2600	C 26000
2.0321	CuZn 37	CW-508L	CuZn 37	CZ 180	C 2720				C 27200
2.0492	G-CuZn 15 Si 4	CC-761S-GS							B-198
2.0592	G-CuZn 35 Al 1	CC-765S	U-Z 36 N 3	HTB 1					C 86500
2.0966	CuAl 10 Ni 5 Fe 4	CW-307G	U-A 10 N	CA 104					C 63000
2.1006	SG-CuSn								
2.1050	G-CuSn 10	CC-480K-GS		CT 1					C 90700
2.1052	G-CuSn 12	CC-483K-GS	UE 12 P	Pb 2					C 91700
2.1060	G-CuSn 12 Ni 2	CC-484K-GS							C 91700
2.1176	G-CuPb 10 Sn	CC-495K-GS	UE 10 Pb 10	LB 2					C 93700
2.1182	G-CuPb 15 Sn	CC-496K-GS	U-Pb 15 E 8	LB 1					C 93800
2.1188	G-CuPb 20 Sn	CC-497K-GS	U-Pb 20	LB 5					C 94100
2.1266	CuCd 1								
2.1292	G-CuCrF 35	CC-140C		CC1-FF					C 81500
2.1293	CuCrZr	CW-106C	U-Cr 0.8 Zr	CC 102					C 81500

S 2.1 TITANIUM | commercially pure <600 N/mm²

Material-number	Tradename	Germany DIN	Europe EN	France AFNOR	GB BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
3.7025		Ti 99,8	Titan Grade 1	AlR:9182T35	2 TA 1					R 50250
3.7035		Ti 99,7	Titan Grade 2	AlR:9182T40	2 TA 2-1					R 50400
3.7055		Ti-99,6	Titan Grade 3	AlR:9182T50	TA 3					R 50550
3.7065		Ti-99,5	Titan Grade 4	AlR:9182T60	2 TA 6-9					R 50700

S 2.2 TITANIUM | alloyed <1000 N/mm²

Material-number	Tradename	Germany DIN	Europe EN	France AFNOR	GB BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
3.7105		TiNi 0,8 Mo 0,3	Titan Grade 12							
3.7115		TiAl 5 Sn 2,5	Titan Grade 6	T-A 5 E						Ti 5 Al-2,5 Sn
3.7195		TiAl 3 V 2,5	Titan Grade 9							
3.7225		Ti 1 Pd	Titan Grade 11		TP 1					R 52250
3.7235		Ti 2 Pd	Titan Grade 7							T 52400
3.7164		TiAl 6 V 4-LN	Titan Grade 5							R 56400
3.7165		TiAl 6 V4	Titan Grade 5	T-A 6 V		TA 10-13				

S 1.1 IRON-BASED ALLOY [HRSA] <1200 N/mm²

Material-number	Tradename	Germany DIN	Europe EN	France AFNOR	GB BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
1.3910	Magnifer® 36	Ni36	D 1							
1.3926	Magnifer® 50	RNi12								
1.4361	X1CrNiSi1815	X 1 CrNiSi 18-15-4	X 1 CrNiSi 18 15 4							
1.4562	Nicrofer® 3127	X1NiCrMoCu32287	X 1 NiCrMoCu 32 28 7							
1.4562	Alloy 31	X1NiCrMoCu32287	X 1 NiCrMoCu 32 28 7							
1.4563	Sanicro® 28	X1NiCrMoCuN31274	X 1 NiCrMoCuN 31-27-4	X 1 NiCrMoCuN 31 27 4		X 1 NiCMoCuN 31 27 4	2584			
1.4862	INCOLOY® Alloy DS	X12NiCr3618		Z 12 NCS 37.18	NA 17					
1.4980	INCOLOY® Alloy 286	X6NiCrTiMoVB21152	X 6 NiCrTiMoVB 21 15 2	Z 6 NCTDV 25.15 B	286 S 31					
2.4478	Alloy 52 (Nilo® 52)	FeNi 52	Titan Grade 4	AlR:9182T60	2 TA 6-9					N 14052

S 1.2 NICKEL-BASED ALLOY [HRSA] <1450 N/mm²

Material-number	Tradename	Germany DIN	Europe EN	France AFNOR	GB BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
2.4602	INCONEL® 622	NiCr21Mo14W				INCONEL® 622				
2.4632	Nimonic® 90	NiCr20Co80Ti	HR 2	NC 20 KTA	NA 36	Nimonic® 90				N 07090
2.4642	INCONEL® 690	NiCr29Fe		NC 30 Fe		INCONEL® 690			NCF 690	N 06690
2.4650	Nimonic® C-263	NiCo20Cr20MoTi	HR 10	NCK 20 D	NA 38	Nimonic® C-263			NCF 690	N 07263
2.4654	Waspaloy®	NiCr19Co14Mo4Ti		NC 20 K14 Y		Waspaloy®				N 07001
2.4662	INCOLOY® 901	NiCr13Mo6Ti3		Z 8 NCDT 42						N 09901
2.4663	INCONEL® 617	NiCr23Co12Mo		NC 22 K12 D9 A		INCONEL® 617				N 06617
2.4665	Hastelloy® X	NiCr22Fe18Mo	HR 6	NC 22 FeD	NA 40	Hastelloy X				
2.4666	Nimonic® PK25	NiCr18CoMo		NKCD 20 ATU						
2.4668	INCONEL® 718	NiCr19FeNbMo	HR 8	NC 19 Fe Nb	INCONEL® 718	INCONEL® 718				N 07718
2.4669	INCONEL® X-750	NiCr15Fe7TiAl		NC 15 Fe 7 TA		INCONEL® X-750				N 07750
2.4694	INCONEL® 751	NiCr16Fe7TiAl								N 07751
2.4816	INCONEL® 600	NiCr15Fe		NC 15 Fe	NA 14	INCONEL® 600			NFC 600	N 06600
2.4819	Nimonic® C-276	NiMo16Cr15W		NC 17 D		Nimonic® C-276				N 10276
2.4851	INCONEL® 601	NiCr23Fe15		NC 23 Fe 14 A		INCONEL® 601			NCF 601	N 06601
2.4856	INCONEL® 625	NiCr22Mo9Nb		NC 22 Fe DNb	NA 21	INCONEL® 625			NCF 625	N 06625
2.4858	INCOLOY® 825	NiCr21Mo	3072.76	NC 21 Fe DU	NA 16	INCOLOY® 825			NCF 825 TB	N 08825
2.4869	Alloy 80/20	NiCr80-20								N 06003
2.4879	Centralloy® 4879	G-NiCr38W								
2.4883	Hastelloy® C276	G-NiMo16Cr								
2.4889	Nicrofer® 45 TM	NiCr28FeSiCe								N 06045
2.4951	Nicrofer® 7520	NiCr20Ti		NC 20 T	HR 5					N 06075

S 1.3 COBALT-BASED ALLOY [HRSA] <1450 N/mm²

Material-number	Tradename	Germany DIN	Europe EN	France AFNOR	GB BS	Italy UNI	Sweden SIS	Spain UNE	Japan JIS	USA AISI
2.4681	ULTIMET® alloy	CoCr26Ni9Mo5W								
2.4682	Stellite® 31	G-CoCr25NiW		KC 25 WN						ASTM A567
2.4683	Conicro® 4023 W	CoCr22NiW								
2.4691	HS 21	G-CoCr28Mo		KC 27 D5 NFe						ASTM F-75
2.4964	Stellite® 25	CoCr20W15Ni		KC 22 WN	HR 240	L605 Haynes® 25				R 30605
2.4979	S 816	CoCr28Mo6								

Technical formulas

Calculate cutting speed (m/min)

$$V_c = \frac{D \cdot \pi \cdot n}{1000}$$

Calculate rotational speed (rpm)

$$n = \frac{V_c \cdot 1000}{D \cdot \pi}$$

Calculate feed rate (mm/min)

$$V_f = n \cdot z \cdot f_z$$

Calculate feed per tooth (mm/number of teeth)

$$f_z = \frac{V_f}{n \cdot z}$$

Calculate chip removal rate (cm³/min)

$$Q = \frac{a_p \cdot a_e \cdot V_f}{1000}$$

Calculate average chip thickness (mm)

$$h_m = \frac{\sqrt{a_e}}{n \cdot z}$$

Explanation of terms

Vc	Cutting speed	in m/min
n	Rotational speed	in rpm
Vf	Feed rate	in mm/min
Fz	Feed per tooth	in mm/number of teeth
z	Number of teeth (cutting)	
ap	Depth of cut	in mm
ae	Width of cut	in mm
hm	Average chip thickness	in mm
Q	Chip removal rate	in cm³/min



GENERAL TERMS OF SALE

§ 1 SCOPE

1. These General Terms of Sale apply to all business relationships between Hofmann & Vratny OHG (hereinafter referred to as “Hofmann & Vratny”) and its customers (hereinafter referred to individually as the “Ordering Party” and collectively as the “Ordering Parties”).
2. These General Terms of Sale only apply to Ordering Parties that are entrepreneurs pursuant to §§ 14 and 310 section 1 of the BGB (Civil Code of Germany), legal entities under public law, and/or special funds under public law.
3. The scope of application of these General Terms of Sale includes, but is not limited to, contracts regarding the sale and/or delivery of chattels (hereinafter referred to as “Goods”) regardless of whether they are produced by Hofmann & Vratny or procured from suppliers (§§ 433 and 651 of the BGB). Unless agreed upon otherwise, the version of these General Terms of Sale applicable at the time the Ordering Party places an order and in any case the most recent version of these General Terms of Sale provided to the Ordering Party in writing in the form of a master agreement also shall apply to similar contracts made at a later date without Hofmann & Vratny being required to make reference to them in every individual case.
4. These General Terms of Sale shall apply exclusively. Any of the Ordering Party’s terms of sale which contradict or deviate from these General Terms of Sale shall not be accepted. These General Terms of Sale also shall apply if and when Hofmann & Vratny executes a delivery despite having knowledge of the Ordering Party’s terms of sale which contradict or deviate from these General Terms of Sale.
5. If Hofmann & Vratny and the Ordering Party have entered into any individual agreements, such individual agreements shall prevail over these General Terms of Sale. The content of such individual agreements only can be substantiated by a written contract or by written confirmation from Hofmann & Vratny.
6. All legal declarations and notifications required to be made by the Ordering Party vis-à-vis Hofmann & Vratny after a contract has been signed (e.g., regarding deadlines, notices of defects, rescission or reduction) shall be made in writing to be effective.
7. All references to applicable laws shall be for the purpose of clarification only. Unless amended in or excluded from these General Terms of Sale, laws shall apply even without express reference.
8. All proprietary rights and copyrights to Documents shall remain with Hofmann & Vratny. Documents marked as confidential shall be forwarded to third parties only with the express written consent of Hofmann & Vratny.

§ 2 OFFERS AND ACCEPTANCE

1. All offers made by Hofmann & Vratny shall be subject to change and shall be non-binding including if and when images, drawings, technical documentation, calculations, other documents or product descriptions (hereinafter referred to as “Documents”) of whatever nature have been provided to the Ordering Party.
2. All orders for Goods placed by the Ordering Party shall constitute binding offers. Unless stated otherwise in the respective order, Hofmann & Vratny shall be entitled to accept an offer within two weeks after receipt of said offer.
3. Hofmann & Vratny shall accept offers in writing (e.g., in the form of an order confirmation) or by delivering the respective Goods to the Ordering Party.
4. All proprietary rights and copyrights to Documents shall remain with Hofmann & Vratny. Documents marked as confidential shall be forwarded to third parties only with the express written consent of Hofmann & Vratny.

§ 3 DELIVERY DEADLINES AND DEFAULT OF DELIVERY

1. Delivery deadlines shall be agreed upon by Hofmann & Vratny and the individual Ordering Party or shall be specified by Hofmann & Vratny upon acceptance of the order or in the order confirmation.

2. Hofmann & Vratny’s compliance with delivery obligations shall be conditional upon the Ordering Party’s on-time and proper compliance with the Ordering Party’s obligations including, but not limited to, the provision of the papers, permits and approvals required to be provided by the Ordering Party and the receipt by Hofmann & Vratny of the agreed-upon down payment, if any. In the event of delays, the delivery time shall be extended reasonably.
3. If Hofmann & Vratny is unable to meet any binding delivery deadlines for reasons beyond the control of Hofmann & Vratny (non-availability of services), the Ordering Party shall be notified without undue delay and shall be provided with an estimated new delivery deadline. If the agreed upon Goods do not become available before the new deadline expires, Hofmann & Vratny shall be entitled to rescind the contract in whole or in part and shall reimburse the Ordering Party without undue delay for any and all consideration paid up to that time. For the fulfillment of this clause, non-availability of services shall include, but shall not be limited to, delayed delivery from any of Hofmann & Vratny’s suppliers, reasons beyond the control of Hofmann & Vratny or its suppliers, or if Hofmann & Vratny is not responsible for procuring the Goods.
4. If failure to comply with a delivery deadline is due to an act of God, industrial dispute or other event beyond the control of Hofmann & Vratny, the delivery time shall be extended reasonably. The same shall apply if and when any such act of God, industrial dispute or other event has arisen at any of Hofmann & Vratny’s sub-suppliers which event can be demonstrated to have had an impact on compliance with the delivery deadline. Hofmann & Vratny shall notify the Ordering Party of such circumstances without undue delay. Events also shall be deemed to be beyond Hofmann & Vratny’s control if and when they occur during a delay. In this case, the delay shall be deemed to be suspended for the duration of the respective event.
5. The beginning of a period of delivery default shall be in accordance with the law, but shall in any case require a reminder issued by the Ordering Party.
6. If a contract regarding stand-by delivery has been signed, Hofmann & Vratny shall deliver and invoice the Goods no later than 12 months after the date of such contract (hereinafter referred to as the “Recall Period”), even if the Ordering Party has failed to recall the Goods by that time. After the Recall Period has expired, Hofmann & Vratny can notify the Ordering Party of Hofmann & Vratny’s readiness to deliver and can request that the Ordering Party recall the Goods within a reasonable period of time. If the Ordering Party fails to recall the Goods within such period, Hofmann & Vratny shall be entitled to demand an additional lumpsum compensation for warehousing costs (hereinafter referred to as the “Warehousing Allowance”). The Warehousing Allowance shall be 0.5% of the net value of the purchased Goods for every full week. The Ordering Party shall be free to prove that Hofmann & Vratny did not incur any damages or that any damages incurred were lower than the Warehousing Allowance. If the Ordering Party fails to recall the Goods within the Recall Period determined by Hofmann & Vratny, Hofmann & Vratny shall be entitled to dispose of the Goods as Hofmann & Vratny sees fit. The statutory provisions regarding rescission shall remain unaffected.
7. Partial deliveries shall be admissible, provided the Ordering Party reasonably can be expected to accept them.
8. Delivered Goods shall be accepted by the Ordering Party even if the delivered Goods have minor defects provided the Ordering Party reasonably can be expected to accept such Goods.

§ 4 DELIVERY AND DEFAULT OF ACCEPTANCE

1. Unless agreed upon otherwise, all deliveries shall be ex works, that is, the place of performance for deliveries and for all subsequent actions. Unless agreed upon otherwise, upon request and at the expense of the Ordering Party the Goods shall be delivered to another destination (hereinafter referred to as “Sales Involving the Carriage of Goods”). Unless agreed upon otherwise, Hofmann & Vratny shall be entitled to determine the shipment method (including, but not limited to, the forwarder, the type of shipment and the packaging).
2. Partial deliveries shall be admissible, provided the Ordering Party reasonably can be expected to accept them.
3. Delivered Goods shall be accepted by the Ordering Party even if the delivered Goods have minor defects provided the Ordering Party reasonably can be expected to accept such Goods.

4. The risk of accidental destruction and/or deterioration of the Goods shall transfer to the Ordering Party no later than upon surrender of the Goods. In the case of Sales Involving the Carriage of Goods, the risk of accidental destruction and/or deterioration of the Goods and the risk of delay shall transfer to the Ordering Party no later than at the time of delivery of the Goods to the forwarder, carrier, or any other person designated to execute shipment of the Goods. Delivery shall be deemed to have been effected even if the Ordering Party is in default of acceptance.
5. If the Ordering Party is in default of acceptance or fails to cooperate or if delivery is delayed for other reasons for which the Ordering Party is responsible, Hofmann & Vratny shall be entitled to demand reimbursement for the damages incurred in connection therewith including additional expenses (e.g., warehousing costs).
6. Unless agreed upon otherwise, in the case of Sales Involving the Carriage of Goods the Ordering Party shall bear the costs of packaging and transportation ex works and the costs, if any, for transportation insurance if such insurance is requested by the Ordering Party. All customs and other fees, taxes and other public charges also shall be borne by the Ordering Party unless agreed upon otherwise. Ownership of the packaging for transportation and otherwise pursuant to the Packaging Ordinance of Germany shall transfer to the Ordering Party and such packaging shall not be returned to Hofmann & Vratny. Pallets shall be exempt from this rule.
7. Unless agreed upon otherwise in the order confirmation, the purchase price plus statutory sales tax shall be due and payable without any deductions within 14 days after the date of invoicing and delivery or acceptance of the Goods. However, Hofmann & Vratny reserves the right to make full or partial deliveries against cash in advance at any time including during an ongoing business relationship. The assertion of such right shall be communicated no later than at the time the order confirmation is issued. The Ordering Party shall be deemed to be in default of payment upon the expiration of the aforementioned payment deadline. The applicable rate of interest on the purchase price of the Goods shall become payable during the default period. The right to assert claims for more substantial compensation shall be reserved.
8. The Ordering Party’s rights of set-off and retention shall be limited to the extent the Ordering Party’s claim is determined in a court of law or is undisputed. The Ordering Party’s rights based on defects in the purchased Goods (see § 7 hereof) shall remain unaffected.
9. After the contract has been signed, if there is evidence that Hofmann & Vratny’s claim to the purchase price will be compromised due to lack of performance on the part of the Ordering Party, Hofmann & Vratny shall be entitled to refuse performance pursuant to the applicable laws and, after setting a deadline, if applicable, shall be entitled to rescind the contract. In the case of contracts regarding the production of customized items, Hofmann & Vratny shall be entitled to rescind the contract immediately and the laws regarding the expendability of setting deadlines shall remain unaffected.
10. Goods subject to retention of title shall not be pledged or assigned as collateral before the Ordering Party has paid in full. The Ordering Party shall notify Hofmann & Vratny in writing without undue delay in the event of a filing for commencement of insolvency proceedings or if third parties gain access (e.g., seizures) to Goods belonging to Hofmann & Vratny.

§ 5 TERMS OF PAYMENT

1. Unless agreed upon otherwise in individual cases, Hofmann & Vratny’s prices plus statutory sales tax valid at the time the contract is signed shall apply. The prices indicated in Hofmann & Vratny’s catalogs are non-binding and subject to change and/or correction.

3. If the Ordering Party violates the contract including, but not limited to, by failing to pay the purchase price when due, Hofmann & Vratny shall be entitled to rescind the contract pursuant to the applicable laws and to demand the surrender of the Goods due to the retention of title and the rescission.
4. Until further notice, the Ordering Party shall be entitled to resell/and or process in the ordinary course of business any Goods subject to retention of title. In this case, the provisions below also shall apply.
5. a) The retention of title shall include title to the full value of work products resulting from processing, mixing or combining the Goods, in which case Hofmann & Vratny shall be deemed to be the manufacturer. If and when third-party goods are processed, mixed or combined and such third parties retain ownership, Hofmann & Vratny shall acquire coownership pro rata of the invoiced value of work products so processed, mixed or combined. In all other cases, the creation of work products shall be subject to the same provisions as the delivered Goods subject to retention of title.
6. b) The Ordering Party hereby agrees to assign to Hofmann & Vratny as collateral any and all receivables against third parties resulting from the resale of the Goods or work results in full or in the amount of Hofmann & Vratny’s estimated share of co-ownership pursuant to a) above, and Hofmann & Vratny hereby accepts such assignment. The Ordering Party’s obligations under § 6 2) hereof also shall apply with respect to the receivables assigned.
7. c) In addition to Hofmann & Vratny, the Ordering Party shall remain authorized to collect receivables. Hofmann & Vratny undertakes to refrain from collecting receivables as long as the Ordering Party meets its payment obligations vis-à-vis Hofmann & Vratny and does not fail to perform and Hofmann & Vratny does not assert its retention of title by asserting a right under § 6 3) hereof. Otherwise, Hofmann & Vratny shall be entitled to demand that the Ordering Party inform Hofmann & Vratny of such receivables assigned and of the names of the debtors, provide Hofmann & Vratny with all the information required for collecting such receivables and the pertinent documents, and inform the debtors (third parties) of the assignment. In addition, in this case Hofmann & Vratny shall be entitled to revoke the Ordering Party’s authorization to resell and/or process Goods which are subject to retention of title.
8. 5. Upon request of the Ordering Party, Hofmann & Vratny shall release the collateral to which Hofmann & Vratny is entitled insofar as the realizable value of such collateral exceeds the receivables to be collateralized by more than 10%. Hofmann & Vratny shall be free in its decision regarding which collateral to release.
9. § 7 LIABILITY FOR DEFECTS AND CLAIMS FOR DEFECTS
10. 1. Unless agreed upon otherwise herein, the Ordering Party’s rights based on defects in quality and in title shall be subject to the applicable laws.
11. 2. The assertion of claims by the Ordering Party regarding defects shall be conditional upon the Ordering Party’s meeting of its statutory duty to inspect and to give notice of defects (§§ 377 and 381 of the HGB (Commercial Code of Germany)). If a defect in the Goods becomes apparent during or after inspection, the Ordering Party shall give written notice to Hofmann & Vratny without undue delay. Such notice shall be deemed to have been given without undue delay if it is given within two weeks and is transmitted before the end of such period. Regardless of the Ordering Party’s duty to inspect and to give notice of defects, the Ordering Party shall give written notice of obvious defects within two weeks after delivery, which notice shall be deemed to have been given in a timely manner if it is transmitted before the end of such period. If the Ordering Party fails to inspect the Goods properly and/or to give proper notice of any defects, Hofmann & Vratny shall not assume liability for any defects for which no notice was given.
12. 3. If any of the Goods are defective, Hofmann & Vratny shall be free to offer supplementary action to remedy the defect or defects (supplementary remedy) or to deliver defect-free Goods (replacement) to the Ordering Party. It is Hofmann & Vratny’s right to refuse to offer supplementary action under the applicable laws shall remain unaffected. The requirement for Hofmann & Vratny to provide any supplementary action owed shall be conditional upon the Ordering Party’s paying of the purchase price when due. However, the Ordering Party shall be entitled to retain a reasonable portion of the purchase price pro rata in consideration of the defect. The Ordering Party shall give Hofmann & Vratny the time and the opportunity to provide the supplementary

action owed including, but not limited to, providing Hofmann & Vratny the opportunity to inspect the Goods which are subject to complaint. If Hofmann & Vratny opts to replace the Goods, the Ordering Party shall return the defective Goods to Hofmann & Vratny in accordance with the applicable laws. Supplementary action shall not include the de-installation of defective Goods or installation of new Goods, provided Hofmann & Vratny originally was not obligated to install the Goods.

4. Any and all expenses incurred in connection with inspections and supplementary action including, but not limited to, transportation, road, labor and material costs shall be borne by Hofmann & Vratny if a defect actually is present. However, if the Ordering Party's demand for remedy of a defect is proven to be invalid, Hofmann & Vratny shall be entitled to demand reimbursement from the Ordering Party for any costs incurred therewith.

5. If the costs of supplementary remedy would be disproportionately high, the Ordering Party shall not be entitled to claim remedy of defects.

6. The Ordering Party's claims for damages or reimbursement for wasted expenses shall be limited by the provisions of § 9 below and shall be excluded in all other cases.

7. The statute of limitations for claims for defects shall be one year after the transfer of risk. This rule shall not apply if and when § 438 section 3 of the BGB (malice) stipulates longer terms.

§ 8 OTHER LIABILITIES

1. Unless agreed upon otherwise in these General Terms of Sale and in the provisions below, Hofmann & Vratny's liability for breach of contractual and non-contractual obligations shall be in accordance with the applicable laws.

2. Hofmann & Vratny's liability for damages, regardless of the legal reasons and of whether or not they are known, shall include intent and gross negligence. In the event of minor negligence, Hofmann & Vratny's liability shall be limited to damages resulting from harm to life, body or health and/or for damages resulting from the not-insignificant breach of a material contractual obligation, that is, an obligation which must be met to make the proper fulfillment of the contract possible and the meeting of which the Ordering Party relies upon and can rely upon on a regular basis. In this case, however, Hofmann & Vratny's liability shall be limited to reimbursement of the foreseeable damages typical in such cases.

3. The limitation of liability under § 8, 2) hereof shall not apply if and when Hofmann & Vratny is found to have failed to disclose a defect maliciously or has assumed a guarantee for the quality of the Goods and for the Ordering Party's claims under the Product Liability Act of Germany.

4. The Ordering Party can rescind or cancel a contract due to a breach of obligation other than a breach based on a defect only if and when Hofmann & Vratny is responsible for such breach of obligation. The Ordering Party shall not have an unrestricted right to terminate a contract. All other cases shall be subject to the applicable laws and legal consequences.

§ 9 APPLICABLE LAW AND JURISDICTION

1. These General Terms of Sale and all legal relationships between Hofmann & Vratny and the Ordering Party shall be subject to the laws of the Federal Republic of Germany under exclusion of the provisions of international private law. The CISG shall not apply.

2. These General Terms of Sale and all disputes arising directly or indirectly from the contractual relationship between Hofmann & Vratny and the Ordering Party shall be subject to the exclusive jurisdiction of Aßling if the Ordering Party is a businessperson. However, Hofmann & Vratny shall be entitled to sue the Ordering Party at the place of performance (see § 4 hereof) or at the Ordering Party's general jurisdiction.

Hofmann & Vratny OHG
September 2021

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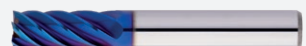
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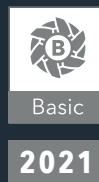


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