



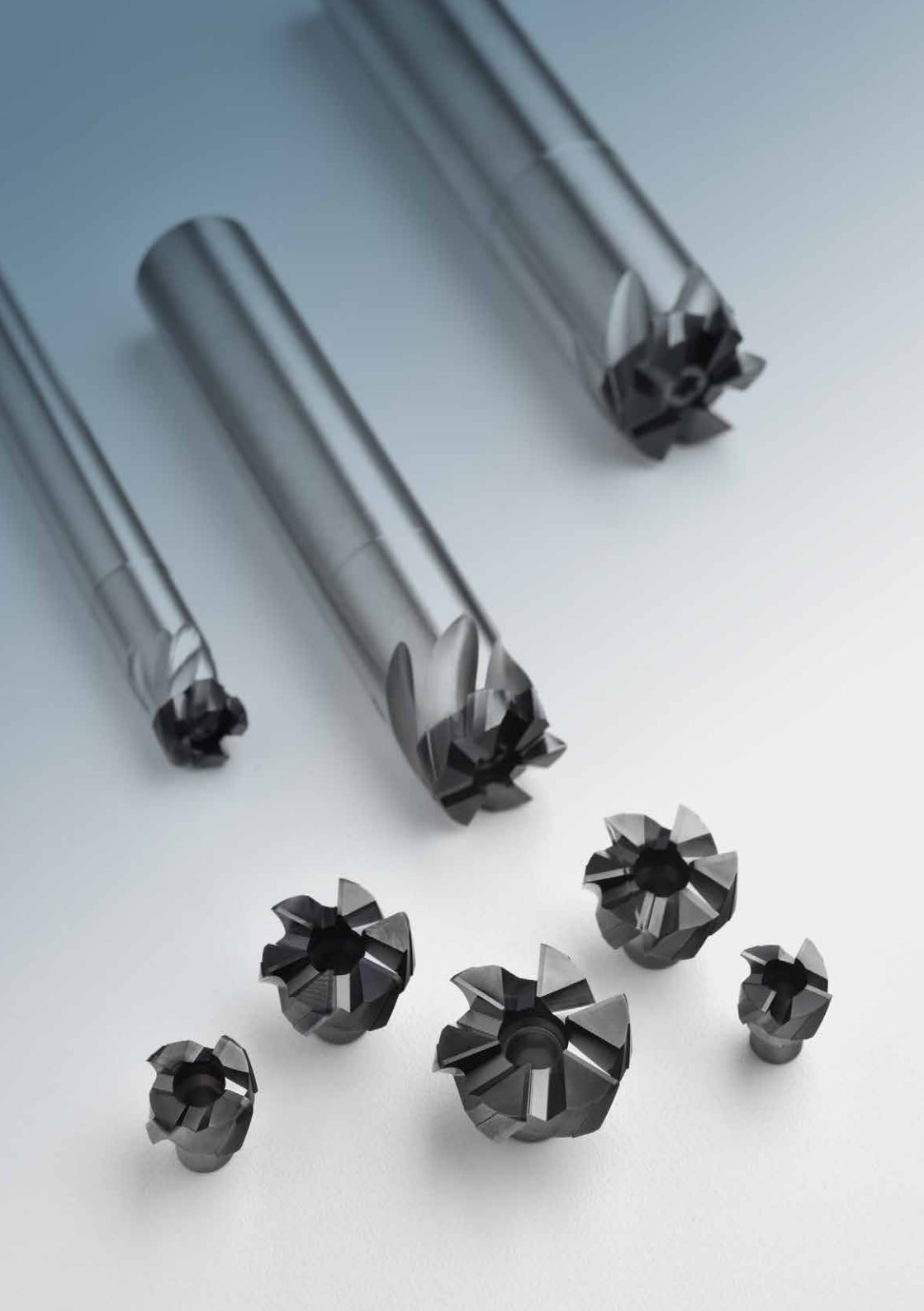
SINCE 1977



2024.01

UFO MILL[®]

Simple _ Speed _ Smart

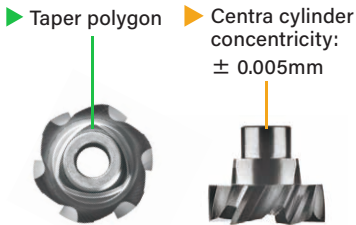


Design of UFO Mill

Taper polygon + Centralizing cylinder



Taper Polygon



• All grinded milling head

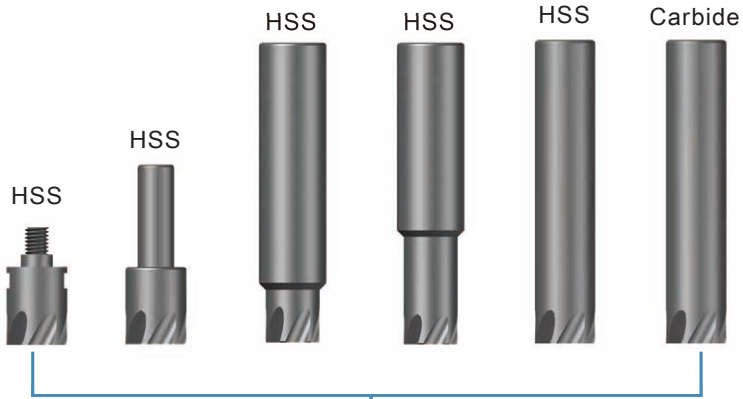


The UFO MILL patented taper polygon design enhances the tight fit of insert joint. It gives a better resistance to the impacts from prolonged machining and solves the cutter slippery issue. The robust tri-face contact design makes the machining stable and durable.

Tri-face contact design



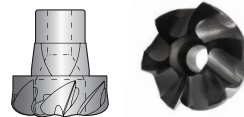
Design of UFO Mill



288 different carbide heads
48 different patented shanks
1938 different combinations

High Feed Milling Heads

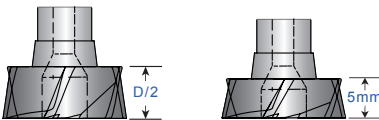
3BH Ø10 - 25



R0.6 / R0.8

Square Milling Heads

3B (M/ME/E)



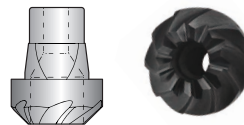
Ø10 - 25



R0 / R0.5 / R1.0 / R1.5 / R2.0

High Feed Chamfer Milling Heads

3BC Ø10,13,16



30° / 45° / 60°

Product competitive advantages

- The best cost - saving solution

- High feed design

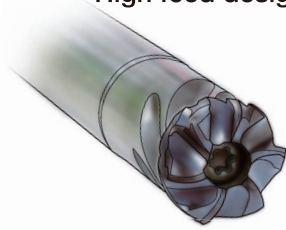
Optional length



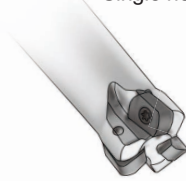
Step Diameter




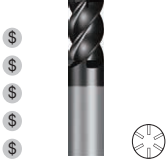


Customized Size



(Y.T. Design) $\varnothing 20$ - 6 flutes
Single head with multi - flutes



(Other brand) $\varnothing 16$ - 3 flutes

Tools comparison				
Productivity ($\varnothing 16$)	6 teeth+patented geometry achieves high metal removal 😊	2-6 teeth	2-3 teeth 😞	2-6 teeth
Accuracy	Concentricity $\pm 0.005\text{mm}$ 😊		😞	
Accuracy on the corner radius	😊		😞	
Regrinding	Not necessary, less tool inventory and management cost	could be regrind but quality might not be equal	not necessary	not necessary
Tool length resetting	not necessary, can be changed directly from M/C	necessary, shrink fit arbor takes longer time to reset	re-setup is necessary in finishing process	not necessary
Price	😊	high quality end mill is very expensive	😊	😞
Flexibility	😊	😞		
Disadvantage	not economical for the user who only make side milling	1.long shank and big dia. end mill is expensive 2.poor flexibility, one size-one tool	less no. of teeth	1. expensive 2. thread breaks sometimes inside the shank



Applications of UFO Mill

Applicable industries

1 Difficult material : hardened steel / stainless steel / inconel/titanium



Aerospace parts

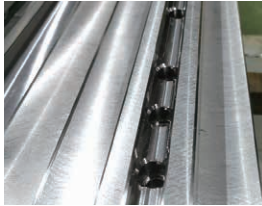


Mould & Die



Medical parts

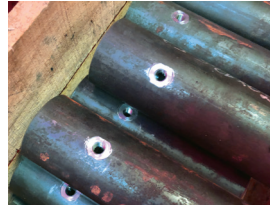
2 General machining



Milling



Flat surface



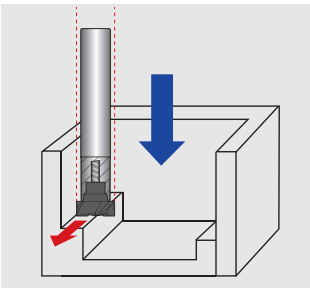
Screw hole plane

3 Casting / forging parts by mass production



Smooth finish texture by high feed machining
(Toolholders BB3 / Insert 3B 16)

4 Deep Cavity Milling



Step diameter avoids body interference



Steel workpiece

Common Holders



D:10~15 D:16~25

Taper Polygon

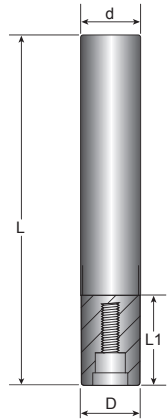
Concentricity: ± 0.005mm

BB3

• HSS



Tolerances (mm)
 D: $+0.0$
 $-0.01 \sim -0.02$ d: h6



Part No.	Dimensions (mm)				KG	Carbide Head	Screw	Key			
	D	d	L	L1							
BB3-1010-60	9.7	10	60	18	0.11	∅10	C03016	T09P			
BB3-1010-90			90		0.13	∅11					
BB3-1212-70	11.5	12	70		25	0.13	∅12 ∅13	C03517	T10P		
BB3-1212-100			100			0.15	∅14 ∅15				
BB3-1414-80	13.5	14	80	24		0.14	∅14	C04020	T15P		
BB3-1414-110			110			0.16	∅15				
BB3-1616-80	15.5	16	80		32	0.15	∅16	C05021	T20P		
BB3-1616-110			110			0.18	∅17				
BB3-1616-160			160	0.2		∅18					
BB3-1818-80	17.5	18	80	30		0.16	∅18			C05021	T20P
BB3-1818-120			120		0.18	∅18					
BB3-2020-90	19.5	20	90		38	0.17	∅20	C05021	T20P		
BB3-2020-120			120			0.2	∅21				
BB3-2020-180			180	0.23		∅25					
BB3-2525-100	24.5	25	100	38		0.4	∅25			C05021	T20P
BB3-2525-130			130		0.5						
BB3-2525-180			180		0.7						

• Not available in shrink fit arbor



Common Holders



D:10~15 D:16~25

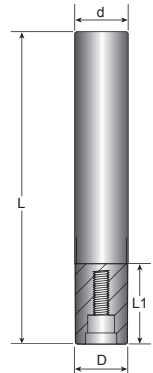
Taper Polygon

Concentricity: $\pm 0.005\text{mm}$



Tolerances (mm)

D : $+0.0$
 $-0.01 \sim -0.02$ d : h6



BB3W

• Carbide

Part No.	Dimensions (mm)				KG	Carbide Head	Screw	Key
	D	d	L	L1				
BB3W-1010-60	9.7	10	60	20	0.20	$\varnothing 10$ $\varnothing 11$	C03016	T09P
BB3W-1010-90			90		0.25			
BB3W-1010-120			120		0.35			
BB3W-1212-70	11.5	12	70	22	0.26	$\varnothing 12$ $\varnothing 13$	C03517	T10P
BB3W-1212-100			100		0.30			
BB3W-1212-140			140		0.40			
BB3W-1414-80	13.5	14	80	26	0.30	$\varnothing 14$ $\varnothing 15$	C04020	T15P
BB3W-1414-110			110		0.40			
BB3W-1616-80	15.5	16	80	26	0.40	$\varnothing 16$ $\varnothing 17$	C04020	T15P
BB3W-1616-110			110		0.50			
BB3W-1616-170			170		0.70			



D:10~15 D:16~25

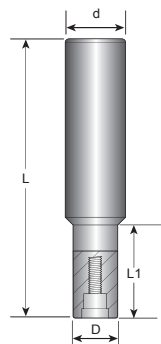
Taper Polygon

Concentricity: $\pm 0.005\text{mm}$

BB3 · HSS



Tolerances (mm)
 $D : +0.0$
 $-0.01 \sim -0.02$ $d : h6$



Part No.	Dimensions (mm)				KG	Carbide Head	Screw	Key
	D	d	L	L1				
BB3-1610-70	9.7	16	70	20	0.20	$\phi 10-11$	C03016	T09P
BB3-1612-80	11.5		80	25	0.25	$\phi 12-13$	C03517	T10P
BB3-2014-90	13.5	20	90	28	0.50	$\phi 14-15$		
BB3-2016-90	15.5			32	0.70	$\phi 16-17$		

- Not available in shrink fit arbor



D:10~15 D:16~25

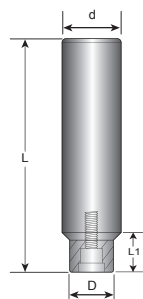
Taper Polygon

Concentricity: $\pm 0.005\text{mm}$

BB3 · HSS



Tolerances (mm)
 $D : +0.0$
 $-0.01 \sim -0.02$ $d : h6$



Part No.	Dimensions (mm)				KG	Carbide Head	Screw	Key
	D	d	L	L1				
BB3-1610-70S	9.7	16	70	12	0.09	$\phi 10-11$	C03016	T09P
BB3-1612-80S	11.5		80		0.12	$\phi 12-13$		
BB3-2014-90S	13.5	20	90		0.21	$\phi 14-15$	C04020	T15P
BB3-2016-90S	15.5				$\phi 16-17$			
BB3-2518-90S	17.5	25	90		0.32	$\phi 18$	C05021	T20P
BB3-2520-90S	19.5				$\phi 20$			
BB3-3225-100S	24.5	32	100		0.59	$\phi 25$		

- Not available in shrink fit arbor



Common Holders



D:10~15

D:16~25

Taper Polygon

Concentricity: $\pm 0.005\text{mm}$

BB3

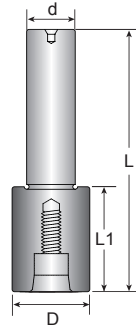
• HSS



Tolerances (mm)

D: $+0.0$
 $-0.01 \sim -0.02$

d: h6



Part No.	Dimensions (mm)				KG	Carbide Head	Screw	Key
	D	d	L	L1				
BB3-1012	11.5	10	50	10	0.09	$\phi 12$ $\phi 13$	C03517	T10P
BB3-1016	15.5			12		0.10		
BB3-1220	19.5	12		13	0.11	$\phi 20$ $\phi 21$	C05021	T20P
BB3-1225	24.5					0.12		

- Not available in shrink fit arbor



D:10~15

D:16~25

Taper Polygon

Concentricity: $\pm 0.005\text{mm}$

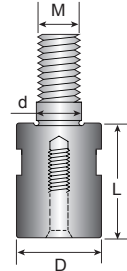
BB3

• HSS



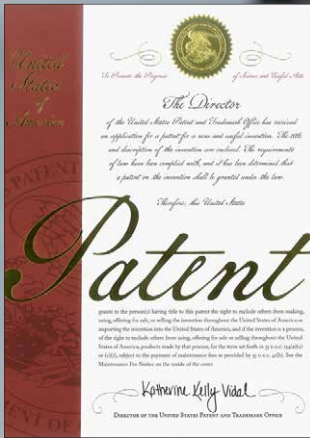
Tolerances (mm)

D: $+0.0$
 $-0.01 \sim -0.02$



Part No.	Dimensions (mm)				KG	Carbide Head	Screw	Key
	D	d	L	M				
BB3-10	9.7	6.5	22	6	0.05	$\phi 10$ $\phi 11$	C03016	T09P
BB3-12	11.5		24			0.06		
BB3-16	15.5	8.5	26	8	0.08	$\phi 16$ $\phi 17$	C04020	T15P
BB3-20	19.5	10.5		10		0.09		
BB3-25	24.5	12.5		12	0.10	$\phi 25$		

- Not available in shrink fit arbor



Patent pending

Taiwan invention patent (Authorized)

No. I647036

Chinese invention patent (Authorized)

No. ZL 2018 1 0214725.9

EPC EU invention patent (Authorized)

No. EPC EP18174847.6

PCT International Patent Priority (Authorized)

International patent priority PCT/CN2019/076867

Canadian patent (Authorized)

No. 3,095,794

U.S. Patent (Authorized)

No.11,453,067 B2

Japanese patent (Authorized)

No.77224364

Korean Patent (Authorized)

No.10-2332216

Indian patent

No.478339

Russian patent (Authorized)

No.2749504

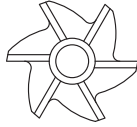
Milling Heads - M

Flute length : D/2

Applicable to Steel / Hardened steel / Cast iron



4 flutes
D:10-15mm



6 flutes
D:16-25mm

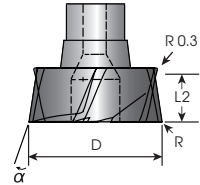


Taper Polygon
Concentricity: ± 0.005mm

3B



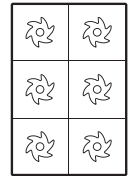
Dimensions (mm)			
D	L2	R	α
10	5	0	48°
		0.5	
		1	
		1.5	
		2	
11	5.5	0	
		0.5	
		1	
		1.5	
		2	
12	6	0	
		0.5	
		1	
		1.5	
		2	
13	6.5	0	
		0.5	
		1	
		1.5	
		2	



Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03

Milling Heads	Part No.	Grades										
		Carbide				Metal cermet	Uncoated					
		B100	C200	C250	F20	F30	CE25	CE60		K10	CE	
	3B1005-M	⊙										
	3B1005R0.5-M	⊙										
	3B1005R1.0-M	⊙										
	3B1005R1.5-M	⊙										
	3B1005R2.0-M	⊙										
	3B1105-M	⊙										
	3B1105R0.5-M	⊙										
	3B1105R1.0-M	⊙										
	3B1105R1.5-M	⊙										
	3B1105R2.0-M	⊙										
	3B1206-M	⊙										
	3B1206R0.5-M	⊙										
	3B1206R1.0-M	⊙										
	3B1206R1.5-M	⊙										
	3B1206R2.0-M	⊙										
	3B1306-M	⊙										
	3B1306R0.5-M	⊙										
	3B1306R1.0-M	⊙										
	3B1306R1.5-M	⊙										
	3B1306R2.0-M	⊙										



Inserts 6 PCS / Box

- ⊙ Steel / Hardened steel / Cast iron
- Ⓜ ⓧ Ⓜ
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1005R0.5-M, B100

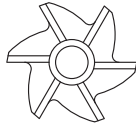
Milling Heads - M

Flute length : D/2

Applicable to Steel / Hardened steel / Cast iron



4 flutes
D:10-15mm



6 flutes
D:16-25mm

Dimensions (mm)			
D	L2	R	α
14	7	0	48°
		0.5	
		1	
		1.5	
		2	
15	7.5	0	
		0.5	
		1	
		1.5	
		2	
16	8	0	
		0.5	
		1	
		1.5	
		2	
17	8.5	0	
		0.5	
		1	
		1.5	
		2	



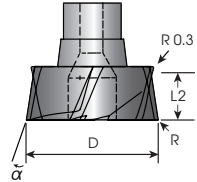
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

3B

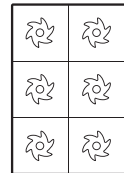


Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide					Metal cermert		Uncoated			
		B100	C200	C250	F20	F80	CE25	CE60	K10		CE	
	3B1407-M	⊗										
	3B1407R0.5-M	⊗										
	3B1407R1.0-M	⊗										
	3B1407R1.5-M	⊗										
	3B1407R2.0-M	⊗										
	3B1507-M	⊗										
	3B1507R0.5-M	⊗										
	3B1507R1.0-M	⊗										
	3B1507R1.5-M	⊗										
	3B1507R2.0-M	⊗										
	3B1608-M	⊗										
	3B1608R0.5-M	⊗										
	3B1608R1.0-M	⊗										
	3B1608R1.5-M	⊗										
	3B1608R2.0-M	⊗										
	3B1708-M	⊗										
	3B1708R0.5-M	⊗										
	3B1708R1.0-M	⊗										
3B1708R1.5-M	⊗											
3B1708R2.0-M	⊗											



Inserts 6 PCS / Box

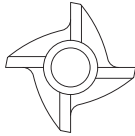
- ⊗ Steel / Hardened steel / Cast iron ⊕ ⊖ ⊗
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie: 3B1407R0.5-M, B100



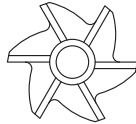
Milling Heads - M

Flute length : D/2

Applicable to Steel / Hardened steel / Cast iron



4 flutes
D:10-15mm



6 flutes
D:16-25mm

Dimensions (mm)			
D	L2	R	α
18	9	0	48°
		0.5	
		1	
		1.5	
		2	
20	10	0	
		0.5	
		1	
		1.5	
		2	
21	10.5	0	
		0.5	
		1	
		1.5	
		2	
25	12.5	0	
		0.5	
		1	
		1.5	
		2	



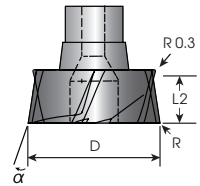
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

3B

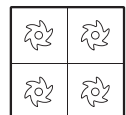


Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide					Metal cermet		Uncoated			
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE	
	3B1809-M	Ⓢ										
	3B1809R0.5-M	Ⓢ										
	3B1809R1.0-M	Ⓢ										
	3B1809R1.5-M	Ⓢ										
	3B1809R2.0-M	Ⓢ										
	3B2010-M	Ⓢ										
	3B2010R0.5-M	Ⓢ										
	3B2010R1.0-M	Ⓢ										
	3B2010R1.5-M	Ⓢ										
	3B2010R2.0-M	Ⓢ										
	3B2110-M	Ⓢ										
	3B2110-R0.5-M	Ⓢ										
	3B2110R1.0-M	Ⓢ										
	3B2110R1.5-M	Ⓢ										
	3B2110R2.0-M	Ⓢ										
	3B2512-M	Ⓢ										
	3B2512R0.5-M	Ⓢ										
	3B2512R1.0-M	Ⓢ										
3B2512R1.5-M	Ⓢ											
3B2512R2.0-M	Ⓢ											



Inserts 4 PCS / Box

- Ⓢ Steel / Hardened steel / Cast iron Ⓟ Ⓜ ⓧ
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1809R0.5-M, B100

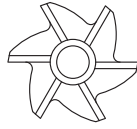
Milling Heads - M E

Flute length : D/2

Applicable to Stainless steel / Titanium alloy / Cast iron



4 flutes
D:10-15mm



6 flutes
D:16-25mm

Dimensions (mm)			
D	L2	R	α
10	5	0	48°
		0.5	
		1	
		1.5	
		2	
11	5.5	0	
		0.5	
		1	
		1.5	
		2	
12	6	0	
		0.5	
		1	
		1.5	
		2	
13	6.5	0	
		0.5	
		1	
		1.5	
		2	



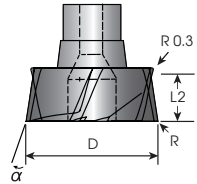
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

3B

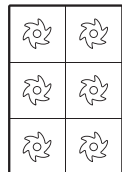


Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades									
		Carbide					Metal cermet		Uncoated		
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE
	3B1005-ME	⊙									
	3B1005R0.5-ME	⊙									
	3B1005R1.0-ME	⊙									
	3B1005R1.5-ME	⊙									
	3B1005R2.0-ME	⊙									
	3B1105-ME	⊙									
	3B1105R0.5-ME	⊙									
	3B1105R1.0-ME	⊙									
	3B1105R1.5-ME	⊙									
	3B1105R2.0-ME	⊙									
	3B1206-ME	⊙									
	3B1206R0.5-ME	⊙									
	3B1206R1.0-ME	⊙									
	3B1206R1.5-ME	⊙									
	3B1206R2.0-ME	⊙									
	3B1306-ME	⊙									
	3B1306R0.5-ME	⊙									
	3B1306R1.0-ME	⊙									
	3B1306R1.5-ME	⊙									
	3B1306R2.0-ME	⊙									



Inserts 6 PCS / Box

- ⊙ Stainless steel / Titanium alloy / Cast iron (M) (S) (K)
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1005R0.5-ME, B100



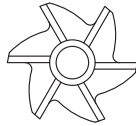
Milling Heads - M E

Flute length : D/2

Applicable to Stainless steel / Titanium alloy / Cast iron



4 flutes
D:10-15mm



6 flutes
D:16-25mm

Dimensions (mm)			
D	L2	R	α
14	7	0	48°
		0.5	
		1	
		1.5	
		2	
15	7.5	0	
		0.5	
		1	
		1.5	
		2	
16	8	0	
		0.5	
		1	
		1.5	
		2	
17	8.5	0	
		0.5	
		1	
		1.5	
		2	



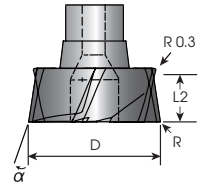
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$


3B

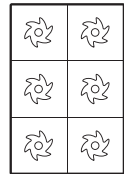


Tolerances (mm)

D : +0.0
-0.01 ~ -0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide				Metal cermet		Uncoated				
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE	
	3B1407-ME	⊙										
	3B1407R0.5-ME	⊙										
	3B1407R1.0-ME	⊙										
	3B1407R1.5-ME	⊙										
	3B1407R2.0-ME	⊙										
	3B1507-ME	⊙										
	3B1507R0.5-ME	⊙										
	3B1507R1.0-ME	⊙										
	3B1507R1.5-ME	⊙										
	3B1507R2.0-ME	⊙										
	3B1608-ME	⊙										
	3B1608R0.5-ME	⊙										
	3B1608R1.0-ME	⊙										
	3B1608R1.5-ME	⊙										
	3B1608R2.0-ME	⊙										
	3B1708-ME	⊙										
	3B1708R0.5-ME	⊙										
	3B1708R1.0-ME	⊙										
	3B1708R1.5-ME	⊙										
	3B1708R2.0-ME	⊙										



Inserts 6 PCS / Box

- ⊙ Stainless steel / Titanium alloy / Cast iron M S K
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1407R0.5-ME, B100

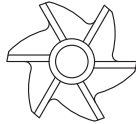
Milling Heads - M E

Flute length : D/2

Applicable to Stainless steel / Titanium alloy / Cast iron



4 flutes
D:10-15mm



6 flutes
D:16-25mm

Dimensions (mm)			
D	L2	R	α
18	9	0	48°
		0.5	
		1	
		1.5	
		2	
20	10	0	
		0.5	
		1	
		1.5	
		2	
21	10.5	0	
		0.5	
		1	
		1.5	
		2	
25	12.5	0	
		0.5	
		1	
		1.5	
		2	



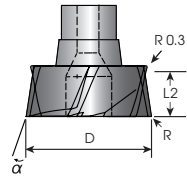
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

3B

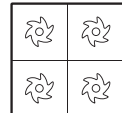


Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades									
		Carbide					Metal Cermet		Uncoated		
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE
	3B1809-ME	⊙									
	3B1809R0.5-ME	⊙									
	3B1809R1.0-ME	⊙									
	3B1809R1.5-ME	⊙									
	3B1809R2.0-ME	⊙									
	3B2010-ME	⊙									
	3B2010R0.5-ME	⊙									
	3B2010R1.0-ME	⊙									
	3B2010R1.5-ME	⊙									
	3B2010R2.0-ME	⊙									
	3B2110-ME	⊙									
	3B2110R0.5-ME	⊙									
	3B2110R1.0-ME	⊙									
	3B2110R1.5-ME	⊙									
	3B2110R2.0-ME	⊙									
	3B2512-ME	⊙									
	3B2512R0.5-ME	⊙									
	3B2512R1.0-ME	⊙									
	3B2512R1.5-ME	⊙									
	3B2512R2.0-ME	⊙									



Inserts 4 PCS / Box

- Stainless steel / Titanium alloy / Cast iron (M) (S) (K)
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1809R0.5-ME, B100



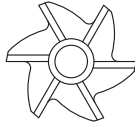
Milling Heads - E

Flute length : D/2

Applicable to Aluminum / Copper



4 flutes
D:10-15mm



6 flutes
D:16-25mm

Dimensions (mm)			
D	L2	R	α
10	5	0	48°
		0.5	
		1	
		1.5	
		2	
11	5.5	0	
		0.5	
		1	
		1.5	
		2	
12	6	0	
		0.5	
		1	
		1.5	
		2	
13	6.5	0	
		0.5	
		1	
		1.5	
		2	



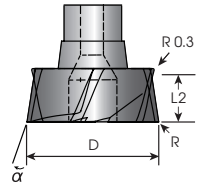
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

3B




Tolerances (mm)

D : $+0.0$
 $-0.01 \sim -0.02$ L2 : ± 0.03



Milling Heads	Part No.	Grades												
		Carbide					Metal cermnet		Uncoated					
		B100	C200	C250	F20	F30	CE25	CE60	K10	CE				
	3B1005-E													
	3B1005R0.5-E													
	3B1005R1.0-E													
	3B1005R1.5-E													
	3B1005R2.0-E													
	3B1105-E													
	3B1105R0.5-E													
	3B1105R1.0-E													
	3B1105R1.5-E													
	3B1105R2.0-E													
	3B1206-E													
	3B1206R0.5-E													
	3B1206R1.0-E													
	3B1206R1.5-E													
	3B1206R2.0-E													
	3B1306-E													
	3B1306R0.5-E													
	3B1306R1.0-E													
	3B1306R1.5-E													
	3B1306R2.0-E													

Inserts 6 PCS / Box

- Aluminum / Copper 
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1005R0.5-E, K10

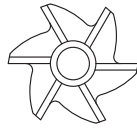
Milling Heads - E

Flute length : D/2

Applicable to Aluminum / Copper



4 flutes
D:10-15mm



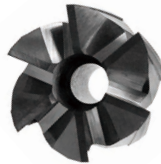
6 flutes
D:16-25mm

Dimensions (mm)			
D	L2	R	α
14	7	0	48°
		0.5	
		1	
		1.5	
		2	
15	7.5	0	
		0.5	
		1	
		1.5	
		2	
16	8	0	
		0.5	
		1	
		1.5	
		2	
17	8.5	0	
		0.5	
		1	
		1.5	
		2	



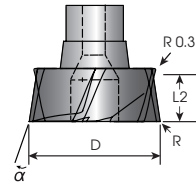
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

3B

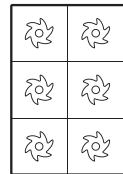


Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades							Uncoated		
		Carbide					Metal	K10	CE		
		B100	C200	C250	F20	F30	CE25			CE60	
	3B1407-E										
	3B1407R0.5-E										
	3B1407R1.0-E										
	3B1407R1.5-E										
	3B1407R2.0-E										
	3B1507-E										
	3B1507R0.5-E										
	3B1507R1.0-E										
	3B1507R1.5-E										
	3B1507R2.0-E										
	3B1608-E										
	3B1608R0.5-E										
	3B1608R1.0-E										
	3B1608R1.5-E										
	3B1608R2.0-E										
	3B1708-E										
	3B1708R0.5-E										
	3B1708R1.0-E										
	3B1708R1.5-E										
	3B1708R2.0-E										



Inserts 6 PCS / Box

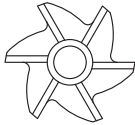
- Aluminum / Copper
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1407R0.5-E, K10



Milling Heads - E

Flute length : D/2

Applicable to Aluminum / Copper



6 flutes
D:16-25mm



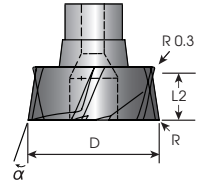
Taper Polygon
Concentricity: ± 0.005mm

3B



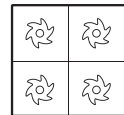
Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Dimensions (mm)			
D	L2	R	α
18	9	0	48°
		0.5	
		1	
		1.5	
		2	
20	10	0	
		0.5	
		1	
		1.5	
21	10.5	2	
		0	
		0.5	
		1	
25	12.5	1.5	
		2	
		0	
		0.5	
		1	

Milling Heads	Part No.	Grades									
		Carbide					Metall cermet	Uncoated			
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE
	3B1809-E										
	3B1809R0.5-E										
	3B1809R1.0-E										
	3B1809R1.5-E										
	3B1809R2.0-E										
	3B2010-E										
	3B2010R0.5-E										
	3B2010R1.0-E										
	3B2010R1.5-E										
	3B2010R2.0-E										
	3B2110-E										
	3B2110R0.5-E										
	3B2110R1.0-E										
	3B2110R1.5-E										
	3B2110R2.0-E										
	3B2512-E										
	3B2512R0.5-E										
	3B2512R1.0-E										
	3B2512R1.5-E										
	3B2512R2.0-E										



Inserts 4 PCS / Box

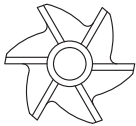
- Aluminum / Copper
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1809R0.5-E, K10

Milling Heads - M

Flute length : 5mm

Applicable to Steel / Hardened steel / Cast iron

Dimensions (mm)			
D	L2	R	α
16	5	0	48°
		0.5	
		1	
		1.5	
		2	
17	5	0	
		0.5	
		1	
		1.5	
		2	

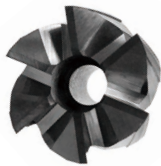


6 flutes
D:16-25mm



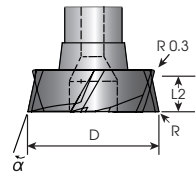
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

3B



Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide					Metal cermet		Uncoated			
		B100	C200	C250	F20	F30	CE25	CE60	K10		OE	
	3B1605-M	⊙										
	3B1605R0.5-M	⊙										
	3B1605R1.0-M	⊙										
	3B1605R1.5-M	⊙										
	3B1605R2.0-M	⊙										
	3B1705-M	⊙										
	3B1705R0.5-M	⊙										
	3B1705R1.0-M	⊙										
	3B1705R1.5-M	⊙										
	3B1705R2.0-M	⊙										

Inserts 6 PCS / Box

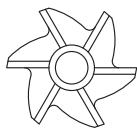
- Steel / Hardened steel / Cast iron
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1605R0.5-M,B100



Milling Heads - M

Flute length : 5mm

Applicable to Steel / Hardened steel / Cast iron



6 flutes
D:16-25mm



Taper Polygon
Concentricity: ± 0.005mm

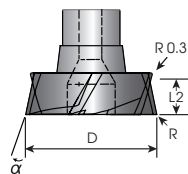
3B





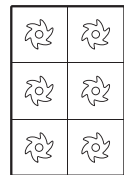
Dimensions (mm)			
D	L2	R	α
18	5	0	48°
		0.5	
		1	
		1.5	
		2	
20	5	0	
		0.5	
		1	
		1.5	
		2	
21	5	0	
		0.5	
		1	
		1.5	
		2	
25	5	0	
		0.5	
		1	
		1.5	
		2	

Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide				Metal cermet		Uncoated				
		B100	C200	C250	F20	F30	CE25	CE60		K10	CE	
	3B1805-M	⊙										
	3B1805R0.5-M	⊙										
	3B1805R1.0-M	⊙										
	3B1805R1.5-M	⊙										
	3B1805R2.0-M	⊙										
	3B2005-M	⊙										
	3B2005R0.5-M	⊙										
	3B2005R1.0-M	⊙										
	3B2005R1.5-M	⊙										
	3B2005R2.0-M	⊙										
	3B2105-M	⊙										
	3B2105R0.5-M	⊙										
	3B2105R1.0-M	⊙										
	3B2105R1.5-M	⊙										
	3B2105R2.0-M	⊙										
	3B2505-M	⊙										
	3B2505R0.5-M	⊙										
	3B2505R1.0-M	⊙										
3B2505R1.5-M	⊙											
3B2505R2.0-M	⊙											



Inserts 6 PCS / Box

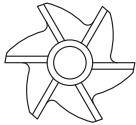
- ⊙ Steel / Hardened steel / Cast iron
- Ⓟ Price and stock are based on current situation
- Ⓜ Please specify model number and grade of insert, ie.: 3B1805R0.5-M,B100

Milling Heads - M E

Flute length : 5mm

Applicable to Stainless steel / Titanium alloy
/ Cast iron

Dimensions (mm)			
D	L2	R	α
16	5	0	48°
		0.5	
		1	
		1.5	
		2	
17	5	0	
		0.5	
		1	
		1.5	
		2	

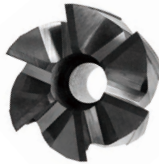


6 flutes
D:16-25mm



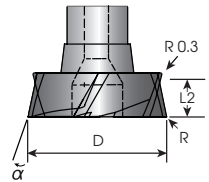
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$



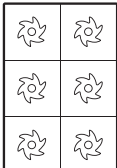
3B



Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades									
		Carbide					Metal cermet		Uncoated		
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE
	3B1605-ME	☉									
	3B1605R0.5-ME	☉									
	3B1605R1.0-ME	☉									
	3B1605R1.5-ME	☉									
	3B1605R2.0-ME	☉									
	3B1705-ME	☉									
	3B1705R0.5-ME	☉									
	3B1705R1.0-ME	☉									
	3B1705R1.5-ME	☉									
	3B1705R2.0-ME	☉									

Inserts 6 PCS / Box

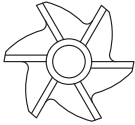
- ☉ Stainless steel / Titanium alloy / Cast iron M 3 K
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1605R0.5-ME, B100



Milling Heads - M E

Flute length : 5mm

Applicable to Stainless steel / Titanium alloy / Cast iron



6 flutes
D:16-25mm



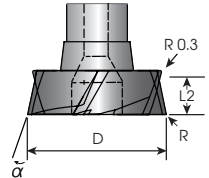
Taper Polygon
Concentricity: ± 0.005mm

3B

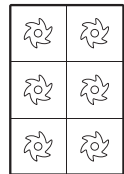


Dimensions (mm)			
D	L2	R	α
18	5	0	48°
		0.5	
		1	
		1.5	
		2	
20	5	0	
		0.5	
		1	
		1.5	
		2	
21	5	0	
		0.5	
		1	
		1.5	
		2	
25	5	0	
		0.5	
		1	
		1.5	
		2	


Tolerances (mm)
D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide				Metal cermet		Uncoated				
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE	
	3B1805-ME	⊙										
	3B1805R0.5-ME	⊙										
	3B1805R1.0-ME	⊙										
	3B1805R1.5-ME	⊙										
	3B1805R2.0-ME	⊙										
	3B2005-ME	⊙										
	3B2005R0.5-ME	⊙										
	3B2005R1.0-ME	⊙										
	3B2005R1.5-ME	⊙										
	3B2005R2.0-ME	⊙										
	3B2105-ME	⊙										
	3B2105R0.5-ME	⊙										
	3B2105R1.0-ME	⊙										
	3B2105R1.5-ME	⊙										
	3B2105R2.0-ME	⊙										
	3B2505-ME	⊙										
	3B2505R0.5-ME	⊙										
	3B2505R1.0-ME	⊙										
	3B2505R1.5-ME	⊙										
	3B2505R2.0-ME	⊙										



Inserts 6 PCS / Box

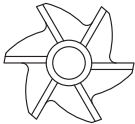
- 
 Stainless steel / Titanium alloy / Cast iron
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1805R0.5-ME, B100

Milling Heads - E

Flute length : 5mm

Applicable to Aluminum / Copper

Dimensions (mm)			
D	L2	R	α
16	5	0	48°
		0.5	
		1	
		1.5	
		2	
17	5	0	
		0.5	
		1	
		1.5	
		2	



6 flutes
D:16-25mm



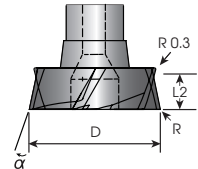
Taper Polygon
Concentricity: $\pm 0.005\text{mm}$


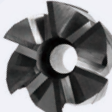
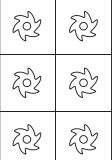
3B



Tolerances (mm)

D : $+0.0$
 $-0.01 \sim -0.02$ L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide					Metal cermet		Uncoated			
		B100	C200	C250	F20	F30	CE25	CE60	K10	CE		
	3B1605-E											
	3B1605R0.5-E											
	3B1605R1.0-E											
	3B1605R1.5-E											
	3B1605R2.0-E											
	3B1705-E											
	3B1705R0.5-E											
	3B1705R1.0-E											
	3B1705R1.5-E											
	3B1705R2.0-E											

Inserts 6 PCS / Box

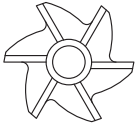
- Aluminum / Copper
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1605R0.5-E, K10



Milling Heads - E

Flute length : 5mm

Applicable to Aluminum / Copper



6 flutes
D:16-25mm



Taper Polygon
Concentricity: ± 0.005mm

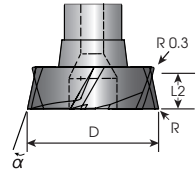
3B





Dimensions (mm)			
D	L2	R	α
18	5	0	48°
		0.5	
		1	
		1.5	
		2	
20	5	0	
		0.5	
		1	
		1.5	
		2	
21	5	0	
		0.5	
		1	
		1.5	
		2	
25	5	0	
		0.5	
		1	
		1.5	
		2	

Tolerances (mm)

D : +0.0
-0.01~-0.02 L2 : ± 0.03



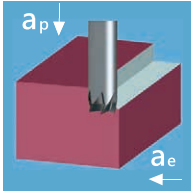




Milling Heads	Part No.	Grades										
		Carbide					Metal cermet		Uncoated			
		B100	C200	C250	F20	F80	CE25	CE60	K10		CE	
	3B1805-E											 Inserts 6 PCS / Box
	3B1805R0.5-E											
	3B1805R1.0-E											
	3B1805R1.5-E											
	3B1805R2.0-E											
	3B2005-E											
	3B2005R0.5-E											
	3B2005R1.0-E											
	3B2005R1.5-E											
	3B2005R2.0-E											
	3B2105-E											
	3B2105R0.5-E											
	3B2105R1.0-E											
	3B2105R1.5-E											
	3B2105R2.0-E											
	3B2505-E											
	3B2505R0.5-E											
	3B2505R1.0-E											
	3B2505R1.5-E											
	3B2505R2.0-E											

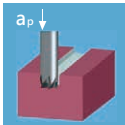
- Aluminum / Copper (N)
- Price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3B1805R0.5-E, K10

Cutting Parameter **3B-M**

Applicable to Steel / Hardened steel / Cast iron

- Keep $Fz \geq 0.03\text{mm}$

3B-M	Materials	D (mm)	Z	Vc (m/min)	f_z (mm/tooth)	a_p (mm)	a_e (mm)	S (rev/min)	F (mm/min)
	Steel 24-32 HRC 	10	4	140	0.035	2	7	4500	630
		12	4	180	0.06	2	8	4850	1160
		16	6	180	0.06	2	11	3600	1300
		20	6	180	0.07	2	14	2900	1200
		25	6	180	0.07	2	17	2300	960
Steel 32-42 HRC 	10	4	100	0.035	2	7	3200	450	
	12	4	150	0.05	2	8	4000	800	
	16	6	150	0.06	2	11	3000	1080	
	20	6	150	0.06	2	14	2400	840	
	25	6	150	0.06	2	17	1900	680	
Hardened steel 50-58 HRC 	10	4	70	0.06	0.1	7	2250	540	
	12	4	70	0.06	0.1	8	1840	440	
	16	6	70	0.06	0.1	11	1370	490	
	20	6	70	0.06	0.1	14	1130	400	
	25	6	70	0.06	0.1	17	890	320	
Cast Iron 	10	4	75	0.08	4	7	2400	770	
	12	4	75	0.1	4	8	2000	800	
	16	6	75	0.1	4	11	1550	930	
	20	6	75	0.1	4	14	1200	720	
	25	6	75	0.1	4	17	950	570	



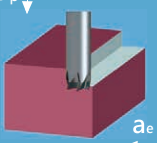



- Set RPM 30% lower for slot milling, except for cast iron materials.



Cutting Parameter **3B-ME**

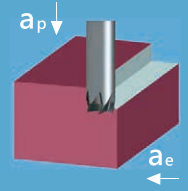
Applicable to Stainless steel / Titanium alloy / Cast iron

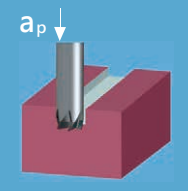
- Keep $Fz \geq 0.025\text{mm}$

3B-ME	Materials	D (mm)	Z	Vc (m/min)	fz (mm/tooth)	a _p (mm)	a _e (mm)	S (rev/min)	F (mm/min)
	Stainless steel 	10	4	55	0.04	2	7	1770	283
		12	4	75	0.06	2	8	1950	468
		16	6	75	0.07	2	11	1500	630
		20	6	75	0.07	2	14	1200	500
		25	6	75	0.07	2	17	960	400
	Titanium alloy 	10	4	45	0.06	1.5	7	1450	350
		12	4	45	0.06	1.5	8	1180	280
		16	6	45	0.07	1.5	11	900	380
		20	6	45	0.07	1.5	14	720	300
		25	6	45	0.07	1.5	17	570	235
	Cast iron 	10	4	75	0.08	4	7	2400	770
		12	4	75	0.1	4	8	2000	800
		16	6	75	0.1	4	11	1550	930
		20	6	75	0.1	4	14	1200	720
		25	6	75	0.1	4	17	950	570

Cutting Parameter 3B-E

Applicable to Aluminum / Copper

3B-E	Materials	D (mm)	Z	Vc (m/min)	fz (mm/tooth)	a _p (mm)	a _e (mm)	S (rev/min)	F (mm/min)
	Aluminum	10	4	800	0.13	4	7	25800	13400
		12	4	800	0.13	4	8	21000	10900
		16	6	800	0.16	4	11	16000	15300
		20	6	800	0.16	4	14	13000	12500
		25	6	800	0.16	4	17	10000	9600
	Copper	10	4	280	0.10	4	7	9000	3600
		12	4	280	0.10	4	8	7500	3000
		16	6	280	0.10	4	11	5700	3400
		20	6	280	0.10	4	14	4500	2700
		25	6	280	0.10	4	17	3600	2160

3B-E	Materials	D (mm)	Z	Vc (m/min)	fz (mm/tooth)	a _p (mm)	a _e (mm)	S (rev/min)	F (mm/min)
	Aluminum	10	4	700	0.12	4	10	22500	10800
		12	4	700	0.12	4	12	18500	8880
		16	6	700	0.15	4	16	14000	12600
		20	6	700	0.15	4	20	11000	9900
		25	6	700	0.15	4	25	9000	8100
	Copper	10	4	250	0.08	2.5	10	8000	2500
		12	4	250	0.08	2.5	12	6700	2150
		16	6	250	0.08	2.5	16	5100	2400
		20	6	250	0.08	2.5	20	4000	1900
		25	6	250	0.08	2.5	25	3160	1500

Screw & Key & Torque Values

Screw Code	Key Code	Torque Value(Nm)
C03016	T9P	2.0
C03517	T10P	3.0
C04020	T15P	4.0
C05021	T20P	6.0





UFO High-Feed Cutter

Cutting force vs. Tool life

The direction of cutting force influences directly and significantly on the machining life and efficiency. The following are three different types of cutting force commonly seen in milling cutters:

(Cutter 1) Radial force = Axial force

There are limitations inherent in milling cutters designed with round insert; to apply it on deep Ap milling or a cavity corner milling, the radial force is nearly same as the axial force, it produces great vibrations and performs in low feed. The next, round inserts take up big space and cause the cutter carries lesser flutes.

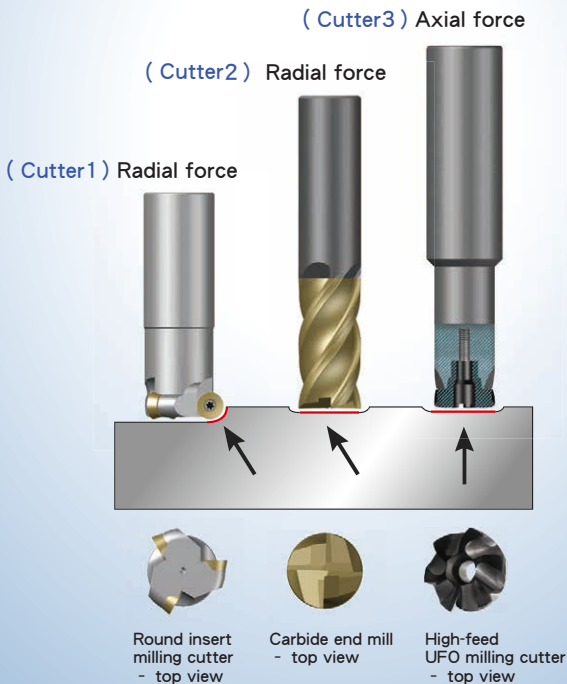
(Cutter 2) Radial force > Axial force

The carbide end mill cutter which is mostly used for finishing and semi-finishing machining. The large helix angle satisfies small cutting area and surface roughness. However, it is not cost-effective to have it removing a large amount of materials.

(Cutter 3) Radial force < Axial force

Y.T. high-feed UFO milling cutter has unique design of curvature and point contact, it is effective in keeping the radial force lesser than axial force.

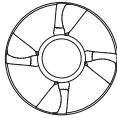
The cutting force is transferred to the spindle, it brings machining process in stable conditions and carries out a high removal rate.



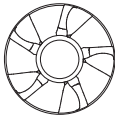
High Feed Milling Heads

- 3BH

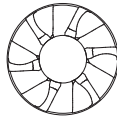
Applicable to Steel / Stainless steel / Titanium alloy



4 flutes
D: 10-11mm



5 flutes
D: 12-13mm



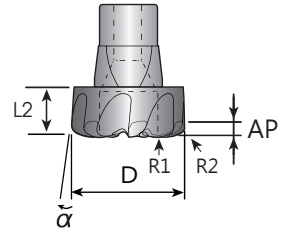
6 flutes
D: 16-25mm

Dimensions (mm)					
D	L2	R1	R2	AP	α
10	5	4	0.6	0.8	3°
11					
12		5	0.8	1.2	
13					
16					
17		6	0.8	1.2	
20					
21		8	0.8	1.2	
25					
25		12	0.8	1.2	





Taper Polygon
Concentricity: $\pm 0.005\text{mm}$

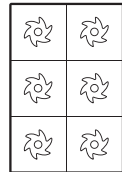
3BH







Tolerances (mm)

D : $+0.0$
 $-0.01 \sim -0.02$ L2 : ± 0.03

Milling Heads	Part No.	Grades										
		Carbide					Metal cermet		Uncoated			
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE	
	3BH1005-M	⊙										
	3BH1105-M	⊙										
	3BH1205-M	⊙										
	3BH1305-M	⊙										
	3BH1605-M	⊙										
	3BH1705-M	⊙										
	3BH2005-M	⊙										
	3BH2105-M	⊙										
	3BH2505-M	⊙										



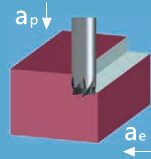




Inserts 6 PCS / Box

-  Steel / Stainless steel / Titanium alloy   
- Correct price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3BH1005-M, B100



Cutting Parameter - 3BH

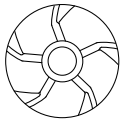
• Keep $Fz \geq 0.02\text{mm}$

3BH	Materials	D (mm)	Z	Vc (m/min)	fz (mm/tooth)	a_p (mm)	a_e (mm)	S (rev/min)	F (mm/min)
	Steel 24-32 HRC 	10	4	200	0.25	0.3	6	6450	6400
		12	5	300	0.25	0.3	7	7900	9800
		16	6	300	0.25	0.3	10	6000	9000
		20	7	300	0.25	0.3	13	4800	8400
		25	7	300	0.25	0.3	16	3850	6700
Steel 32-42 HRC 	10	4	100	0.25	0.3	6	3200	3200	
	12	5	130	0.25	0.3	7	3400	4200	
	16	6	130	0.25	0.3	10	2600	3900	
	20	7	130	0.25	0.3	13	2100	3700	
	25	7	130	0.25	0.3	16	1650	1900	
Stainless steel 	10	4	160	0.25	0.3	6	5160	5160	
	12	5	180	0.25	0.3	7	4700	5800	
	16	6	180	0.25	0.3	10	3600	5400	
	20	7	180	0.25	0.3	13	2900	5000	
	25	7	180	0.25	0.3	16	2300	4000	
Titanium alloy 	10	4	60	0.3	0.3	6	1900	2280	
	12	5	60	0.3	0.3	7	1600	2400	
	16	6	60	0.3	0.3	10	1200	2160	
	20	7	60	0.3	0.3	13	950	2000	
	25	7	60	0.3	0.3	16	770	1600	

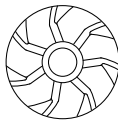
High Feed Chamfer Milling Heads - 3BC

Applicable to all Materials

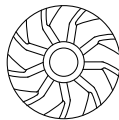
Dimensions (mm)					
D	L2	d	AP	C	Angle Chamfer
10	5	6	3.4	4.0	30°
			2.0	2.7	45°
			1.15	2.3	60°
13		9	3.4	4.0	30°
			2.0	2.7	45°
			1.15	2.3	60°
16		11	4.3	5.0	30°
			2.5	3.5	45°
			1.4	2.8	60°



5 flutes
D: 10mm



7 flutes
D: 13mm



9 flutes
D: 16mm

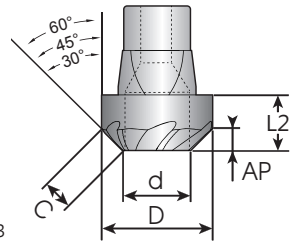




Taper Polygon
Concentricity: ± 0.005mm

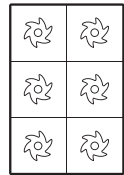
3BC



Tolerances (mm)
D : +0.0
-0.01~-0.02 L2 : ± 0.03



Milling Heads	Part No.	Grades										
		Carbide					Metal cermet		Uncoated			
		B100	C200	C250	F20	F30	CE25	CE60	K10		CE	
	3BC1005-30°-ME	★										
	3BC1005-45°-ME	★										
	3BC1005-60°-ME	★										
	3BC1305-30°-ME	★										
	3BC1305-45°-ME	★										
	3BC1305-60°-ME	★										
	3BC1605-30°-ME	★										
	3BC1605-45°-ME	★										
	3BC1605-60°-ME	★										

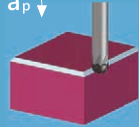








Inserts 6 PCS / Box

- ★ Applicable to all Materials
- Correct price and stock are based on current situation
- Please specify model number and grade of insert, ie.: 3BC1005-30°-ME,B100

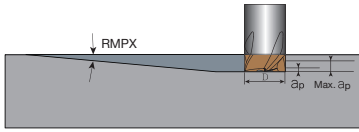


Cutting Parameter **3BC**

3BC	Materials	D (mm)	Z	Vc (m/min)	fz (mm/tooth)	a _p (mm)	S (rev/min)	F (mm/min)
	Steel 24-32 HRC 	10	5	230	0.07	1C	7400	2600
		13	7	230	0.07	1C	5700	2800
		16	9	230	0.07	1C	4600	2900
	Steel 32-42 HRC 	10	5	130	0.06	1C	4200	1260
		13	7	130	0.06	1C	3250	1360
		16	9	130	0.06	1C	2650	1460
	Stainless steel 	10	5	180	0.06	1C	5800	1740
		13	7	180	0.06	1C	4500	1800
		16	9	180	0.06	1C	3600	1950
Titanium alloy 	10	5	70	0.06	1C	2250	670	
	13	7	70	0.06	1C	1750	730	
	16	9	70	0.06	1C	1400	750	
Aluminum 	10	5	500	0.07	1C	16000	5600	
	13	7	500	0.07	1C	12500	6100	
	16	9	500	0.07	1C	10200	6400	
Cast iron 	10	5	75	0.07	1C	2400	840	
	13	7	75	0.07	1C	1900	920	
	16	9	75	0.07	1C	1500	950	

Technical Data

• Ramping

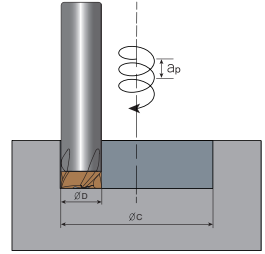


Unit : mm

$\varnothing D$	RMPX	Max. a_p
10	1.5°	1
12	1.5°	1
16	1.5°	1
20	1.5°	1
25	1.5°	1

• It's calculated with exchangeable milling head R0.

• Helical milling



Unit : mm

$\varnothing D$	Min. $\varnothing C$ / Max. a_p			
	Min. $\varnothing C$	Max. a_p mm	Max. $\varnothing C$	Max. a_p mm
10	15	0.4	19	0.7
12	17	0.4	23	0.7
16	25	0.7	31	1.2
20	33	1.0	39	1.5
25	43	1.4	49	1.9

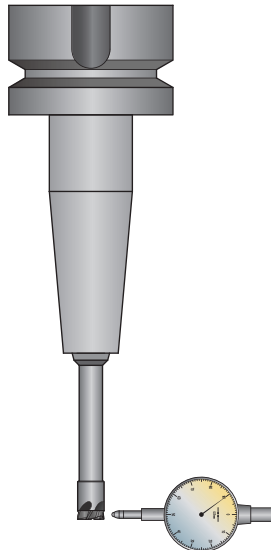
• It's calculated with exchangeable milling head R0.

Arbor and chuck

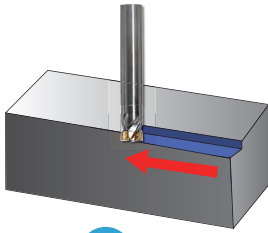
Precise arbor and chuck will improve the tool life in high speed machining.

Arbor recommendation:

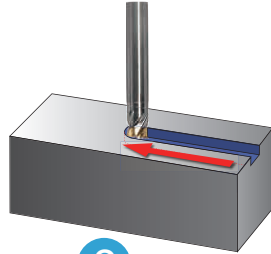
Hydraulic chuck, shrink fit chuck or highly precision chuck.



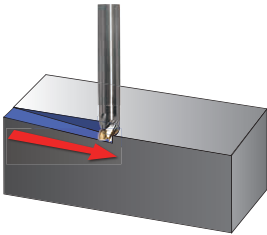
Different Applications



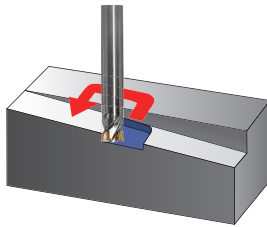
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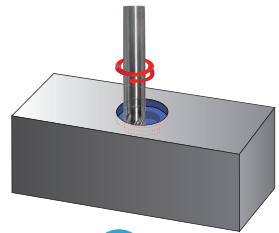
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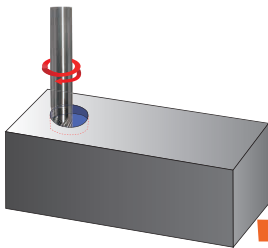
3



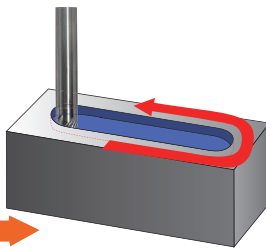
4



5



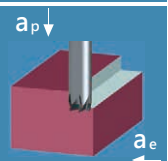

6



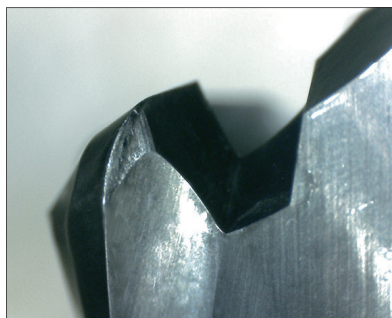
7

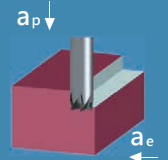



Test Report

3B	Material	D (mm)	Z	Vc (m/min)	f _z (mm/tooth)	a _p (mm)	a _e (mm)	S (rev/min)	F (mm/min)
	Stainless steel 	12	4	60	0.06	4.5	4.5	1600	400

- Life time: 240 minutes
- 200 x magnification
- Tested tool:
Milling head (3B1206R0.5-ME, B100)
HSS shank (BB3-1212-70)



3B	Material	D (mm)	Z	Vc (m/min)	f _z (mm/tooth)	a _p (mm)	a _e (mm)	S (rev/min)	F (mm/min)
	Steel 24-32 HRC 	12	4	120	0.06	4.5	4.5	3200	770

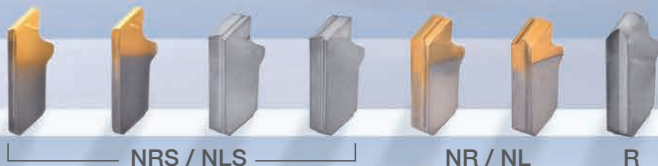
- Life time: 80 minutes
- 200 x magnification
- Tested tool:
Milling head (3B1206R0.5-M, B100)
HSS shank (BB3-1212-70)



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