

# PCD Tools

KANEFUSA



*Kanefusa - A New Dimension of Performance*



JQA-QM3710



JQA-EM3137  
Head Office  
Factory

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**0-66E-3**  
[Class] [Article] [Revision]

# FACE MILLING TOOL

High efficiency face mill for aluminum processing

## SUPER FINE PITCH PCD FACEMILL

### SFP series

Tool diameter  $\phi 50$  has 16 teeth! High precision tool with high efficiency.

Highly efficient face milling of aluminum parts is achieved by the multi-tooth specification in which diamond tips are arranged in an extremely narrow pitch.



Shank Type  
SFP50-25-S16



Cutter Type  
SFP80-25.4-C20  
(Mounted to BT40 Facemill Arbor)



Constant Overall Height Type  
SFP63-22-M16  
(Mounted to BT40 Facemill Arbor)

### 1 No need for cutting edge adjustment

Adopting brazed re-sharpening type and it's under manufacturer's warranty regarding run-out of brand-new product as well as re-sharpened one.

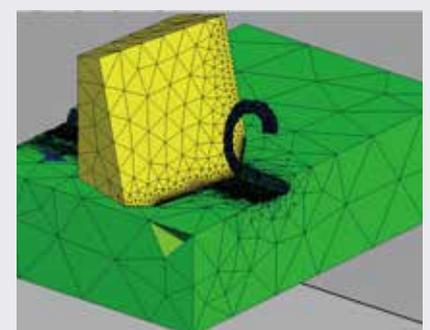
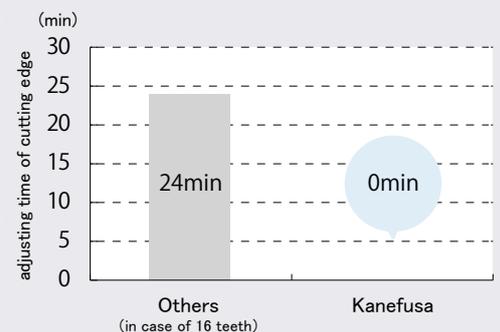
### 2 Burr reduction

High quality processing is achieved by the multi-tooth specification and high rake design.

### 3 High speed stable processing

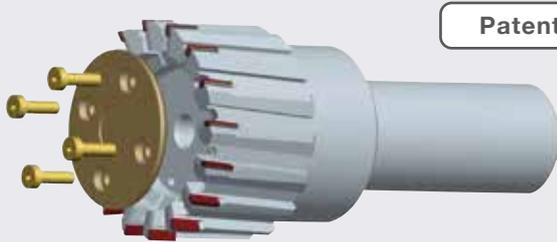
Tooth geometry is optimized by cutting simulation analysis, and cutting force is reduced at 40% compared to the conventional one.

High quality, less surface roughness and high flatness are realized by the low cutting resistance tooth geometry and multi-tooth.



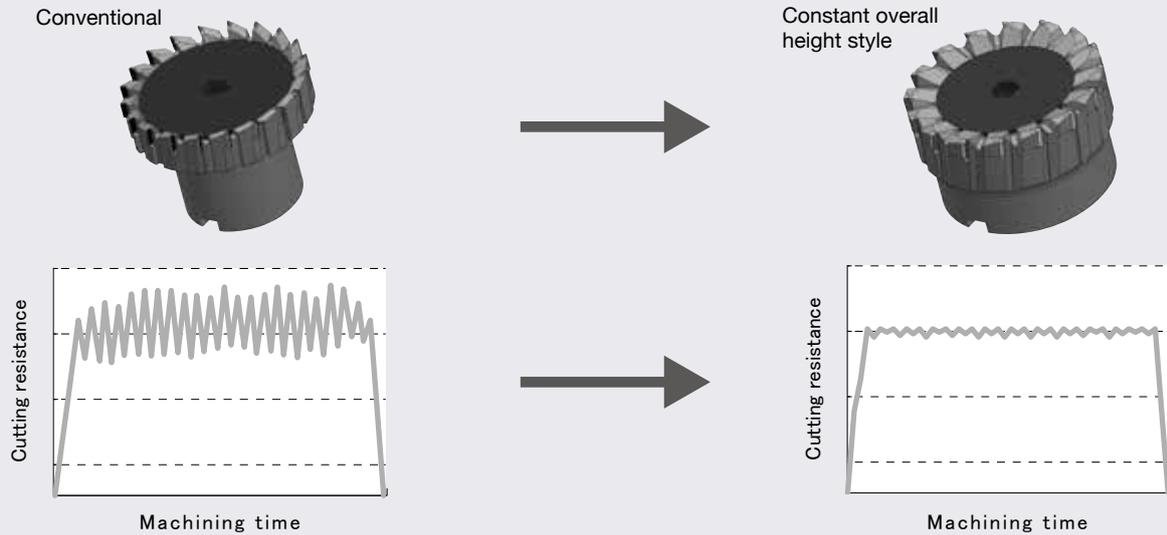
## 4 Improve removal of saw dust

Apply to center hole coolant supply by the innovative clamping bolt structure.



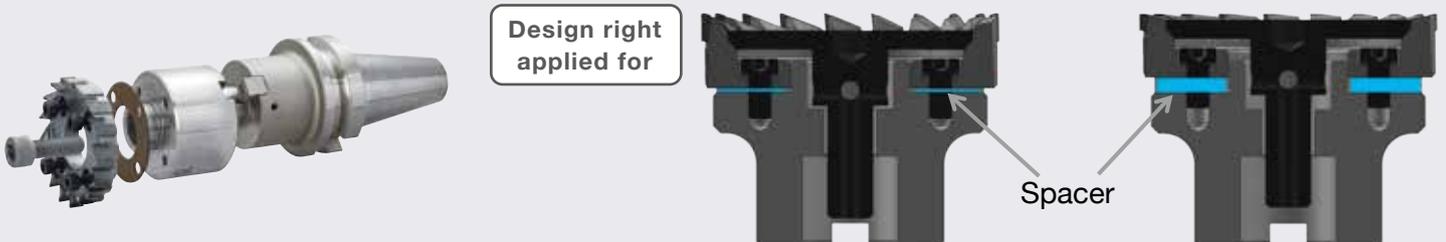
## 5 High quality even under intermittent process

Steady processing quality is realized by high rigidity of body specification due to preventing from up and down fluctuation of cutting resistance.



## 6 No need to adjust the total length

In case of constant overall height type, the total length can be fixed with the same length as the original one, by combining the different thickness of spacer and increasing the thickness of spacer for enough re-grinding allowance, when re-grinding is done.



### Recommended processing parameter

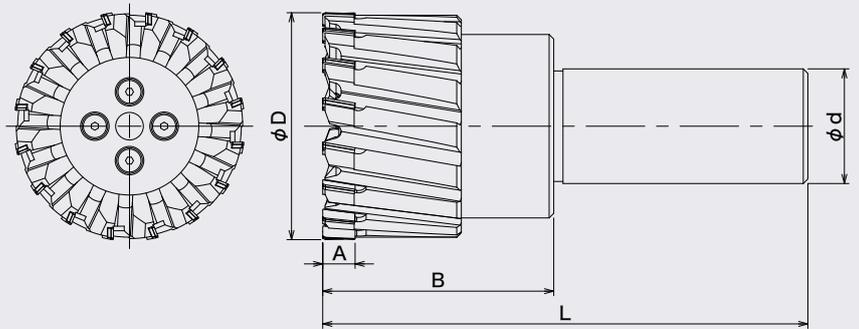
Work Material	Aluminum alloy	
Content amount of Si	<13%	≥13%
Cutting Speed Vc (m/min)	1000~3000	300~900
Feed Rate f (mm/tooth)	0.04~0.12	0.04~0.12
Depth (amount) of cutting ap (mm)	≤2.0	

Optimum condition needs to be adjusted depend on the processing conditions such as machine and work rigidity.

# 【Shank Type】



Shank Type  
SFP50-25-S16



(mm)

Item Number	Number of teeth	Tool Diameter	Shank Diameter	Teeth Length	Total Length	Projection Length	Weight (Kg)
		D	d	A	L	B	
SFP 25 - 25 - S 8	8	25	25	7	105	50	0.4
SFP 25 - 25 - S 6 G	6	25	25	7	105	50	0.4
SFP 30 - 25 - S 10	10	30	25	7	105	50	0.5
SFP 30 - 25 - S 8 G	8	30	25	7	105	50	0.5
SFP 40 - 25 - S 12	12	40	25	7	105	50	0.7
SFP 40 - 25 - S 10 G	10	40	25	7	105	50	0.7
SFP 50 - 25 - S 16	16	50	25	7	105	50	0.8
SFP 50 - 25 - S 12 G	12	50	25	7	105	50	0.8
SFP 63 - 25 - S 16	16	63	25	7	105	50	1.0
SFP 63 - 25 - S 12 G	12	63	25	7	105	50	1.0
SFP 80 - 32 - S 20	20	80	32	7	120	50	1.8
SFP 80 - 32 - S 16 G	16	80	32	7	120	50	1.8

G symbol end of model: High rigidity body

## Shank Type

### Machining Example 1

- Item Number ..... SFP50-25-S16
- Work Material ..... Timing chain cover (Aluminum alloy)
- Cutting Parameters ..... S=10,000rpm  
fz=0.06mm/t (F=9.6m/min)  
ap=1.0mm

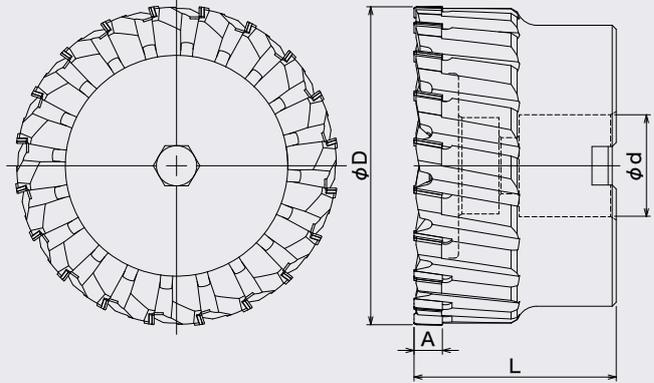
### Machining Example 2

- Item Number ..... SFP80-32-S20
- Work Material ..... Gear case (Aluminum alloy)
- Cutting Parameters ..... S=9,500rpm  
F=7m/min

#### Result

Attained 1.5 – 2 times faster cutting. Machining time was decreased by half and solved the bottleneck of processing.

# [Cutter Type]



Cutter Type  
SFP80-25.4-C20  
(Mounted to BT40 Facemill Arbor)

Item Number		Number of teeth	Tool Diameter	Hole diameter	Teeth Length	Total Length	Weight (Kg)
			D	d	A	L	
Inch	SFP 80 - 25.4 - C 20	20	80	25.4	7	50	1.5
	SFP 80 - 25.4 - C 16 G	16	80	25.4	7	50	1.5
	SFP 100 - 31.75 - C 24	24	100	31.75	7	50	2.0
	SFP 100 - 31.75 - C 20 G	20	100	31.75	7	50	2.0
	SFP 125 - 38.1 - C 32	32	125	38.1	7	60	3.3
	SFP 125 - 38.1 - C 24 G	24	125	38.1	7	60	3.3

(mm)

G symbol end of model: High rigidity body

Item Number		Number of teeth	Tool Diameter	Hole diameter	Teeth Length	Total Length	Weight (Kg)
			D	d	A	L	
Metric	SFP 50 - 22 - C 16	16	50	22	7	50	0.6
	SFP 50 - 22 - C 12 G	12	50	22	7	50	0.6
	SFP 63 - 22 - C 16	16	63	22	7	50	1.0
	SFP 63 - 22 - C 12 G	12	63	22	7	50	1.0
	SFP 80 - 27 - C 20	20	80	27	7	50	1.5
	SFP 80 - 27 - C 16 G	16	80	27	7	50	1.5
	SFP 100 - 32 - C 24	24	100	32	7	50	2.0
	SFP 100 - 32 - C 20 G	20	100	32	7	50	2.0
	SFP 125 - 40 - C 32	32	125	40	7	60	3.3
	SFP 125 - 40 - C 24 G	24	125	40	7	60	3.3

(mm)

G symbol end of model: High rigidity body

## Cutter Type

### Machining Example 1

- Item Number ..... SFP63-22-C16
- Work Material ..... Cam housing (Aluminum alloy)
- Cutting Parameters ..... S=10,000rpm (Vc=1,979m/min)  
F=12.8m/min (f=0.08mm/tooth)  
ap=0.5mm

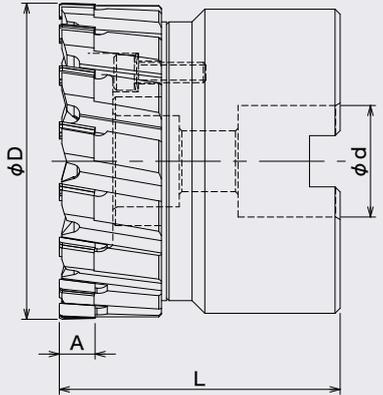
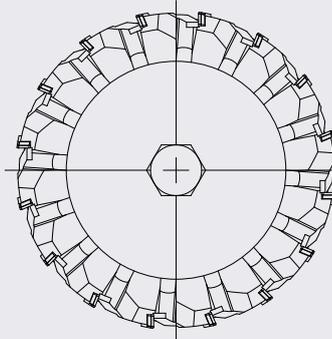
**Result** Surface roughness was improved within 0.2 $\mu$ m and production efficiency was also increased.

### Machining Example 2

- Item Number ..... SFP100-31.75-C20G
- Work Material ..... Valve body (ADC12)
- Cutting Parameters ..... S=6,000rpm (Vc=1,885m/min)  
F=4.6m/min (f=0.038mm/tooth)  
ap=0.2mm

**Result** Attained burr suppressing compared with conventional condition, moreover realized shortening machining time and life prolongation even under high speed feeding.

# 【Constant Overall Height Type】



Constant Overall Height Type  
SFP63-22-M16  
(Mounted to BT40 Facemill Arbor)

(mm)

	Item Number	Number of teeth	Tool Diameter	Hole diameter	Teeth Length	Total Length	Weight (Kg)
			D	d	A	L	
Inch	SFP 80 - 25.4 - M 20	20	80	25.4	7	55	1.5
	SFP 80 - 25.4 - M 16 G	16	80	25.4	7	55	1.5
	SFP 100 - 31.75 - M 24	24	100	31.75	7	55	2.1
	SFP 100 - 31.75 - M 20 G	20	100	31.75	7	55	2.1
	SFP 125 - 38.1 - M 32	32	125	38.1	7	63	3.4
	SFP 125 - 38.1 - M 24 G	24	125	38.1	7	63	3.4

G symbol end of model: High rigidity body

(mm)

	Item Number	Number of teeth	Tool Diameter	Hole diameter	Teeth Length	Total Length	Weight (Kg)
			D	d	A	L	
Metric	SFP 63 - 22 - M 16	16	63	22	7	55	1.0
	SFP 63 - 22 - M 12 G	12	63	22	7	55	1.0
	SFP 80 - 27 - M 20	20	80	27	7	55	1.5
	SFP 80 - 27 - M 16 G	16	80	27	7	55	1.5
	SFP 100 - 32 - M 24	24	100	32	7	55	2.1
	SFP 100 - 32 - M 20 G	20	100	32	7	55	2.1
	SFP 125 - 40 - M 32	32	125	40	7	63	3.4
	SFP 125 - 40 - M 24 G	24	125	40	7	63	3.4

G symbol end of model: High rigidity body

## PCD Reamers with Micro 3D chip breaker

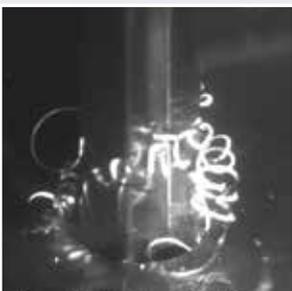
Our original Micro 3D chip breaker is adopted that is effective in dividing and evacuating swarf in rotation cutting.



### Features

- Chip breaker cuts swarf and controls its length and direction.
- Decreasing risks of damages on work material surface and machines with curling swarf. Operators' safety are improved.
- Less chipping on cutting edges caused by contacts between swarf and tool. It improves tool life and work efficiency.

### Prevents chip from wrapping around

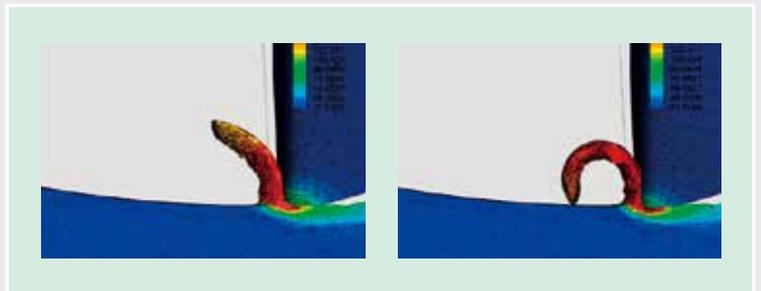


No breaker



With breaker

### Chip simulation



No breaker

With breaker

# PCD Reamer and Drill Bits

## Best and customized specification!

For high precision roundness and finish boring, and high speed feeding and one pass finish drilling.  
 Technical consultation for shorter process time and reduction of tool cost is available.



### Features

- High precision and smooth finish.
- PCD tools are superior to carbide tools in temperature resistance and prove longer lifetime in high speed feed processing.
- Inquiries for  $\phi 4$ mm or smaller diameter reamer, twisted face bevel angle endmill, and fine pitch tooth reamer for high feeding are welcome.
- Consultation for shorter process time and reduction of tool cost are available.

### Machining Example

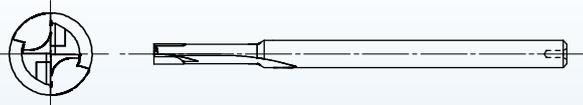
- Automotive parts: Hydraulic sleeve (ADC12) ..... Finishing on  $\phi 12$
- Automotive Engine: Intake Manifold (ADC12) ..... Hole processing  $\phi 6-\phi 8.3$
- Car air conditioner: Compressor parts (High Silicon Aluminium) ..... Finishing on  $\phi 2.6-\phi 30$
- Automotive transmission case (ADC12) ..... Long hole for oil piston  $\phi 12 \times 170$  L
- Hydraulic control component (Extruded Aluminium) ..... Finishing on oil holes  $\phi 3.2$

Edge Material	Backing material	Available sizes	Tolerances
PCD	Tungsten carbide Steel	Edge dia.= $\phi 3-\phi 60$ Length= $\sim 320$ mm	Edge dia. = Standard $10\mu\text{m}$ - High precision within $4\mu\text{m}$
* Various grades are available.	Carbide for the edge + Steel for shank	O/D run-out=Within $5\mu\text{m}$ Bottom Edge run-out=Within $20\mu\text{m}$	Length = Standard $40\mu\text{m}$ - High precision within $20\mu\text{m}(\pm 10\mu\text{m})$

# Our Custom Designed PCD Reamers and Drills

## Smaller diameter PCD reamer

The PCD brazed smallest diameter reamer (3mm dia.) to improve cutting condition and tool life in processing small parts.

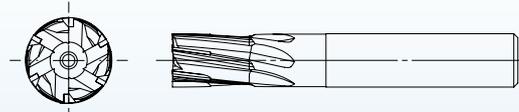


(mm)

Shank Diameter	Tool Diameter	Total Length	Teeth Length	Number of teeth
4	3	60	5	2

## Fine tooth pitch PCD helical endmill

High speed feeding is available by fine tooth pitch helical system.

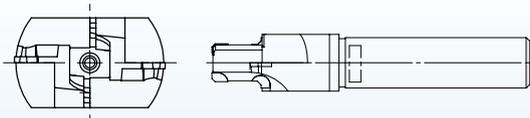


(mm)

Shank Diameter	Tool Diameter	Total Length	Teeth Length	Number of teeth
14	14	90	10	6

## PCD profile reamer

Reduction of production process by combining profile cutter and Reamer (Drill).

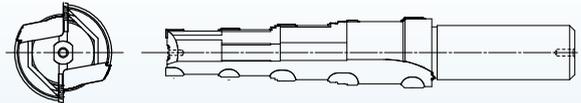


(mm)

Shank Diameter	Tool Diameter	Total Length	Teeth Length	Number of teeth
16	12-30	100	10	6

## Multistep type PCD reamer

Reducing cost by choosing appropriate electric discharge conditions on each edge step.



(mm)

Shank Diameter	Tool Diameter	Total Length	Teeth Length	Number of teeth
20	17-26	150	10	10

## High roundness and high quality finish reamer

High roundness with odd tooth number and high quality finish with step edges.

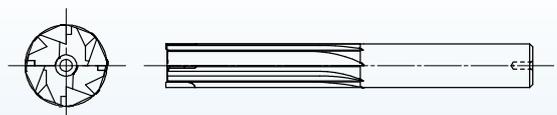


(mm)

Shank Diameter	Tool Diameter	Total Length	Teeth Length	Number of teeth
8	5.6-6	100	8	3

## Fine tooth pitch PCD reamer for high precision roundness

The high quality drilling at low cost.



(mm)

Shank Diameter	Tool Diameter	Total Length	Teeth Length	Number of teeth
12	12	100	6.5	4D+4UH

## Nova metal

**Nova metal** is suitable to cut Aluminum alloys with silicon content of over 10 %.

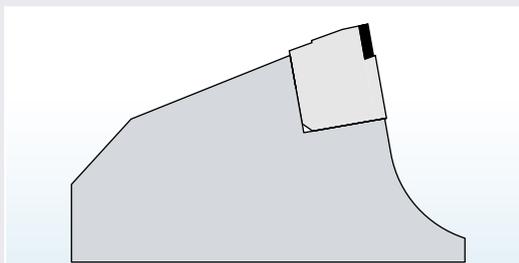
**Nova metal** is tipped with polycrystalline diamond (PCD).

PCD provides extensively longer life than tungsten carbide when cutting Aluminum alloys.

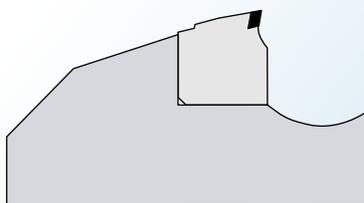
In the past, a certain size of the PCD tooth was required to assure that the tooth was firmly attached to the saw plate.

Because PCD is much more expensive than other cutting edge materials, the sawblade price strongly depended on the tooth size.

We at Kanefusa have developed a technology that allows us to fuse a very small PCD tooth to a tungsten carbide substrate, which is brazed to the saw plate. In this way we can optimize the use of PCD and make the single use of PCD tipped sawblades possible.



**Tooth with negative hook angle for cutting gate of aluminum castings**



**Tooth with positive hook angle for cutting solid**



**For many reasons, sawblades for single use are superior to sawblades that can be re-sharpened.**

Reground sawblades are instable in performance, especially after they have been reground a few times. Sawblades for single use provide the same cut quality cut after cut, blade after blade.

Sawblades for single use can be run to the limit. Sawblades that can be re-sharpened should be taken off the machine earlier to avoid damage. For that reason, **Nova metal** outlasts conventional PCD sawblades.

For various applications, sawblades with positive or negative hook angle are available.

**The value for the user is:**

- Extensively longer life time than tungsten carbide tipped sawblades
- Outperforms regular PCD sawblades
- More machine uptime
- High process reliability due to single use concept
- Maintenance free

Specification are available upon request. Please contact Kanefusa.

# PCD Saw Blade

<b>Application</b>	Cuts solids
<b>Edge Material</b>	PCD
<b>Available sizes</b>	Up to $\phi$ 800 mm



## Features

- PCD saw blades can be reground several times.
- The saw blades are manufactured upon order and designed according to the application.
- Kanefusa high brazing technology reduces edge chipping of the teeth.
- Saw plate withstands the heaviest load.

# For Deburring

## PCD Tipped End Mill

<b>Application</b>	Deburring
<b>Edge Material</b>	PCD

## Features

- PCD end mills have up to 50 times longer life than tungsten carbide tooling.
- PCD tools allow twice the cutting speed compared with tungsten carbide tooling.
- PCD tooling is more economical than tungsten carbide tooling.





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