



Jongen Werkzeugtechnik

The Step Milling System

B18

**Depth of Cut
 a_p = up to 17 mm
possible!**



Products from



Willich



NRW



Deutschland



Europa

for



Europa

and the



THE TOOL

☞ New step milling programme ensure a smooth running of the machines, with highest productivity and precision

CHARACTERISTICS

Multi-functional step-, slot- and contour milling

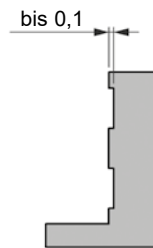
☞ The positive cutting geometry allows a smooth running with lowest vibrations rate

☞ Almost step-free milling can be obtained

JMB18-49../JMB18-249..



Competitor



No visible edges with milling up to ap approx. 10 mm

☞ The different tool versions shank-, screw-in-, shell- and multi-tooth milling cutters and cassette holders, allow almost all usual milling operations



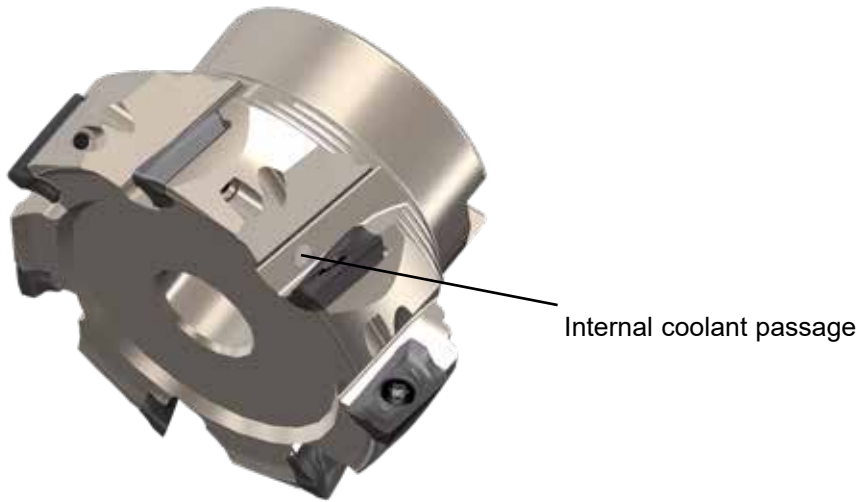
The different available versions are:

- Shell type cutters with normal and close tooth pitch, with diameter range 40-160mm
- Shank type milling cutters made to DIN1835-B, normal and close tooth pitch, diameters 25-40mm
- Shank type milling cutters made to DIN1835-A, long version, diameter 25-40mm
- Screw-in milling cutters for machining big cavities, diameters 25-40 mm
- Multi-tooth milling cutters made to DIN1835-B, diameters 32+40mm
- Multi-tooth milling cutters with crosswise slot, made to DIN8030-A, diameters 50-80mm
- Cassettes for our milling heads with diameters 80-312mm

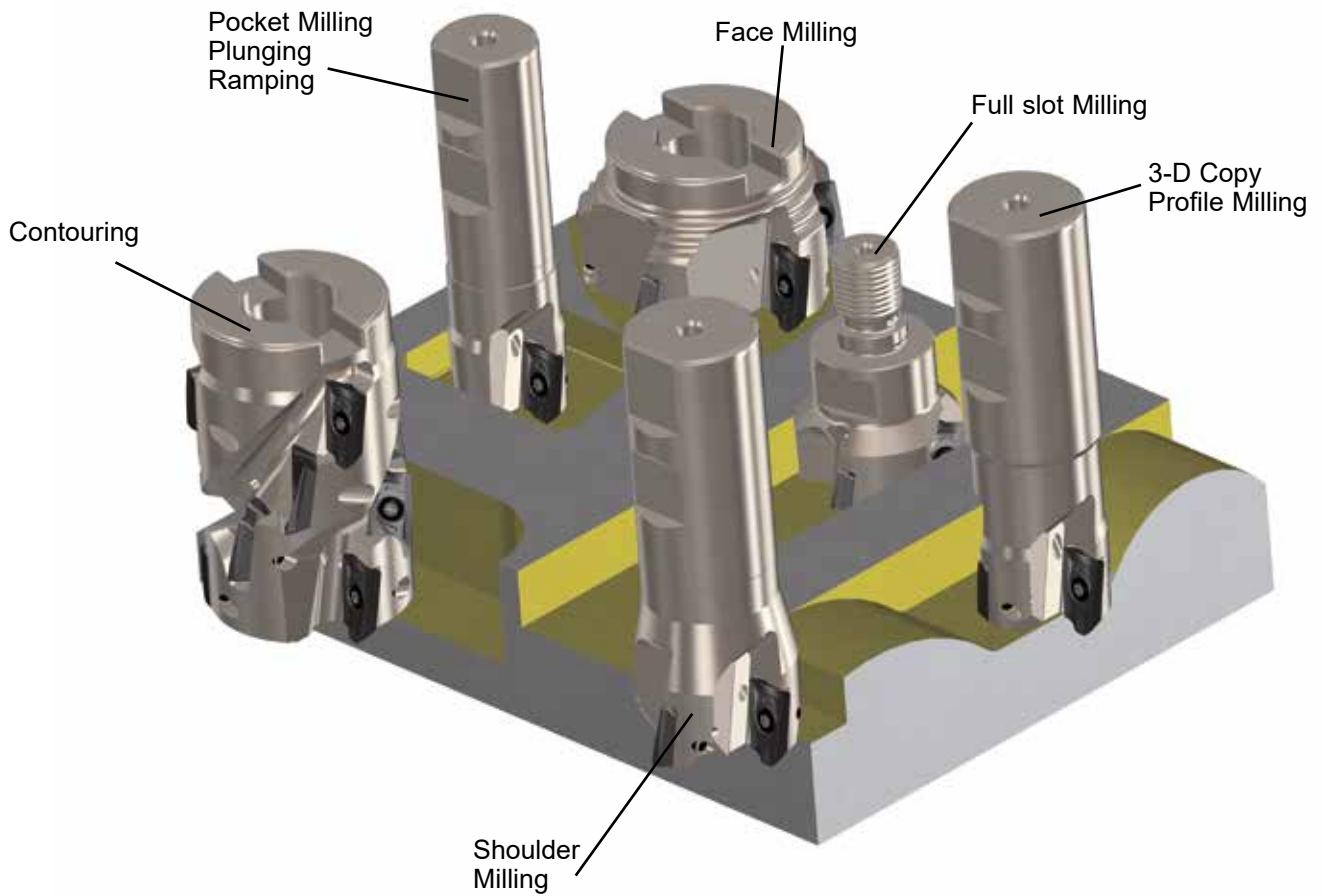
☞ Different numbers of teeth ensure almost all milling applications, in terms of roughing, finishing, big cavities etc.



☞ All tools include internal coolant passages



APPLICATION AREAS



THE INSERT

☞ 2-edge step milling insert that allows a depth of cut of up to 17 mm ($a_p = 17$ mm max.).

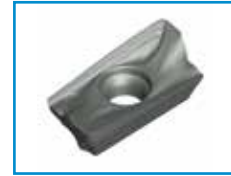
Precision sintered version:



JMB18-49R..
edge radius
R 1,0 - 1,6 - 2,0 - 3,2



JMB18-49TR10
edge radius R1,0

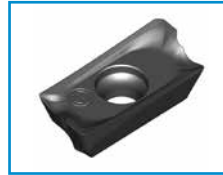


JMB18-49MR10
edge radius R1,0
with optimized cutting
geometry in comparison to
the JMB18-49R...

Precision ground version:



JMB18-249R10
edge radius R1,0



JMB18-249MR10
edge radius R1,0
with stabilized cutting
geometry in comparison to
the JMB18-249R..

**Precision ground
and polished version:**



JMB18-249R10-K15M
edge radius R1,0

☞ The cutting geometry and the stable cutting edges illustrate focal insert features.

☞ Different carbide qualities are available for processing all usual materials.

Following carbide qualities are offered:

HC45



Code 41, ISO Classification P30 - P35

Very tough fine grain quality with a thick power nitride coating for middle - high cutting speeds and high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing of almost all steels such as structural steel, tool steel, heat-treatable steel as well as unalloyed, low alloyed and high alloyed steel, and also cast-qualities such as grey cast iron, globular graphite cast iron etc.

HT45



Code 31, ISO Classification P30 - P35

Very tough fine grain carbide with an AlTiN- Nanocomposit-coating for middle to high cutting speeds with high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing of almost all steels and cast iron qualities such as: structural steel, tool steel, heat-treatable steel as well as unalloyed steel, low alloyed steel, high alloyed steel and also grey cast iron, globular graphite cast iron etc.

HT32



Code 33, ISO Classification M20 - M30

Hard wearing and tough finest grain carbide with an AlTiN- Nanocomposit-coating for medium to high cutting speeds and middle feed rates. This quality is equally applicable for dry as well as wet milling. It is especially suited for processing stainless steel, tool steel as well as high alloyed steel.

HC30



Code 52, ISO Classification M25 - M30

Hard wearing and tough finest grain carbide with power nitride coating for middle cutting speeds and middle feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing high grade steel as well as high alloyed materials.

XC35



Code 46, ISO Classification M20 - M30

Wear resistant and tough finest grain hard metal quality with power nitride coating. On the basis of the experience gained wet machining is preferably to be adopted with this quality; however the dry processing is also possible. XC35 has been especially developed for processing stainless steel, duplex steel and high-alloyed materials, but also for titanium etc. .

Following carbide qualities are offered:

HC20



Code 53 , Iso-Classification K15-K20

Very hard wearing fine grain carbide with power nitride coating for middle – high cutting speeds with high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing of cast iron materials, e.g. grey-, tempered-, vermicular-, graphite- and globular graphite cast iron.

HT20



Code 32, ISO Classification K15 - K20

Very hard wearing fine grain carbide with an AlTiN- Nanocomposit-coating for middle – high cutting speeds with high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing of cast iron materials, e.g. grey-, tempered-, vermicular-, graphite- and globular graphite cast iron.

K15M

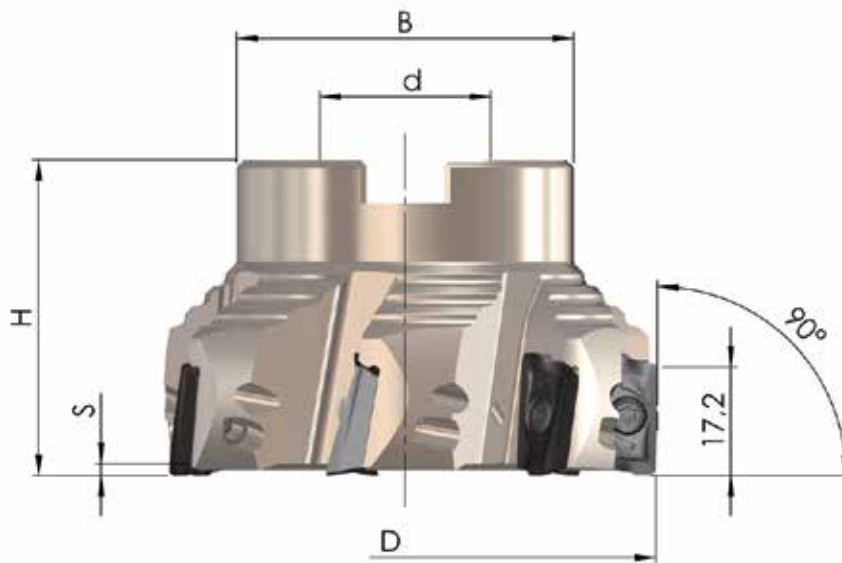


Code 8, ISO Classification K10

Very hard wearing fine grain carbide, for high cutting speeds with high feed rates. This quality is suitable for dry milling and can also be adopted with cooling. Application areas are roughing and finishing nonferrous heavy materials and aluminium up to a Si-content of approx. 8%.

TECHNICAL DATA

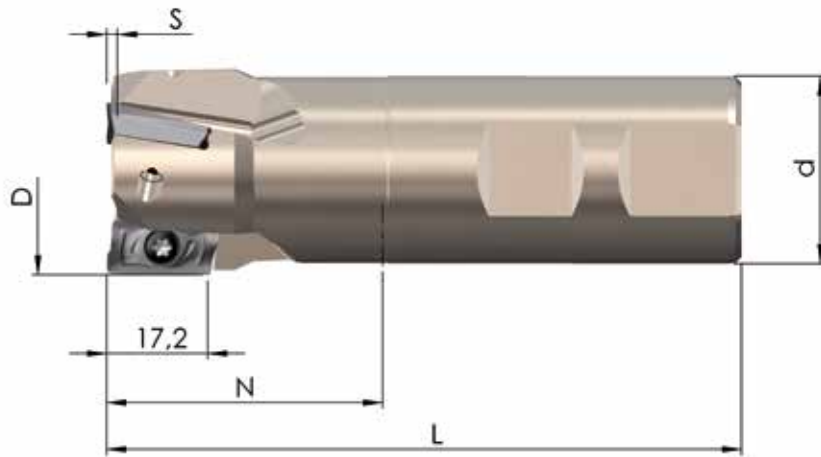
Shell Type Milling Cutters



Order-Nr.	D	H	d	B	S	Z	MS
90PP-040-49-3	40	40	16	32	1,8	3	MS-8x25-912
90PP-050-49-4	50	40	22	46	1,8	4	MS-10x25-912
90PP-063-49-5	63	40	22	46	1,8	5	MS-10x25-912
90PP-080-49-5	80	50	27	58	1,8	5	MS-12x35-912
90PP-100-49-7	100	50	32	64	1,8	7	MS-16x35-6912
90PP-125-49-8	125	63	40	90	1,8	8	MS-20x60-7991
90PP-160-49-11	160	63	40	90	1,8	11	MS-20x60-7991
Close teeth pitch:							
90PP-040-49-4	40	40	16	32	1,8	4	MS-8x25-912
90PP-050-49-5	50	40	22	46	1,8	5	MS-10x25-912
90PP-063-49-6	63	40	22	46	1,8	6	MS-10x25-912
90PP-080-49-7	80	50	27	58	1,8	7	MS-12x35-912
90PP-100-49-8	100	50	32	64	1,8	8	MS-16x35-6912
90PP-125-49-10	125	63	40	90	1,8	10	MS-20x60-7991
90PP-160-49-13	160	63	40	90	1,8	13	MS-20x60-7991

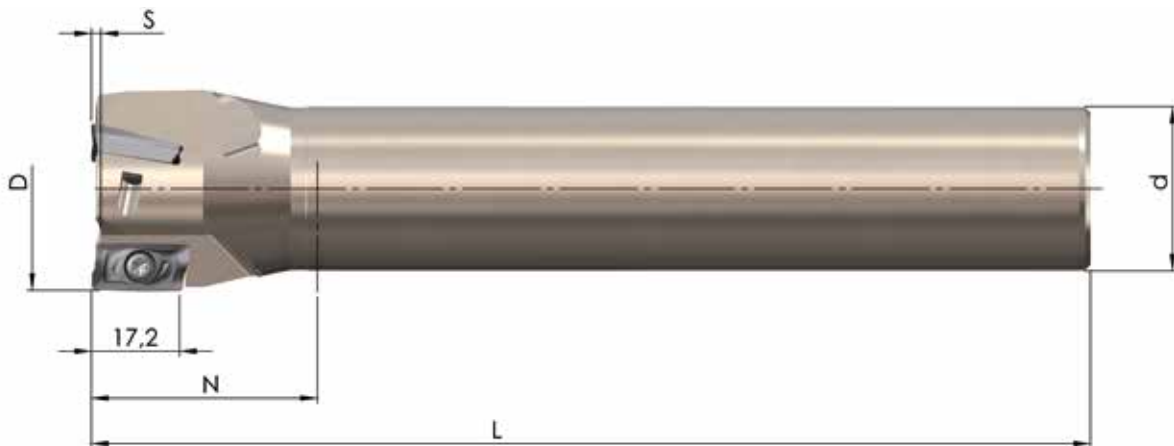
MS= central screw

Shank Type Milling Cutters made to DIN 1835-B (Weldon)



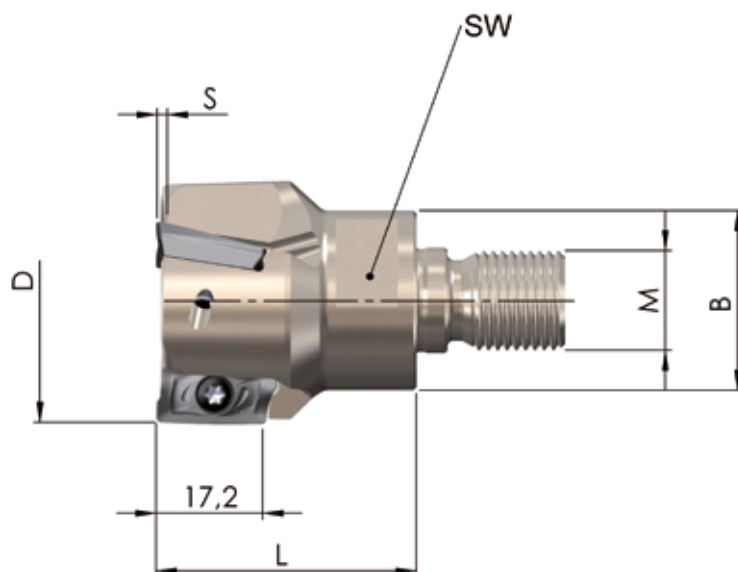
Order-Nr.	D	L	d	N	S	Z
90PP-25-38-49-2	25	95,2	25	38	1,3	2
90PP-28-42-49-2	28	98,2	25	42	1,8	2
90PP-30-45-49-2	30	101,2	25	45	1,8	2
Close teeth pitch:						
90PP-32-48-49-3	32	108,2	32	48	1,8	3
90PP-36-48-49-3	36	108,2	32	48	1,8	3
90PP-40-48-49-4	40	108,2	32	48	1,8	4

Shank Type Milling Cutters made to DIN 1836 (cylindrical)

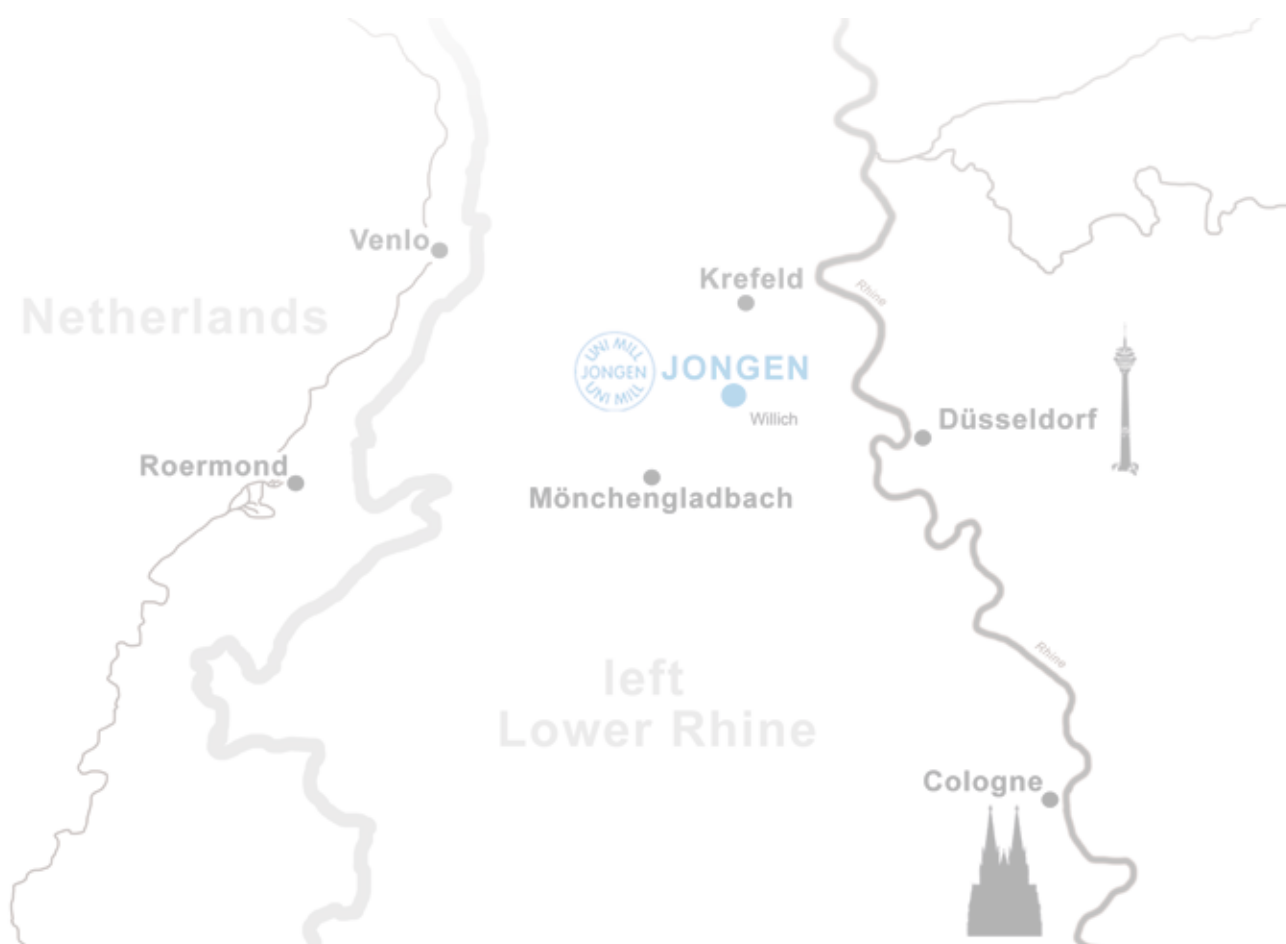


Order-Nr.	D	L	d	N	S	Z
90PP-25-49-2-170	25	170	20	38	1,8	2
90PP-32-49-2-195	32	195	25	52	1,8	2
90PP-40-49-3-195	40	195	32	42	1,8	3

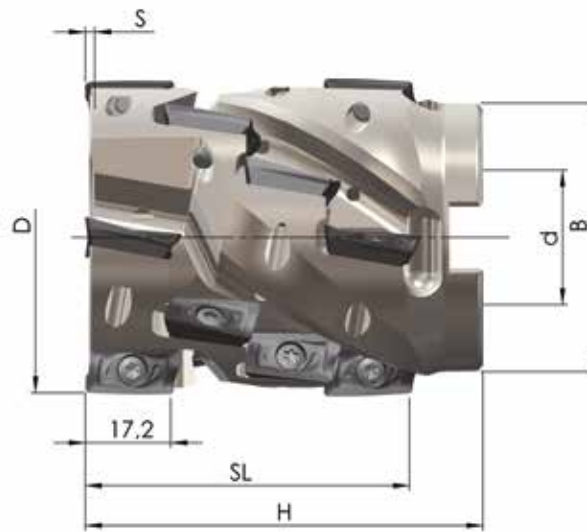
Screw-In Cutters



Order-Nr.	D	L	M	B	SW	S	Z
ESF-25-32-M12-49-2	25	32	M12	21,0	SW18	1,8	2
ESF-32-42-M16-49-3	32	42	M16	29,0	SW24	1,8	3
ESF-35-42-M16-49-3	35	42	M16	29,0	SW24	1,8	3
ESF-40-42-M16-49-3	40	42	M16	29,0	SW24	1,8	3

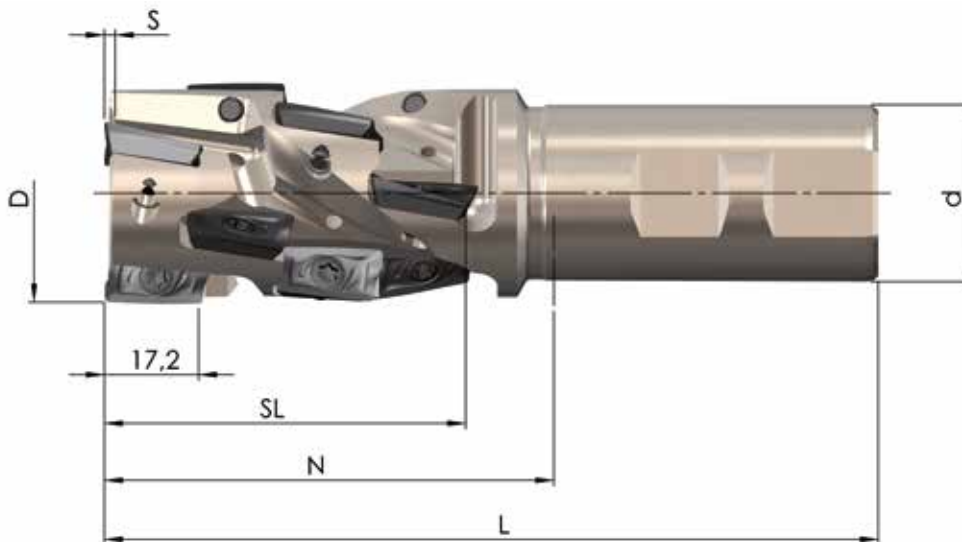


Multi-Tooth Milling Cutters




Order-Nr.	D	SL	H	d	B	S	Z _{eff.}	ZZ	MS
VZF-63-64-49-3 KD27	63	64	90	27	58	1,8	3	12	MS-12x75-912
VZF-80-64-49-4 KD32	80	64	90	32	78	1,8	4	16	MS-16x70-912
Close teeth pitch:									
VZF-50-64-49-3 KD22	50	64	80	22	46	1,8	3	12	MS-10x65-912
VZF-63-64-49-4 KD27	63	64	80	27	54	1,8	4	16	MS-12x65-912
VZF-80-64-49-5 KD32	80	64	80	32	64	1,8	5	20	MS-16x60-912

MS= central screw






























Order-Nr.	D	SL	N	L	d	S	Z _{eff.}	ZZ
VZF-32-48-25-49-2	32	48	59	115	25	1,8	2	6
VZF-32-48-32-49-2	32	48	60	120	32	1,8	2	6
VZF-40-64-32-49-2	40	64	80	140	32	1,8	2	8
Close teeth pitch:								
VZF-40-64-32-49-3	40	64	60	140	32	1,8	3	12

Cassettes





	K90-49-G	<p>Hard wearing Ni-Coating</p> <p>☞ For milling heads see catalogue page I-6</p>
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Inserts

		HC45 (code 41)	HT45 (code 31)	HT32 (code 33)	HC30 (code 52)	XC35 (code 46)	HC20 (code 53)	HT20 (code 32)	K15M (code 8)
	JMB18-49R10- 18,0x9,54x5,5 R1,0 H M  		B18A-UJ31	B18A-TJ33				B18A-SA32	
	JMB18-49TR10- 18,0x9,54x5,5 R1,0 H M  	B18A-YO41			B18A-XU52		B18A-SU53		
	JMB18-49R16- 18,0x9,54x5,5 R1,6 H M  		B18A-WN31	B18A-ZW33				B18A-YE32	
	JMB18-49R20- 18,0x9,54x5,5 R2,0 H M  		B18A-EY31	B18A-AR33				B18A-NM32	
	JMB18-49R32- 18,0x9,54x5,5 R3,2 H M  		B18A-MZ31	B18A-LY33				B18A-JO32	
	JMB18-49MR10- 18,0x9,54x5,5 R1,0 U  	B18A-NF41			B18A-PO52				
	JMB18-249R10- 18,0x9,54x5,5 R1,0 S  		B18B-HR31	B18B-JU33		B18B-LW46		B18B-TX32	
	JMB18-249MR10- 18,0x9,54x5,5 R1,0 U  					B18B-RL46			
	JMB18-249R10- 18,0x9,54x5,5 R1,0 U  								B18D-OZ08

Key to symbols see catalogue page XV-39

Spare Parts

	SS 4,0-2	tightening torque 3,2 Nm	Fixing screw for milling heads from diam. 50 and cassettes
	SS 4,0-3	tightening torque 3,2 Nm	Fixing screw for milling heads up to diam. 40
	T 15	Screw driver	
	100g	Heavy duty grease	

PARAMETERS STEP MILLING

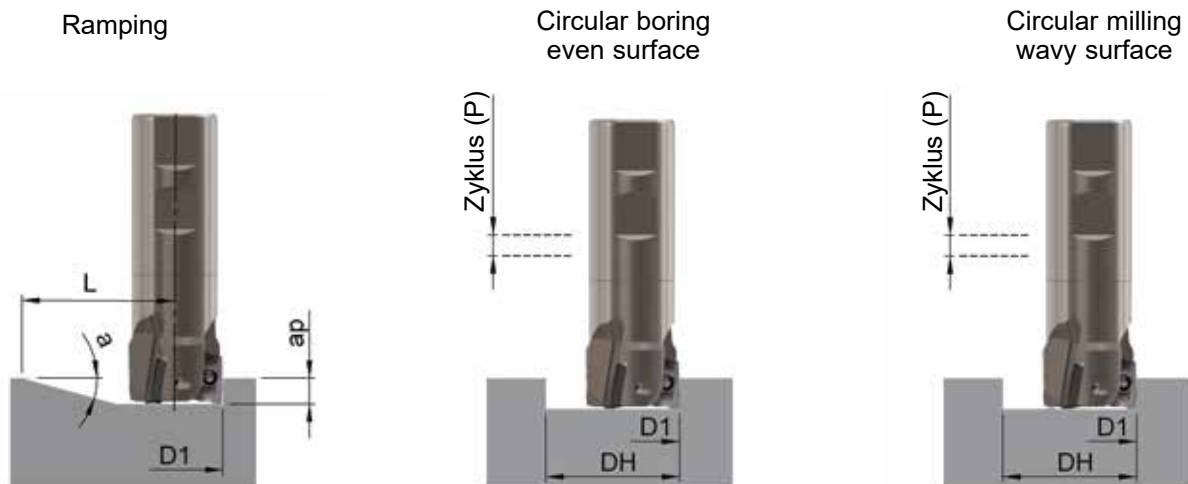
	Material	Hardness	Quality	Depth of cut a_e [mm]	Cutting speed V_c [m/min]
P	Structural steel, Unalloyed steel	<180 HB	HC45 HT45	-0,25D	250 (200-350)
				-0,5D	
				-0,75D	
				>0,75D-1D	
	Tool steel, Heat-treatable steel, Alloyed steel	180-350 HB	HC45 HT45 HT32	-0,25D	220 (160-280)
				-0,5D	
				-0,75D	
				>0,75D-1D	
M	Stainless-steel, High grade steel, High alloyed steel,	<270 HB	XC35 HC30 HT32	-0,25D	240 (140-300)
				-0,5D	
				-0,75D	
				>0,75D-1D	
S	Heat-resistant super alloys Titan alloys		XC35 HC30 HT32	-0,25D	60 (40-200)
				-0,5D	
				-0,75D	
				>0,75D-1D	
H	Tempered steel	40-55 HRC	HC20 HT20	-0,25D	80 (50-120)
				-0,5D	
				-0,75D	
				>0,75D-1D	
K	Grey cast iron	<800 N/mm ²	HC20 HT20	-0,25D	250 (180-350)
				-0,5D	
				-0,75D	
				>0,75D-1D	
	Globular graphite cast iron	<350 N/mm ²	HC20 HT20 (HC45) (HT45)	-0,25D	200 (130-280)
				-0,5D	
				-0,75D	
				>0,75D-1D	
N	Aluminium Non-ferrous metals	bis 12% Si	K15M	-0,25D	500 (500-1000)
				-0,5D	
				-0,75D	
				>0,75D-1D	

The above mentioned data are standard values.

Up and down corrections are admitted depending on the machine type, tool and holding fixture.

ø25-32 f _z [mm]	ø36-50 f _z [mm]	ø63-100 f _z [mm]	ø125-160 f _z [mm]
0,20 (0,10-0,35)	0,24 (0,14-0,39)	0,30 (0,20-0,45)	0,30 (0,20-0,45)
0,14 (0,09-0,29)	0,17 (0,07-0,32)	0,21 (0,11-0,36)	0,21 (0,11-0,36)
0,12 (0,08-0,27)	0,14 (0,09-0,29)	0,17 (0,12-0,32)	0,17 (0,12-0,32)
0,10 (0,10-0,30)	0,12 (0,10-0,32)	0,15 (0,10-0,35)	0,15 (0,10-0,35)
0,20 (0,10-0,35)	0,24 (0,14-0,39)	0,30 (0,20-0,45)	0,30 (0,20-0,45)
0,14 (0,09-0,29)	0,17 (0,07-0,32)	0,21 (0,11-0,36)	0,21 (0,11-0,36)
0,12 (0,08-0,27)	0,14 (0,09-0,29)	0,17 (0,12-0,32)	0,17 (0,12-0,32)
0,08 (0,10-0,30)	0,12 (0,10-0,32)	0,15 (0,10-0,35)	0,15 (0,10-0,35)
0,20 (0,10-0,35)	0,24 (0,10-0,39)	0,30 (0,10-0,45)	0,30 (0,10-0,45)
0,14 (0,10-0,35)	0,17 (0,10-0,32)	0,21 (0,11-0,36)	0,21 (0,11-0,36)
0,12 (0,10-0,37)	0,14 (0,10-0,29)	0,17 (0,10-0,32)	0,17 (0,10-0,32)
0,10 (0,10-0,37)	0,12 (0,10-0,27)	0,15 (0,10-0,35)	0,15 (0,10-0,35)
0,16 (0,10-0,30)	0,20 (0,10-0,35)	0,24 (0,15-0,39)	0,24 (0,14-0,39)
0,11 (0,10-0,30)	0,14 (0,10-0,29)	0,17 (0,12-0,32)	0,17 (0,12-0,32)
0,10 (0,10-0,30)	0,12 (0,10-0,27)	0,14 (0,10-0,29)	0,14 (0,10-0,29)
0,10 (0,10-0,30)	0,10 (0,10-0,25)	0,12 (0,10-0,27)	0,12 (0,10-0,27)
0,10 (0,05-0,20)	0,10 (0,05-0,20)	0,14 (0,09-0,24)	0,14 (0,09-0,24)
0,07 (0,05-0,20)	0,07 (0,05-0,20)	0,10 (0,05-0,25)	0,10 (0,05-0,25)
0,06 (0,05-0,20)	0,06 (0,05-0,20)	0,08 (0,05-0,25)	0,08 (0,05-0,25)
0,05 (0,05-0,20)	0,05 (0,05-0,20)	0,07 (0,05-0,25)	0,07 (0,05-0,25)
0,30 (0,20-0,40)	0,36 (0,20-0,50)	0,30 (0,20-0,50)	0,30 (0,20-0,50)
0,21 (0,15-0,40)	0,25 (0,15-0,50)	0,28 (0,20-0,50)	0,28 (0,20-0,50)
0,17 (0,15-0,45)	0,21 (0,15-0,50)	0,23 (0,20-0,50)	0,23 (0,20-0,50)
0,15 (0,10-0,45)	0,18 (0,15-0,50)	0,20 (0,20-0,50)	0,20 (0,20-0,50)
0,26 (0,20-0,45)	0,32 (0,20-0,50)	0,36 (0,20-0,50)	0,36 (0,20-0,50)
0,18 (0,15-0,45)	0,23 (0,18-0,50)	0,25 (0,18-0,50)	0,25 (0,18-0,50)
0,15 (0,15-0,45)	0,18 (0,13-0,50)	0,21 (0,13-0,50)	0,21 (0,13-0,50)
0,15 (0,15-0,45)	0,16 (0,10-0,50)	0,18 (0,10-0,50)	0,18 (0,10-0,50)
0,40 (0,20-0,60)	0,44 (0,20-0,60)	0,50 (0,20-0,60)	0,50 (0,20-0,60)
0,28 (0,20-0,60)	0,31 (0,20-0,60)	0,35 (0,20-0,60)	0,35 (0,20-0,60)
0,23 (0,20-0,60)	0,25 (0,20-0,60)	0,29 (0,20-0,60)	0,29 (0,20-0,60)
0,20 (0,20-0,60)	0,22 (0,20-0,60)	0,25 (0,20-0,60)	0,25 (0,20-0,60)

PARAMETERS PROFILE MILLING AND CIRCULAR MILLING



D1	Ramping Angle		Circular boring (flat surface)				Circular milling (wavy surface)	
	Anlge of lead max. α (°)	Processing distance min. L (mm)	Diam. max. DH (mm)	Depth of cut max. cycle P (mm)	Diam. min. DH (mm)	Depth of cut max. cycle P (mm)	Diam. min. DH (mm)	Depth of cut max. cycle P (mm)
25	5,9	16	49,0	5,0	48	4,8	42,5	3,7
28	4,9	19	55,0	4,7	54	4,5	48,5	3,6
30	4,5	21	59,0	4,6	58	4,4	52,5	3,5
32	4,1	23	63,0	4,4	62	4,3	56,5	3,5
35	3,6	26	69,0	4,3	68	4,1	62,5	3,5
36	3,5	27	71,0	4,2	70	4,1	64,5	3,4
40	3,0	31	79,0	4,1	78	4,0	72,5	3,4
50	2,3	41	99,0	3,8	98	3,8	92,5	3,3
63	1,7	54	125,0	3,7	124	3,6	118,5	3,3
80	1,3	71	159,0	3,5	158	3,5	152,5	3,3
100	1,0	91	199,0	3,5	198	3,4	192,5	3,2
125	0,8	116	249,0	3,4	248	3,4	242,5	3,2
160	0,6	151	319,0	3,3	318	3,3	312,5	3,2

Formula for calculating the max. angle of immersion:

$$\tan \alpha = \frac{s}{(D-9,54)}$$

s = Variable (see above)
 $9,54$ = Insert's width
 D = Tool diam.

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Errors and omissions excepted.