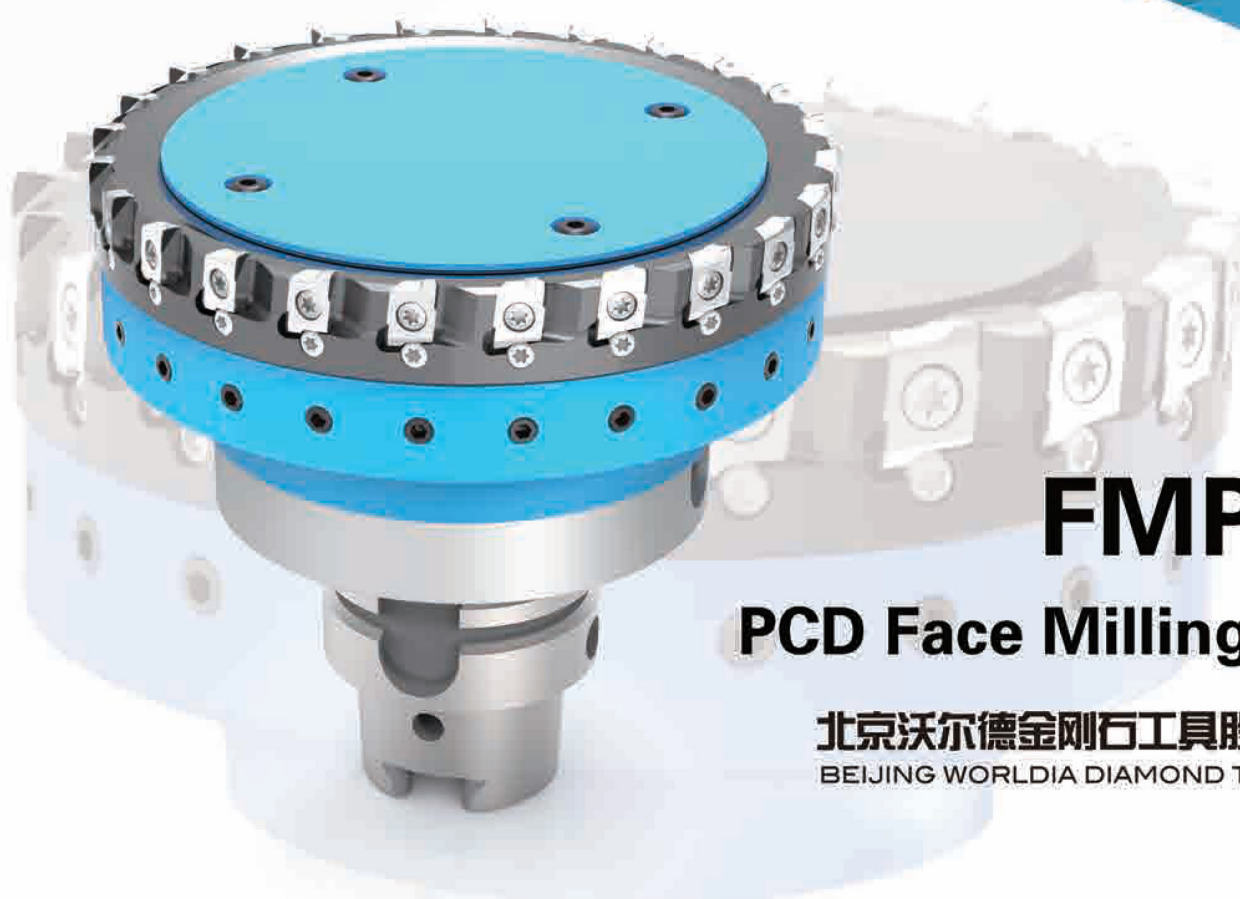




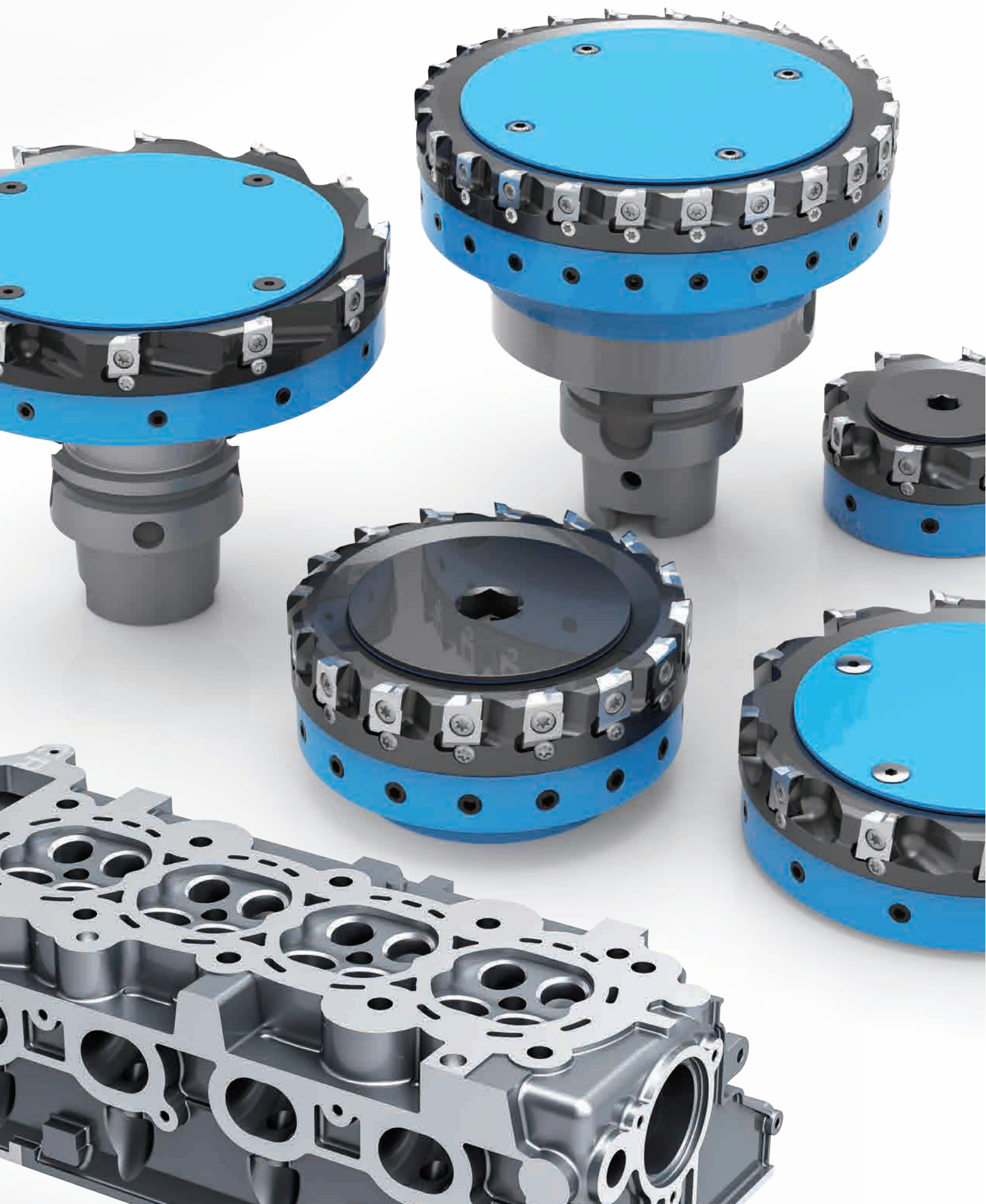
FMP-BE

PCD Face Milling Cutters

北京沃尔德金刚石工具股份有限公司
BEIJING WORLDIA DIAMOND TOOLS CO.,LTD.

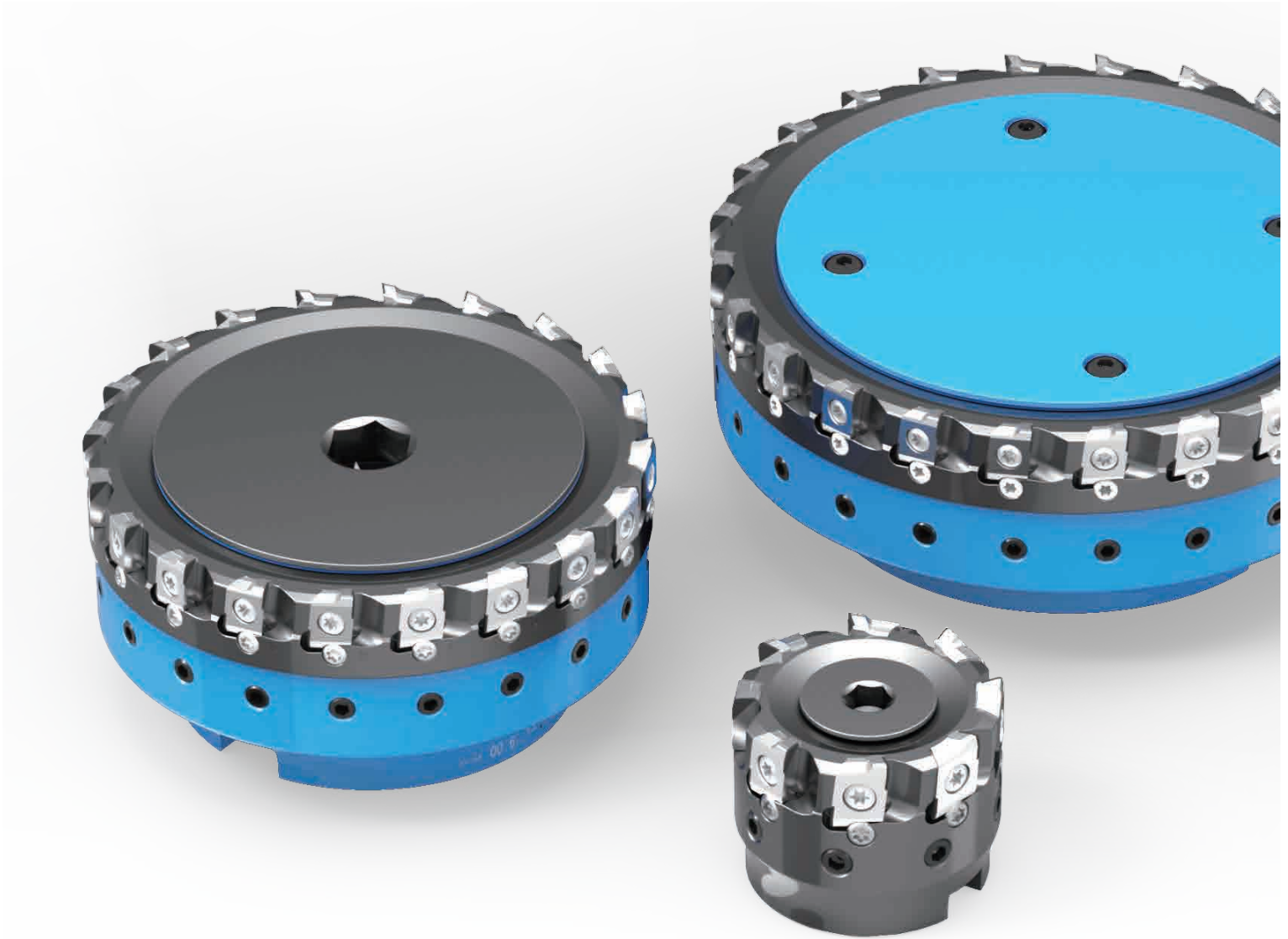


FACTORY MAX



CONTENTS

Application of WORLDIA® FMP-BE PCD Face Milling Cutters	03
Features & Structures	06
Shell Face Milling Cutters Specifications	07
Light Weight Shell Face Milling Cutters Specifications	09
Parallel Shank Milling Cutters Specifications	10
Milling Adaptors	11
Insert Nomenclature	13
Milling Inserts Specification	15
WORLDIA® PCD Grades	17
Case Studies	18
Product Support	20



WORLDIA® FMP-BE Indexable Face Milling Cutters for Consistent High Precision and High Speed Machining

Main Application:

WORLDIA® FMP-BE milling cutters with indexable inserts for milling of non ferrous material. Used for roughing and finishing operation to ensure the economical solution over the others. WORLDIA® FMP-BE face milling cutters are the first choice for end user to maintain quality standards with the high chip removal.



WORLDIA[®] FMP-BE Indexable Face Milling Cutters for Consistent High Precision and High Speed Machining

Main Application:

In different industries application, many small-sized machines are used to processing aluminum case body. These machines have high precision spindles that can be worked at extremely high speed. They are not designed for high torque and normally the maximum tool weight is loaded with 3kg. WORLDIA[®] developed light weight milling tools that precisely meet these requirements.

Innovative double metal design with light weight and high strength performance, all face milling cutters from diameters 80mm to 160mm can be mounted on the same milling holder. Even the face milling cutter of diameter 160mm with the BT30 adaptor, the total weight does not exceed 3kg.



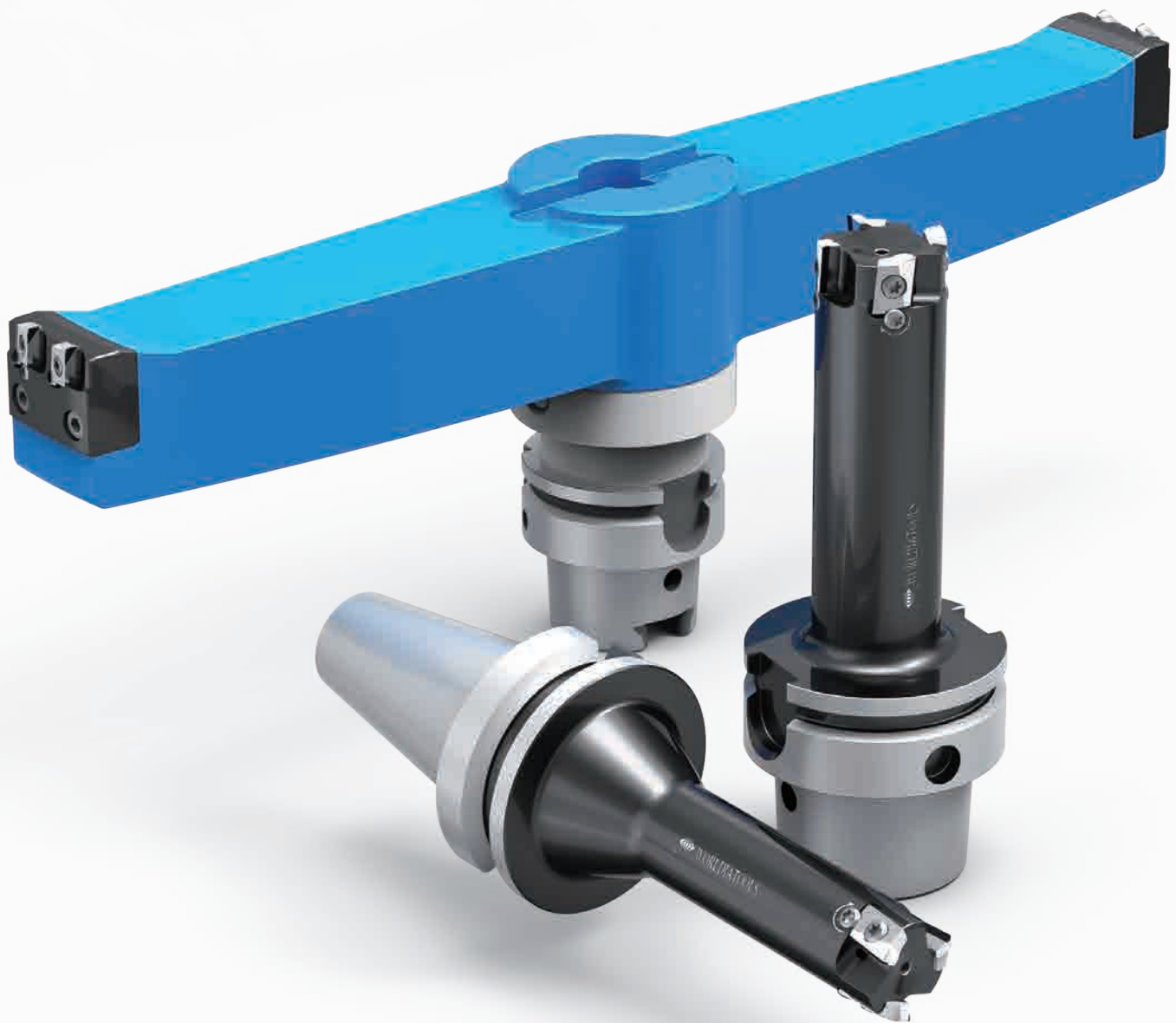
WORLDIA® FMP-BE Face Milling Cutters with Indexable Inserts

Customized design

Main Applications:

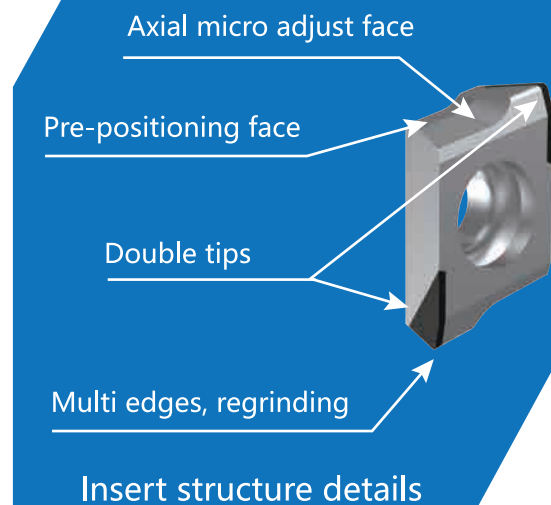
Used for complex structure, and special requirements for tool diameter, length or rigidity,

Used for flexibly machining for cavity, shoulder and end face.

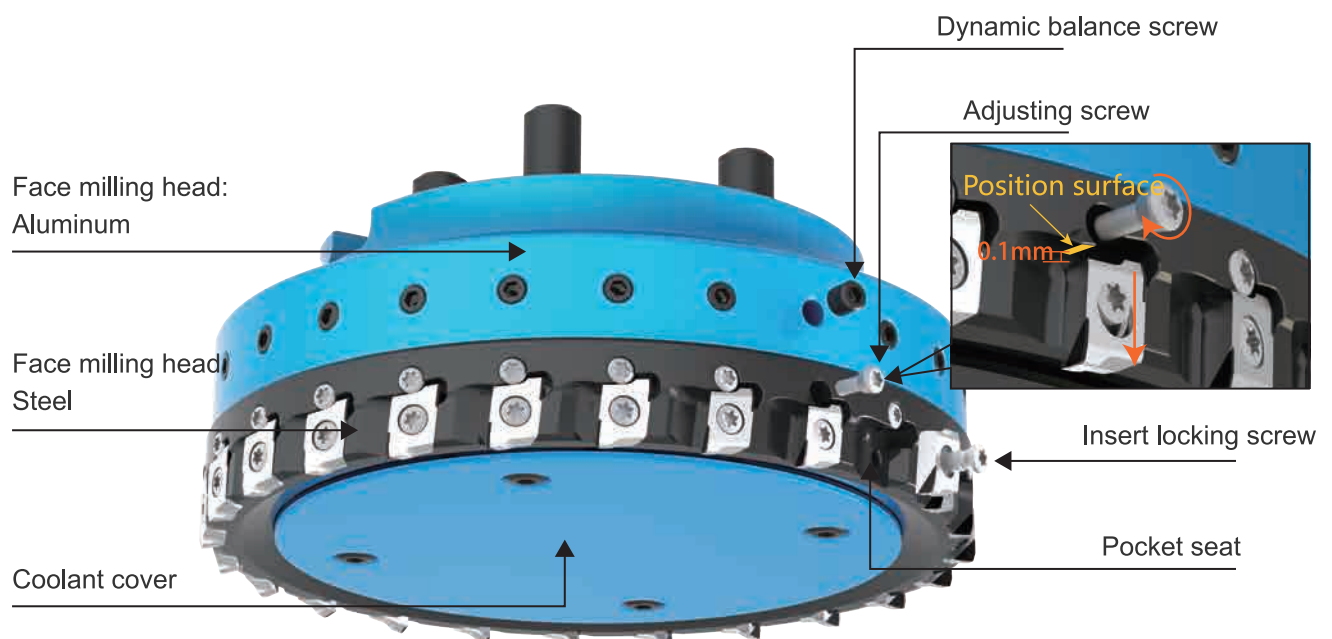


WORLDIA® FMP-BE PCD Face Milling Features

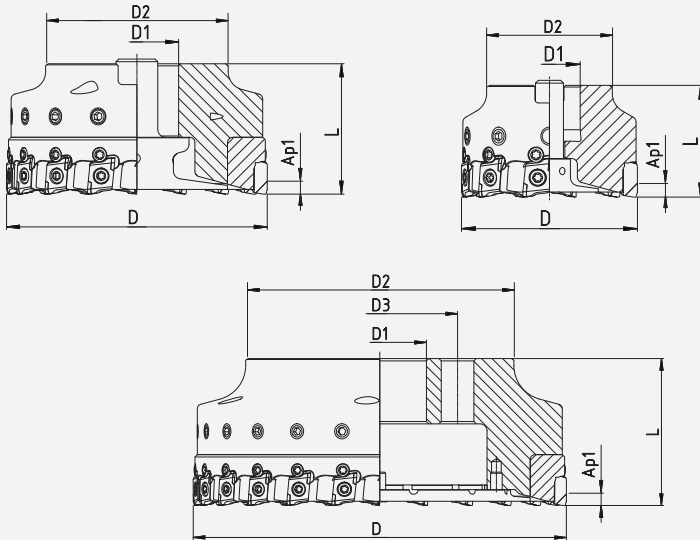
- "Aluminum Alloy-Steel" double metal design, the aluminum center reduces the weight, while the hardened steel outer ring increases the rigidity speed and feeds.
- The double metal design makes the tooling lifetime several times longer than other aluminum face milling cutter.
- High-precision pocket seat keeps 0.02mm axial runout without insert adjustment.
- It can be easily adjusted to 2μm axial run out within 0.1mm range.
- Inserts are designed by variety of Kr, could meet different application of end milling and shoulder milling.
- The positioning surface and Flank face separated design, keep the positioning surface effectiveness when we do relap or retip.
- Two cutting edges design and retip service which could help our customers reduce their cost.
- Rough and finish in one tool.



WORLDIA® FMP-BE PCD Face Milling Structures Detail



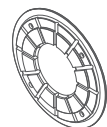
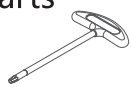
Shell Face Milling Cutters and Specifications



ISO

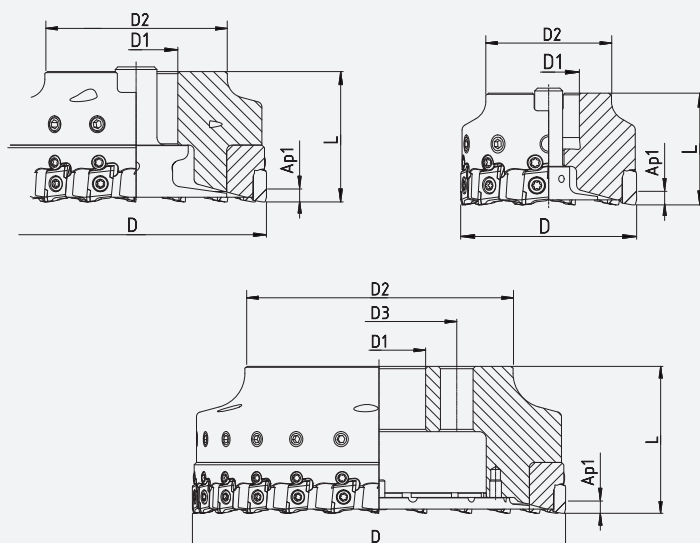
Specification	System code	D	D1	D2	D3	L	Ap1 max	Z	Kg	max RPM	Material
FMP040SA16-BE12-06	040401060013	40	16	36	—	40	11	6	0.36	40000	Steel
FMP050SA22-BE12-08	040401060005	50	22	45	—	40	11	8	0.55	35100	Steel
FMP063SA22-BE12-10	040401060006	63	22	45	—	40	11	10	0.75	30200	Steel
FMP080SA27-BE12-12	040401060007	80	27	50	—	50	11	12	0.96	27500	Steel+aluminium
FMP100SB32-BE12-16	040401060008	100	32	70	—	50	11	16	1.45	23800	Steel+aluminium
FMP125SB40-BE12-20	040401060009	125	40	90	—	63	11	20	2.40	19100	Steel+aluminium
FMP160SC40-BE12-24	040401060010	160	40	115	66.7	63	11	24	3.00	14900	Steel+aluminium
FMP200SC60-BE12-30	040401060011	200	60	150	101.6	63	11	30	4.25	11900	Steel+aluminium
FMP250SC60-BE12-36	040401060012	250	60	200	101.6	63	11	36	6.50	9550	Steel+aluminium

Spare Parts



D1	Wrench	Insert screw	Adjusting screw	Dynamic balance screw	Coolant lock screw	Coolant lock screw	Coolant shower plate
40	15IP	S40120J	S30110G	M6*0.75	FMP040SA16-BE12-06.02	—	—
50	15IP	S40120J	S30110G	M6*0.75	FMP050SA22-BE12-08.02	—	—
63	15IP	S40120J	S30110G	M6*0.75	FMP063SA22-BE12-10.02	—	—
80	15IP	S40120J	S30110G	M6*0.75	FMP080SA27-BE12-12.03	—	—
100	15IP	S40120J	S30110G	M6*0.75	—	FMP100SB32-BE12-16.03	—
125	15IP	S40120J	S30110G	M6*0.75	—	FMP125SB40-BE12-20.03	—
160	15IP	S40120J	S30110G	M6*0.75	—	—	FMP160SC40-BE12-24.03
200	15IP	S40120J	S30110G	M6*0.75	—	—	FMP200SC60-BE12-30.03
250	15IP	S40120J	S30110G	M6*0.75	—	—	FMP250SC60-BE12-36.03

Shell Face Milling Cutters and Specifications



JIS

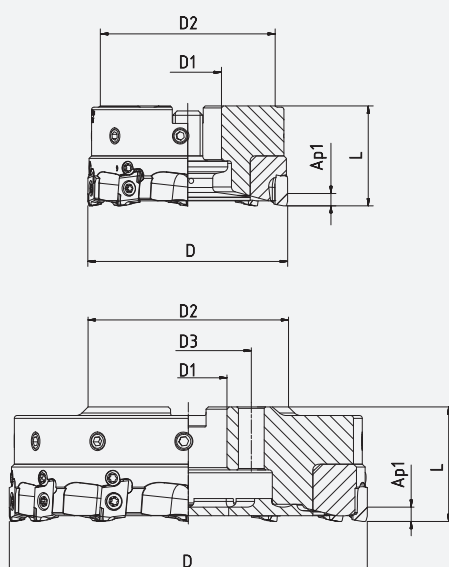
Specification	System code	D	D1	D2	D3	L	Ap1 max	Z	Kg	max RPM	Material
FMP040SA16-BE12-06	040401060013	40	16	36	—	40	11	6	0.36	40000	Steel
FMP050SA22-BE12-08	040401060005	50	22	45	—	40	11	8	0.55	35100	Steel
FMP063SA22-BE12-10	040401060006	63	22	45	—	40	11	10	0.75	30200	Steel
FMP080SA25.4-BE12-12	040401060033	80	25.4	50	—	50	11	12	0.84	27500	Steel+aluminium
FMP100SB31.75-BE12-16	040401060034	100	31.75	60	—	50	11	16	1.25	23800	Steel+aluminium
FMP125SB38.1-BE12-20	040401060035	125	38.1	80	—	63	11	20	2.15	19100	Steel+aluminium
FMP160SC50.8-BE12-24	040401060036	160	50.8	100	—	63	11	24	2.7	14900	Steel+aluminium
FMP200SC47.625-BE12-30		200	47.625	150	101.6	63	11	30		11900	Steel+aluminium
FMP250SC47.625-BE12-36		250	47.625	200	101.6	63	11	36		9550	Steel+aluminium

Spare Parts



D1	Wrench	Insert screw	Adjusting screw	Dynamic balance screw	Coolant lock screw	Coolant lock screw	Coolant shower plate
40	15IP	S40120J	S30110G	M6*0.75	FMP040SA16-BE12-06.02	—	—
50	15IP	S40120J	S30110G	M6*0.75	FMP050SA22-BE12-08.02	—	—
63	15IP	S40120J	S30110G	M6*0.75	FMP063SA22-BE12-10.02	—	—
80	15IP	S40120J	S30110G	M6*0.75	FMP080SA25.4-BE12-12.03	—	—
100	15IP	S40120J	S30110G	M6*0.75	—	FMP100SB31.75-BE12-16.03	—
125	15IP	S40120J	S30110G	M6*0.75	—	FMP125SB38.1-BE12-20.03	—
160	15IP	S40120J	S30110G	M6*0.75	—	—	FMP160SC50.8-BE12-24.03
200	15IP	S40120J	S30110G	M6*0.75	—	—	FMP200SC47.625-BE12-30.03
250	15IP	S40120J	S30110G	M6*0.75	—	—	FMP250SC47.625-BE12-36.03

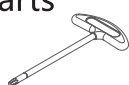
Light Weight Shell Face Milling Cutters Specifications ISO



ISO

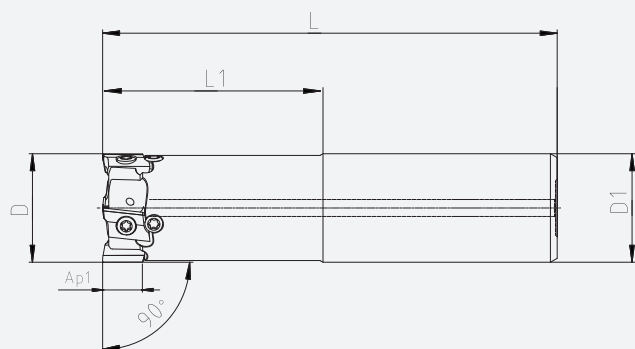
Specification	System code	D	D1	D2	D3	L	Ap1 max	Z	Kg	max RPM	Material
FMP080SB27-BE12-08	040401060029	80	27	70	—	40	11	8	0.78	27500	Steel+aluminium
FMP100SB27-BE12-08	040401060028	100	27	70	—	40	11	8	1.12	23800	Steel+aluminium
FMP125SC27-BE12-12	040401060027	125	27	70	54	40	11	12	1.43	19100	Steel+aluminium
FMP160SC27-BE12-12	040401060026	160	27	70	54	40	11	12	2.00	14900	Steel+aluminium

Spare Parts



D1	Wrench	Insert screw	Adjusting screw	Dynamic balance screw	Coolant lock screw	Coolant lock screw	Coolant shower plate
80	15IP	S40120J	S30110G	M6*0.75	—	FMP080SB27-BE12-08.03	—
100	15IP	S40120J	S30110G	M6*0.75	—	FMP100SB27-BE12-08.03	—
125	15IP	S40120J	S30110G	M6*0.75	—	—	FMP125SC27-BE12-12.03
160	15IP	S40120J	S30110G	M6*0.75	—	—	FMP160SC27-BE12-12.03

Parallel Shank Milling Cutters Specifications



ISO

Specification	System code	D	D1	D2	L	L1	Ap1 max	Z	Kg	max RPM	Material
FMP025CS25-BE12-03	040401060015	25	25	—	130	50	11	3	0.50	25000	Steel
FMP032CS32-BE12-04	040401070005	32	32	—	130	50	11	4	0.80	25000	Steel

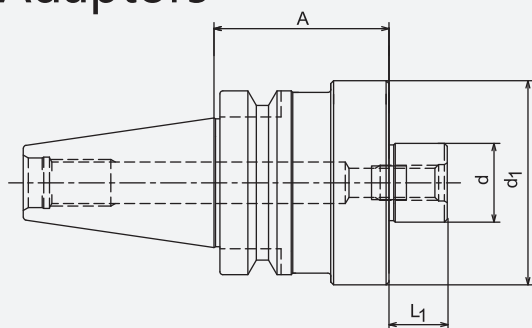
Spare Parts



D	Wrench	Insert screw	Adjusting screw
25	15IP	S40090J	S30110G
32	15IP	S40090J	S30110G

Milling Adaptors

BT

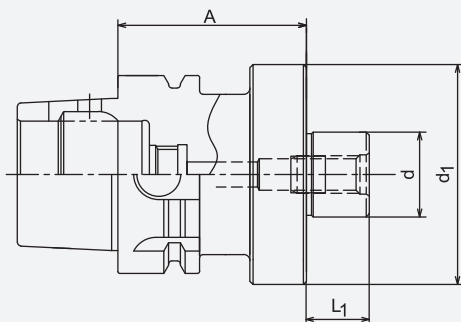


JIS B
6339



Specification	System code	d	d1	d2	L1	A	Kg
BT30-FMC16-045		16	34	—	17	45	0.60
BT30-FMC22-045	040401070007	22	45	—	18	45	0.70
BT30-FMC27-045	040401070008	27	70	—	20	45	1.10
BT40-FMC22-060	040401070009	22	45	—	18	60	1.50
BT40-FMC27-060	040401070010	27	70	—	20	60	2.00
BT40-FMC32-060	040401070011	32	85	—	22	60	2.40
BT40-FMB40F-060	040401070002	40	85	66.7	26	60	2.60
BT50-FMB40F-075	040401070013	40	110	66.7	26	75	6.70
BT50-FMB60-075	040401070014	60	140	101.6	25	75	8.50

HSK



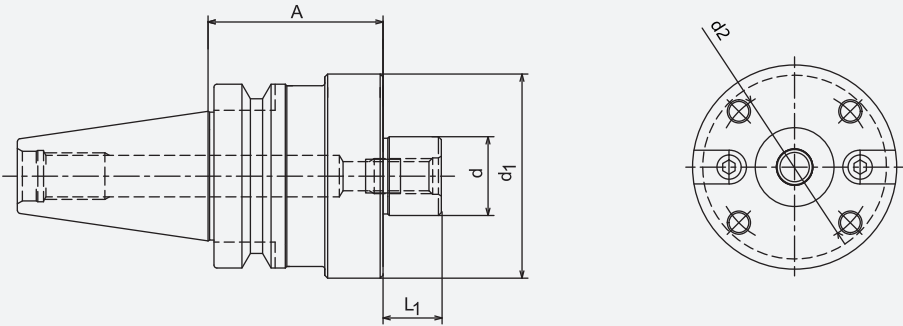
DIN
69893



Specification	System code	d	d1	d2	L1	A	Kg
HSK63A-FMC22-060	040401070015	22	45	—	18	60	1.10
HSK63A-FMC27-060	040401070016	27	70	—	20	60	1.50
HSK63A-FMC32-060	040401070017	32	85	—	22	60	1.80
HSK63A-FMB40F-060	040401070018	40	85	66.7	26	60	1.80
HSK100A-FMB40F-075	040401070019	40	110	66.7	26	75	4.80
HSK100A-FMB60-075	040401070020	60	140	101.6	25	75	6.80

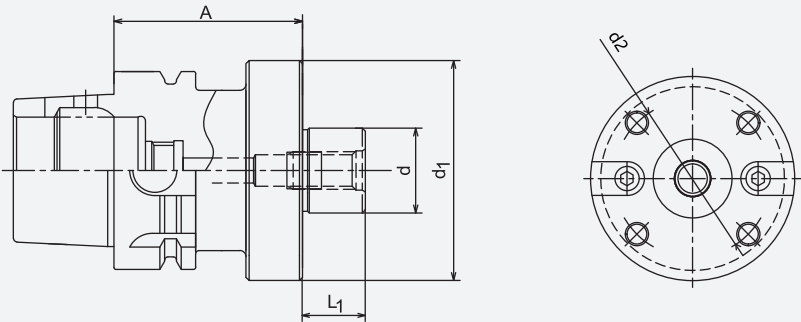
Light Weight Milling Adaptors

BT



Specification	System code	d	d1	d2	L1	A	Kg
BT30-FMC27F-035	040401070040	27	70	54	20	35	0.90
BT40-FMC27F-060	040401070042	27	70	54	20	60	2.00

HSK



Specification	System code	d	d1	d2	L1	A	Kg
HSK63A-FMC27F-060	040401070041	27	70	54	20	60	1.50

Inserts Nomenclature

B	E	H	W	12	04	E	Z	F	R	1	-	WG
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪		⑫

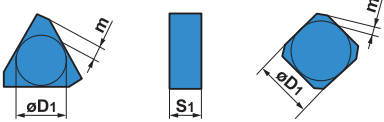
①

Shape		
Code	Shape	
O	Octagonal	
S	Square	
T	Triangle	
C	Diamond 80°	
M	Diamond 86°	
B	Diamond 82°	
R	Round	
X	Special	—
W	Wiper	—

②

Clearance angle		
Code	Clearance Angle	
C	7°	
D	15°	
E	20°	
F	25°	
G	30°	
N	0°	
P	11°	
Z	Other clearance angle	

③

Tolerance			
			
Code	Nose Height m (mm)	Inscribed Circle Diameter &D1(mm)	Tolerance S1(mm)
A	±0.005	±0.025	±0.025
C	±0.013	±0.025	±0.025
E	±0.025	±0.025	±0.025
H	±0.013	±0.013	±0.025
K*	±0.013	±0.05—±0.15	±0.025
M*	±0.08—±0.18	±0.05—±0.15	±0.13
N*	±0.08—±0.18	±0.05—±0.15	±0.025
*standard for no lapping on the side face.			

④

Chip breaker and Fixing type				
Code	Bore	Shape of Bore	Chip Breaker	Shape
W	With Bore	Cylindrical Bore + Single Side (40°—60°)	Without	
T	With Bore		Single	
B	With Bore	Cylindrical Bore + Single Side (70°—90°)	Without	
N	Without	—	Without	
R	Without	—	Single	
X	—	—	—	Special

Inserts Nomenclature

B	E	H	W	12	04	E	Z	F	R	1	-	WG
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪		⑫

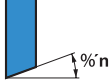
⑤

Inscribed circle Dia.				
Code				Inscribed Circle (mm)
				
	06	06	11	6.35
	08	07	13	7.94
	09	09	16	9.525
10				10.00
12				12.00
	12	12	22	12.70
	16	15	27	15.875
20				20.00

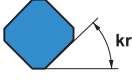
⑥

Thickness	
	
Code	Thickness (mm)
03	3.18
T3	3.97
04	4.76

⑧

Clearance angle of wiper	
	
Code	Clearance angle of wiper
D	15°
E	20°
F	25°
G	30°
Z	Other Angle

⑦

Tool cutting edge angle	
	
Code	Tool cutting edge angle
A	45°
E	75°
P	90°
Z	Other Angle

⑨

Cutting edge design	
Code	Cutting Edge Design
E	 Honed
F	 Sharp Edge
T	 Chamfered
S	 Chamfered + Honed
Z	 Chamfered

⑩

Cutting direction	
Code	Cutting Direction
L	Left Hand
N	Left& Right
R	Right Hand

⑪

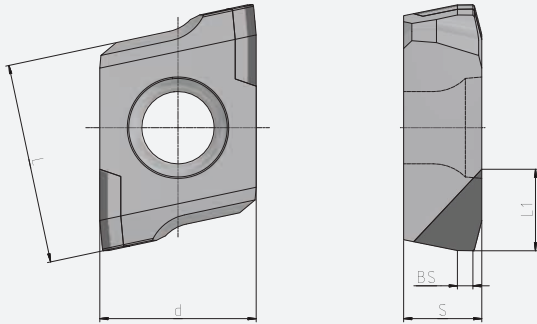
Edges	
Code	Edges
1	1 edge
2	2 edge
4	4 edge

⑫

Cutting edge design		
WG	UW	PT
Wiper	Universal Wiper	PT edge

Milling Inserts Specifications

Insert are designed by variety of Kr, could meet different application of end milling and shoulder milling.



Specifications

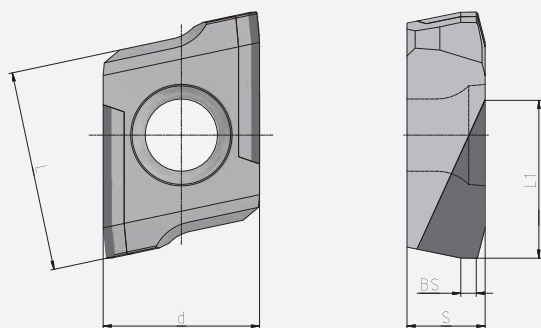
Figure	Specification	Z	L	d	S	BS	L1	R	N			
									PD01F	PD10E	PD32E	CVDD
 Standard	BEHW1204EZR1	1										
	BEHW1204EZR2	2	12.20	9.525	4.76	1	4	—	○	●	○	○
	BEHW1204EZR1B	1										
 Wiper	BEHW1204EZR1-WG	1										
	BEHW1204EZR2-WG	2	12.20	9.525	4.76	4	4	—	○	●	○	○
	BEHW1204EZR1B-WG	1										
 Corner edge	BEHW1204EZR1-PT	1										
	BEHW1204EZR2-PT	2	12.20	9.525	4.76	—	4	0.4	○	●	○	○
	BEHW1204EZR1B-PT	1										
 Popular wiper	BEHW1204PZFR1-UW	1										
	BEHW1204PZFR2-UW	2	12.20	9.525	4.76	1.5	4	0.4	○	●	○	○
	BEHW1204PZFR1B-UW	1										
 straight edge	BEHW1204PZFR1	1	12.20	9.525	4.76	1.5	11	0.4	○	●	○	○
	BEHW1204PZFR1B	1										

Note: BEHW1204***R1B is suitable for milling cutter with the diameter below 40mm.

● In stock ○ Tailor-made

Milling Inserts (Heavy cutting) Specifications

Inserts are designed by variety of Kr could meet different application of end milling and shoulder milling.



Specifications

Figure	Specification	Z	L	d	S	BS	L1	R	N			
									PD01F	PD10E	PD32E	CVDD
Standard 	BEHW1204EZTR1	1							○	●	○	○
	BEHW1204EZTR2	2	12.20	9.525	4.76	1	8	0.4	○	●	○	○
	BEHW1204EZTR1B	1										
Wiper 	BEHW1204EZTR1-WG	1							○	●	○	○
	BEHW1204EZTR2-WG	2	12.20	9.525	4.76	4	8	—	○	●	○	○
	BEHW1204EZTR1B-WG	1										
Sharp corner 	BEHW1204EZTR1-PT	1							○	●	○	○
	BEHW1204EZTR2-PT	2	12.20	9.525	4.76	—	8	0.4	○	●	○	○
	BEHW1204EZTR1B-PT	1										
Right-angle 	BEHW1204PZTR1	1							○	●	○	○
	BEHW1204PZTR1B	1	12.20	9.525	4.76	1	11	0.8	○	●	○	○

Note: BEHW1204***R1B is suitable for milling cutter with the diameter below 40mm.

● In stock ○ Tailor-made

WORLDIA® PCD Grades



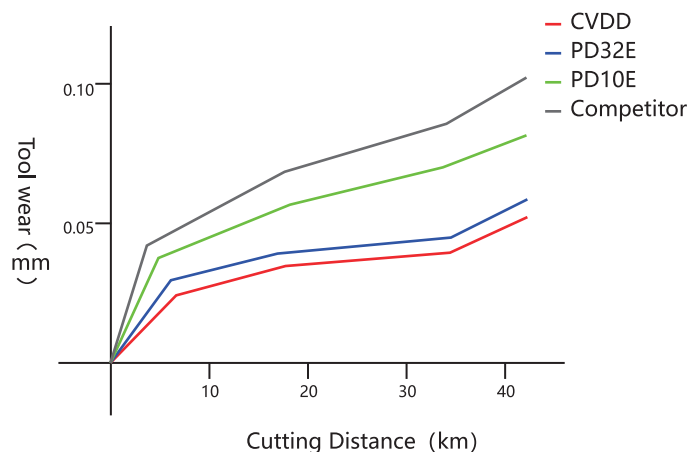
Introduction

Material	Grade size(μm)	Feature	Application
PD01F	1	PD01E fine grain size PCD material(1μm) is suitable for mirror finishing applications. Its high impact resistance and high abrasive resistance are no less than that of rough grade of PCD.	PD01E has excellent chip resistance is suitable for the roughing and interrupt cutting aluminium alloys. This grade is also commonly used for non-ferrous finishing applications. Other successful applications include machining of wood, MDF.
PD10E	10	PD10E is the universal grade in the market. It's the first choice for many applications where a good balance of toughness and wear resistance are required.	This grade is commonly used for non-ferrous finishing applications. Other successful applications include machining of wood, MDF. The machining of low-medium content silicon aluminium alloys, carbide, hard rubber, graphite and so on.
PD32E	2~30	PD32E has a unique combination of wear resistance, edge strength and edge quality. It contains a carefully selected mix of micron diamond (between 2 - 30 μm). The combination of these particle sizes and a specifically developed high pressure sintering process produces a structure with extreme abrasion resistance and good thermal stability.	Application areas include the machining of abrasive workpieces such as MMC, high silicon aluminium alloys as well as for the machining of carbide and carbide, hard rubber, graphite and other applications.
CVDD	—	CVDD is a pure carbon material without binder, which is extreme abrasion resistance and good thermal suitability. Due to its Perfect cutting edge suitable for applications where mirror finishes are required.	Application areas include the machining of abrasive workpieces such as MMC, high silicon aluminium alloys as well as for the machining of carbide, hard rubber, graphite and other applications.

Material Performance

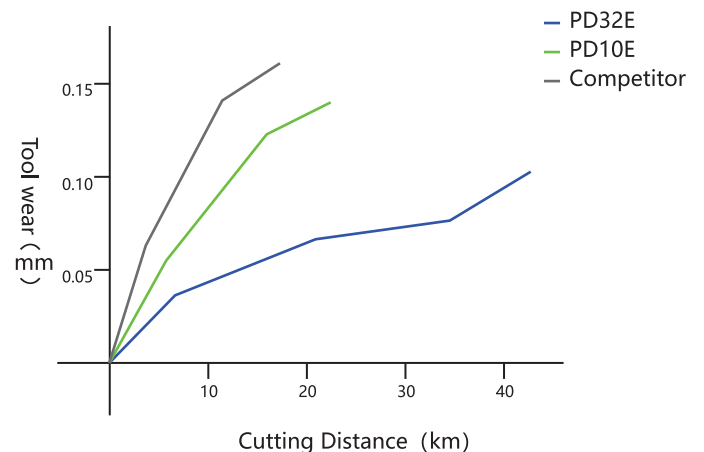
Continue cutting AL-25%Si

Vc=3927m/min f=0.1mm/r
ap=0.2mm

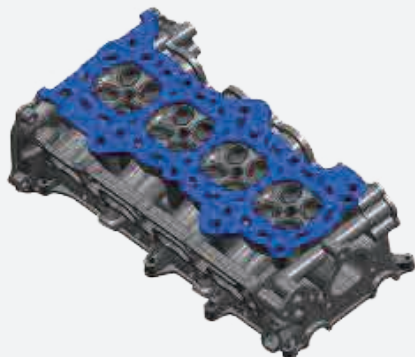


Continue cutting Al-20%SiC

Vc=3500m/min f=0.2mm/r
ap=0.18mm



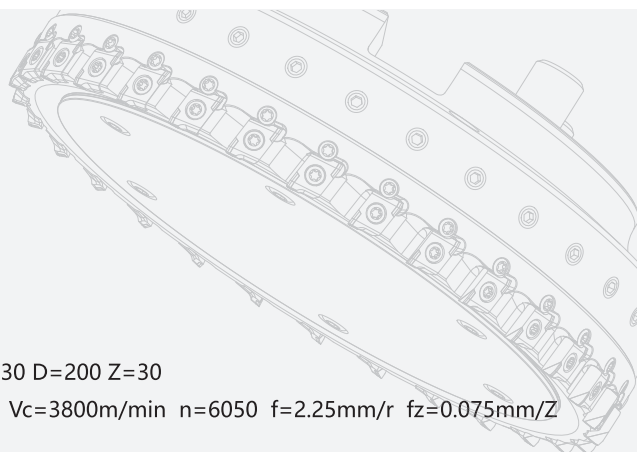
Case Studies



Material: AlSi7Mg

Tool: FMP200SC60-BE12-30 D=200 Z=30

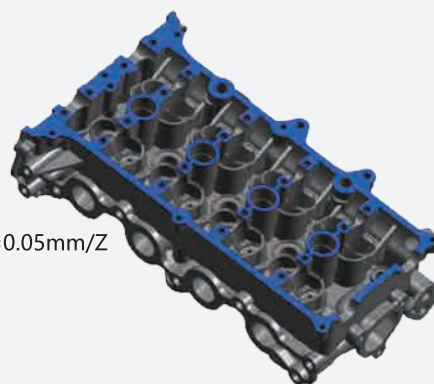
Cutting Data: $a_p=0.5\text{mm}$ $V_c=3800\text{m/min}$ $n=6050$ $f=2.25\text{mm/r}$ $f_z=0.075\text{mm/Z}$



Material: AlSi7Mg

Tool: FMP125SB40-BE12-20 D=125 Z=20

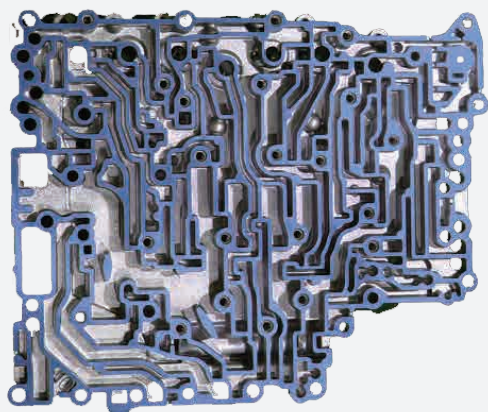
Cutting Data: $a_p=7\text{mm}$ $V_c=3927\text{m/min}$ $n=10000$ $f=1\text{mm/r}$ $f_z=0.05\text{mm/Z}$



Material: Aluminum + Gray Iron

Tool: FMP200SC60-BE12-30 D=200 Z=30

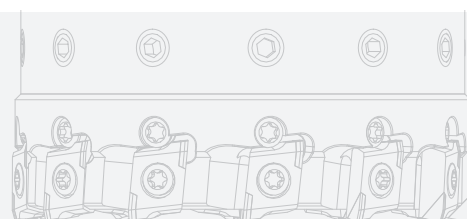
Cutting Data: $a_p=0.5\text{mm}$ $V_c=785\text{m/min}$ $n=1250$ $f=1.44\text{mm/r}$ $f_z=0.048\text{mm/Z}$



Material: ADC12

Tool: FMP230SC40-BE12-30 D=230 Z=30

Cutting Data: $a_p=0.2\text{mm}$ $V_c=2746\text{m/min}$ $n=3800$ $f=1.5\text{mm/r}$ $f_z=0.05\text{mm/Z}$



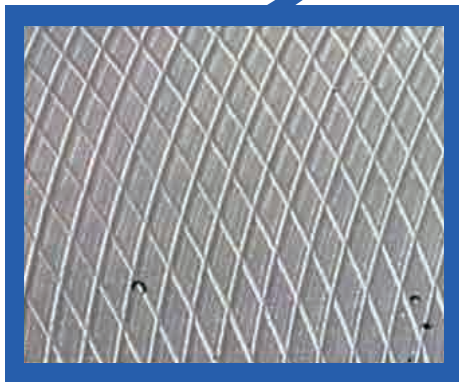
Case Studies——Hatching Milling

Material: AlSi10Mg

Roughness: Rz8~16

Tool: FMP063SA22-BE12-10 (D63, Z=10)

Cutting Data: $a_p=1\text{mm}$ $n=9600\text{rpm}$ $f=8500\text{mm/min}$



Material: ADC12

Roughness: RZ16~40

Tool: FMP063SA22-BE12-10 (D63, Z=10)

Cutting Data: $a_p=0.5\text{mm}$ $n=6000\text{rpm}$ $f=6000\text{mm/min}$



Product Supports

Under current cutting condition during machining, WORLDIA® can provide the most reasonable, scientific process and design to customers depends on our fully experience to ensure the high efficiency.



New Products Delivery

According to requirements, we can adjust the inserts and setup milling cutter completely before delivery.



PCD Inserts Service

Supply regrinding service.
Supply retip service which can keep the same size as the new tools.

[illegible]

WORLDIA® Cutting Tools Series

More Information Vew
[Http://www.worldia-tools.com](http://www.worldia-tools.com)



01-8
Coated PCBN Inserts
(for hardened steel)



02-8
PCBN Inserts
(for hardened steel)



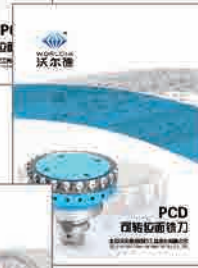
03-8 PCBN Inserts
(for cast iron)



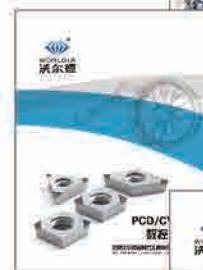
04-8
PCBN Inserts
(for powder steel)



05-8
PCBN Face Milling Cutters



06-8
FMP-BE
PCD Face Milling Cutters



07-8
PCD/CVDD Inserts



08-8
PCD Specialty Tools
for Auto Parts

