SUMIDIA/SUMIDIA BINDERLESS SUMICRYSTAL M1 to M73

M

M SUMICRYSTAL

Stock Markings and Symbols

- ● ● mark: Standard stocked item
- ● mark: To be replaced with the new item featured on the same page
- ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)
- * mark: Semi-standard stock (please confirm stock availability)
- ○ mark: Stock or planned stock (please confirm stock availability)
- Blank: Made-to-order item
- — mark: Not available

SUMIDIA series

■ General Features

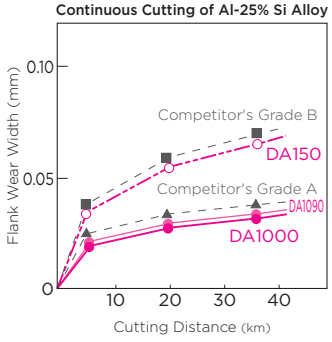
Our SUMIDIA sintered diamond series has 5 grades (DA1090, DA90, DA150, DA2200, DA1000) with individual features depending on the optimum combination of diamond particle size and binder, as well as the NPD10 grade (nano-polycrystalline diamond) where nano-sized diamond particles are directly bound with high strength without using binders.
This series is suited to a wide range of applications from machining of aluminum alloy to machining of hard brittle materials and cemented carbide.

■ Grades, Features and Applications

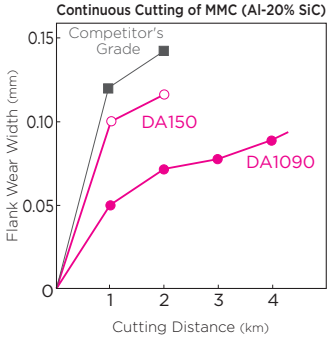
Grade		Features	Applications	Average grain size of diamond particles (μm)	Hardness HK (GPa)	Transverse Rupture Strength (GPa)
SUMIDIA BINDERLESS	NPD10	100% diamond structure that directly binds nano-sized diamond particles with high strength. Demonstrates optimum wear and fracture resistance as well as the best edge sharpness.	· Finishing of Cemented Carbide · Machining of Hard Brittle Materials (Ceramic)	up to 0.05	120 to 130	≈ 3.15
SUMIDIA	DA1000	High-density sintered grade made of ultra-fine grain diamond that demonstrates excellent wear and fracture resistance as well as edge sharpness.	· Machining of High-Silicon Aluminum Alloy · Roughing, Interrupted Machining and Finishing of Aluminum Alloy · Woodcraft or Wooden Board Cutting/Facing · General Finishing of Non-Ferrous Metals	up to 0.5	50 to 60	≈ 2.60
	DA2200	Sintered grade made of ultra-fine grain diamond that demonstrates optimum wear and fracture resistance and excellent edge sharpness.	· Roughing, Interrupted Machining and Finishing of Aluminum Alloy · Woodcraft or Wooden Board Cutting/Facing	0.5	45 to 55	≈ 2.45
	DA150	Grade with micro-grained sintered diamond particles. With strong diamond particle bonding, it has an excellent balance of machinability and wear resistance.	· General Finishing of Non-Ferrous Metals · Finishing of Semi-Sintered Ceramic and Mold-Extruded Products · FRP, Hard Rubber & Carbon Cutting · Wooden or Inorganic Board Cutting/Facing	5	50 to 60	≈ 1.95
	New DA1090	Grade in which coarse diamond grains are sintered at high density. Shows the highest diamond content for excellent wear resistance and fracture resistance.	· Machining of High-Silicon Aluminum Alloy · Machining of Aluminum Composite (MMC) · Green or Semi-Sintered Cemented Carbide & Ceramic Roughing · Machining of Sintered Ceramic/Stone/Rock	up to 50	55 to 70	≈ 1.30
	DA90	Contains coarser diamond particles than other grades, giving it good wear resistance suitable for the machining of carbides and high-silicon aluminum. Shows the highest diamond content for excellent wear resistance.		50	50 to 65	≈ 1.10

Transverse rupture strength measured with test piece equivalent to insert PCD layer

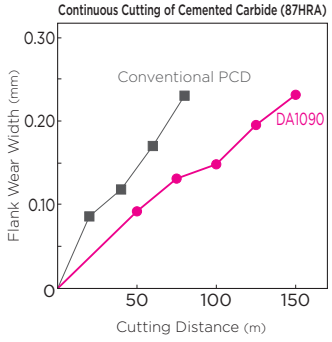
■ Performance



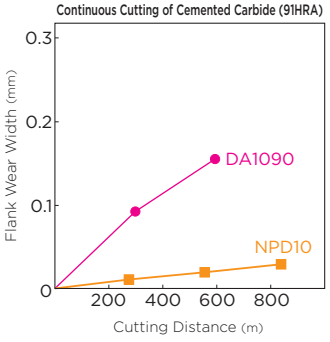
Work Material: Al-25% Si alloy
Tool Cat. No. : SPGN 120304
Cutting Conditions: vc = 500m/min
f = 0.1mm/rev
ap = 0.2mm, Dry



Work Material: MMC (Al-20%SiC)
Tool Cat. No. : CNMX 120408
Cutting Conditions: vc = 350m/min
f = 0.2mm/rev
ap = 0.18mm Wet



Work Material:
Cemented Carbide (87HRA)
Tool Cat. No. : NF-DCMW 070204
Cutting Conditions: vc = 20m/min
f = 0.1mm/rev
ap = 0.2mm Wet

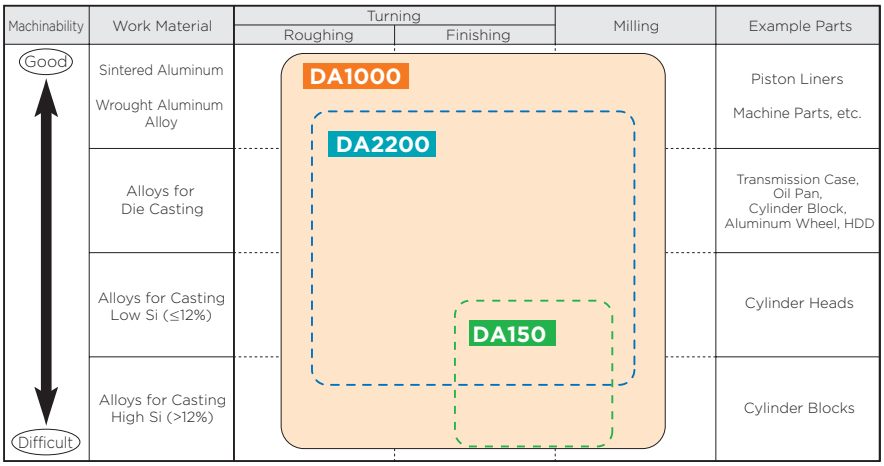


Work Material:
Cemented Carbide (91HRA)
Tool Cat. No. :
DCMW 11T304RH (NPD10)
NF-DCMW 11T304(DA90)
Cutting Conditions: vc = 20m/min
f = 0.05mm/rev
ap = 0.05mm, Dry

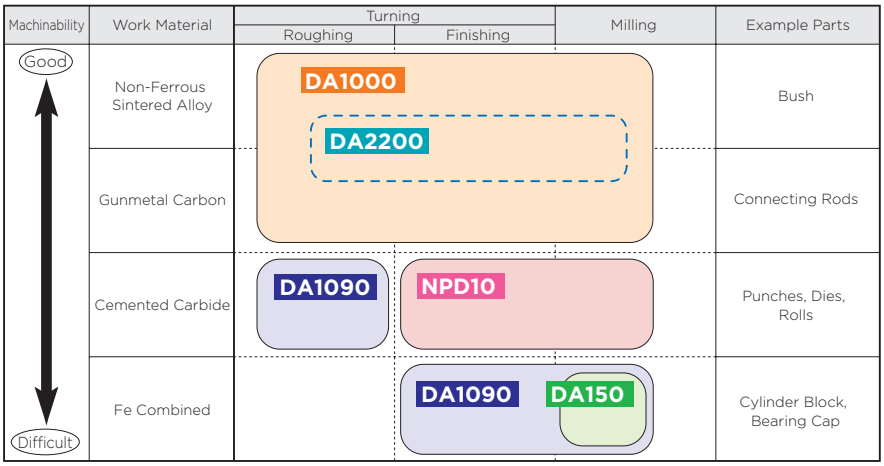
SUMIDIA series

■ Application Range

● Aluminum



● Non-aluminum



■ Recommended Cutting Conditions (Turning)

Work Material	Cutting Speed vc(m/min)	Feed Rate f(mm/rev)	Depth of Cut ap(mm)
Aluminum Alloy	up to 3,000	up to 0.2	up to 3
Copper Alloy	up to 1,000	up to 0.2	up to 3
Reinforced Plastics	up to 1,000	up to 0.4	up to 2
Wood or Organic Materials (Cutting, etc.)	up to 4,000	up to 0.4	—
Cemented Carbide	up to 30	up to 0.2	up to 0.5
Carbon	100 to 600	1	up to 2

■ SUMIDIA Grinding Method

Functions		Description
Grinding Machine	—	(1) A special-purpose high-rigidity grinding machine. (2) Capable of wet grinding operations.
Grinding Wheel	Abrasive Grain	Diamond
	Grain Size	Rough Grinding: 400 mesh, Finish Grinding: 800 to 1,500 mesh
	Bond	Vitrified or Metal Bond Dedicated for Polycrystalline Diamond Tool
	Concentration	100 to 125
	Dressing	Use a WA stick with a mesh of about 400.
Grinding Conditions	Peripheral Speed	800 to 1,000m/min
	Table Rocking	30 to 60 cycle/min
	Grinding Fluid	Water-soluble Grinding Fluid (Solution type)
Others	—	(1) The rake face is generally lapped. (2) Inspect for edge chipping using a microscope with a magnification of 30 to 50 times. (3) Machining of non-ferrous metals requires a sharp cutting edge. (4) Surfaces that were cut by EDM should have more than 0.05mm ground off.

*Please contact us for details on regrinding of NPD10.

NPD10/DA1090

Nano-polycrystalline Diamond

- **Indexable Inserts** (Cemented Carbide Turning) ☞M31
- **Ballnose Endmills and Radius Endmills** (Cemented Carbide Milling) ☞M59 ~

■ General Features

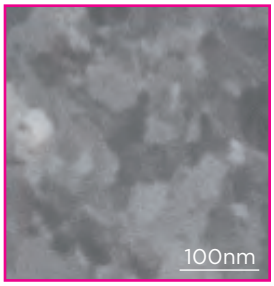
Nano-polycrystalline diamond is a polycrystalline diamond that directly binds nano-sized diamond particles with high strength without using any binders. This Sumitomo Electric proprietary material is harder than polycrystalline diamond with a binder, achieving excellent wear resistance and fracture resistance.
NPD10 cutting edge is 100% diamond material made from high-hardness nano-polycrystalline diamond which, unlike single-crystal diamonds, has no anisotropy.
Achieves longer tool life and higher machining accuracy than conventional diamonds in the machining of cemented carbide and other hard brittle materials.

■ Features

- **Ideal for finishing of cemented carbide and other hard brittle materials (NPD10)**
  The outstanding wear resistance of nano-polycrystalline diamond enables high-precision machining of cemented carbides.
- **Maintains excellent dimensional accuracy for a long time (NPD10)**
  Compared to conventional diamond tools, the number of tool changes is drastically reduced, improving work efficiency and reducing total costs.

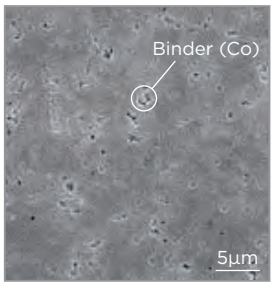
■ Comparison of Structures

Nano-polycrystalline Diamond Tool SEM Profile



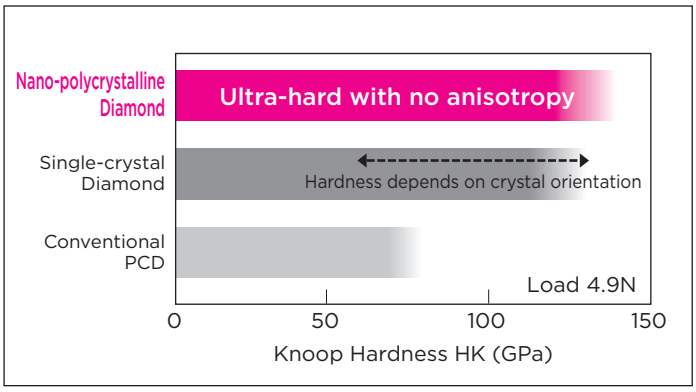
Diamond Particles (30 to 50nm)

Conventional PCD SEM Profile

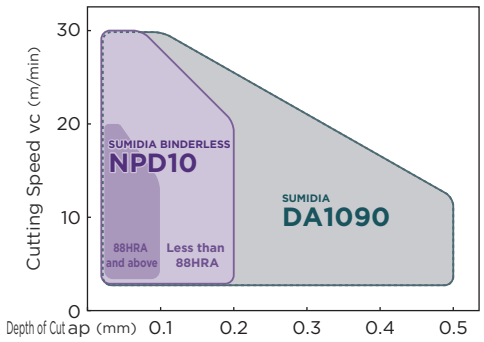


Diamond Particles (1 to 10 µm)

■ Hardness



■ Application Range (Cemented Carbide Machining)



■ Applications of NPD10 and DA1090 (Cemented Carbide Machining)

Grade	SUMIDIA BINDERLESS **NPD10**		SUMIDIA **DA1090**	
Dimensional Tolerance	◎	Best	△	The first recommendation is NPD10
Tool Life (Wear Resistance)	◎	Best ap = 0.2mm or less f =0.1mm/rev or less recommended	○	ap = 0.2mm or above can also be used
Machining Cemented Carbide With Sintered Surface	×	Not Applicable	◎	Best
Machined Surface Quality	◎	Best	△	The first recommendation is NPD10

■ Recommended Cutting Conditions (Cemented Carbide Machining)

Work Material				Grade	Cutting Conditions		
Classification		Hardness (HRA)	Our Grades		Cutting Speed vc (m/min)	Feed Rate f (mm/rev)	Depth of Cut ap (mm)
VM, VC	40	88 or more	G5,D2	**NPD10**	5 - **15** - 20	0.03 - **0.05** - 0.07	0.03 - **0.05** - 0.07
VM, VC	70,60,50	83 to less than 88	G7,G6	**NPD10**	5 - **20** - 30	0.03 - **0.10** - 0.20	0.03 - **0.10** - 0.20
VM, VC	-	83 or more	G7,G6 G5,D2	**DA1090**	5 - **20** - 30	0.03 - **0.10** - 0.20	0.03 - **0.20** - 0.50

Min. - **Optimum** - Max. Lubrication: Dry

NPD10/DA1090

VIDEO OF CUTTING

■ General Features

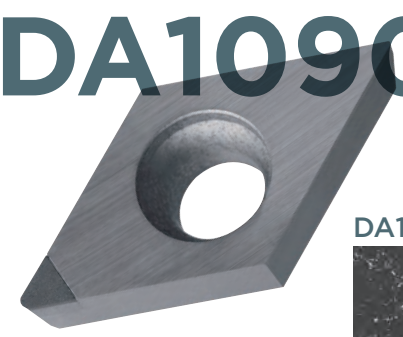
DA1090 is a polycrystalline diamond grade with the highest diamond content, made by sintering coarse diamond particles at high density. High density and enhanced particle binding strength provide excellent wear and fracture resistance when machining cemented carbide and aluminum composite materials, enabling even more stable machining.

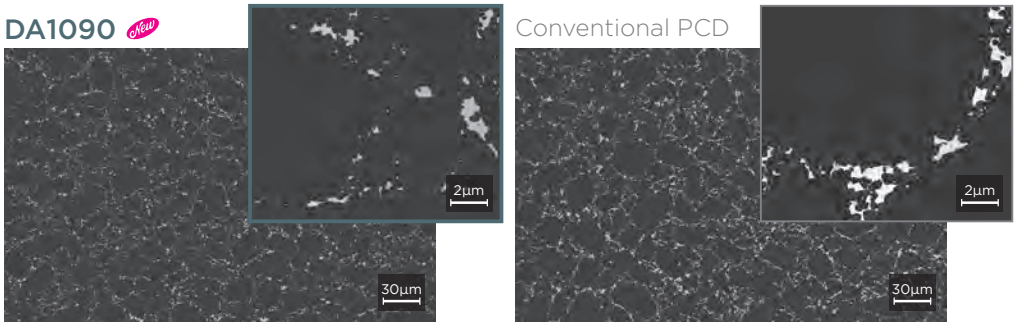
■ Features

- **Ideal for roughing of cemented carbide and other hard brittle materials**
  Coarse-grained polycrystalline diamond with excellent wear resistance and enhanced particle binding strength improve fracture resistance, realising stable machining in high-load roughing of cemented carbide and other hard brittle materials
- **Aluminum alloy and cast iron bi-metal machining is possible when used with ALNEX cutters**
  Achieving excellent performance by combining the grade's high wear- and fracture-resistance with the ALNEX GB type blade

SUMIDIA

DA1090 New



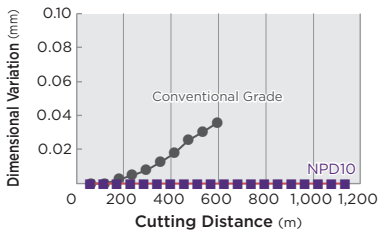


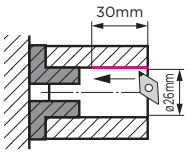
Achieves high content and high strength

*Black areas in image are diamond particles

■ Machining Precision (NPD10)

Internal boring of cemented carbide: VM30 (91HRA)



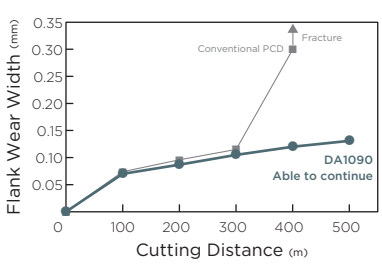


NPD10 shows no dimensional variation even after 1,100m of cutting.

Work Material: Cemented Carbide: VM30 (91HRA)
Tool Cat. No. : DCMW 11T304RH
Cutting Conditions : vc = 20m/min f = 0.05mm/rev
ap = 0.05mm, Dry

■ Wear Resistance (DA1090)

External turning of cemented carbide VM30 (91HRA)

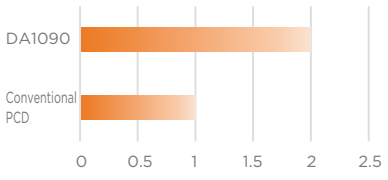


Work Material: Cemented Carbide: VM30 equivalent (91HRA)
Tool Used : NF-DCMW11T308
Cutting Conditions : vc = 30m/min, f = 0.05mm/rev,
ap = 0.2mm, Dry

■ Wear Resistance (DA1090)

AD12/FC250
Bi-metal face milling

Improved wear resistance
achieves twice the tool life of conventional PCD



Work Material: ADC12 FC250
Tool Used : ANB1600R-GB
Cutting Conditions : vc = 350m/min, fz = 0.12mm/rev,
ap = 0.2mm Wet

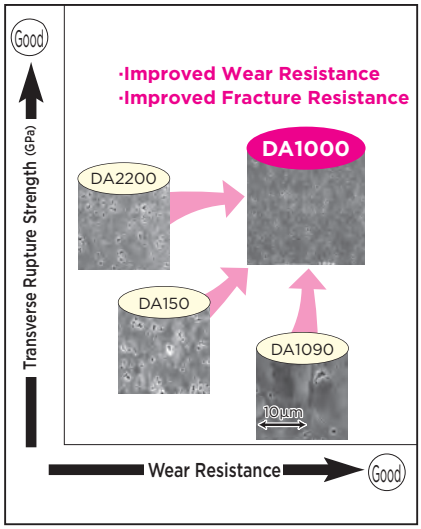
DA1000

■ Features

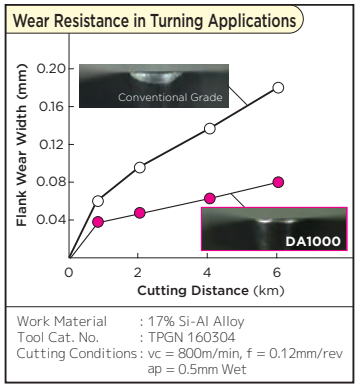
Ultra-high-density sintered ultra-fine grained diamond

- **Significantly improved surface roughness on machined surfaces**
- **Excellent wear resistance and strength**
- **High-performance, high-precision, high-efficiency machining of all aluminum and non-ferrous alloys**

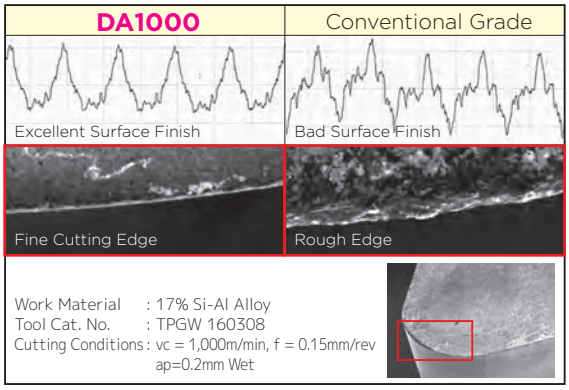
■ Position of DA1000



■ Cutting Performance



Work Material : 17% Si-Al Alloy
Tool Cat. No. : TPGN 160304
Cutting Conditions : vc = 800m/min, f = 0.12mm/rev
ap = 0.5mm Wet



Work Material : 17% Si-Al Alloy
Tool Cat. No. : TPGW 160308
Cutting Conditions : vc = 1,000m/min, f = 0.15mm/rev
ap=0.2mm Wet

■ NF Insert

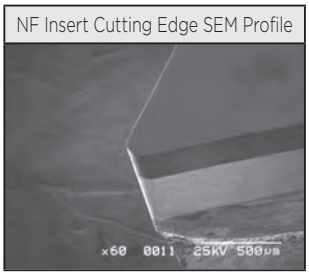
The NF type SUMIDIA insert uses optimised design and improved mass production techniques that maintain the good basic performance of DA1000 yet offer higher cost efficiency. This maximises the high performance of SUMIDIA DA1000, including excellent chipping resistance, wear resistance, and machined surface finish.

● Total cost effectiveness with high performance and lower price

· Optimum design utilizing improved mass production techniques provides a lower cost.
· Regrindable type results in huge total cost reduction.

● Wide lineup from general turning to milling

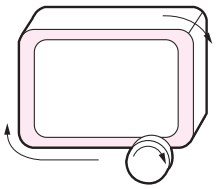
· Wide range of items in stock for small diameter boring and external turning to milling.
· Negative/positive type inserts that can be used on standard lever-lock and pin-lock type holder are also in stock.



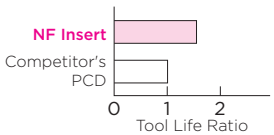
High-precision cutting edge quality

■ Application Examples

● Milling of Aluminum Alloy Oil Pump Cover

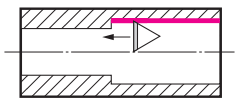


Results:
1.5 times longer tool life than competitors' PCD, with higher cost performance.

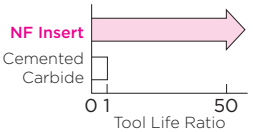


Work Material : ADC12, Tool Cat. No.: NF-TEEN32R
Cutting Conditions : vc = 3,000m/min, fz = 0.06mm/t, ap = 0.2mm Wet

● Boring of Aluminum Valve Bore



Results:
No initial breakage, tool life is more than 50 times that of carbides.

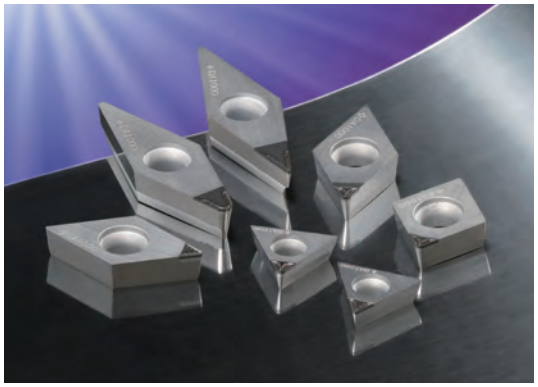


Work Material : ADC12, Tool Cat. No.: NF-TPGN110304P
Cutting Conditions : vc = 530m/min, f = 0.05mm/rev, ap = 0.2mm Wet

SUMIDIA BREAK MASTER

LD type/GD type

VIDEO OF CUTTING

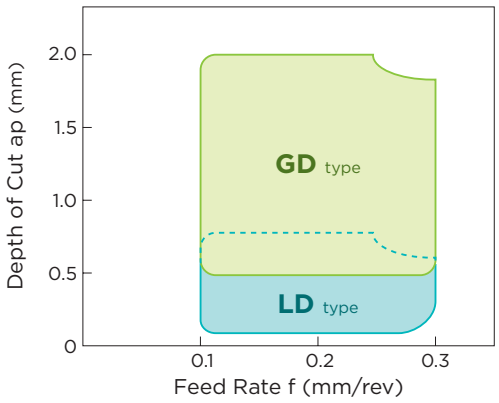


■ Features

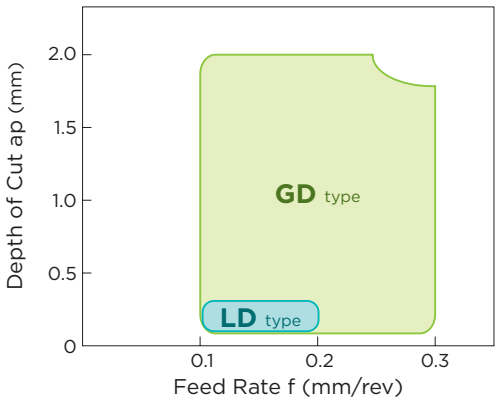
- SUMIDIA insert with chipbreaker.
- Provides excellent chip control in medium finishing and finishing of aluminum alloy.
- Solves chip control problems and dramatically improves work efficiency.
- Achieves long, stable tool life by employing high-toughness grade DA1000.

■ Application Range

● Wrought Aluminum Alloy (A6061)

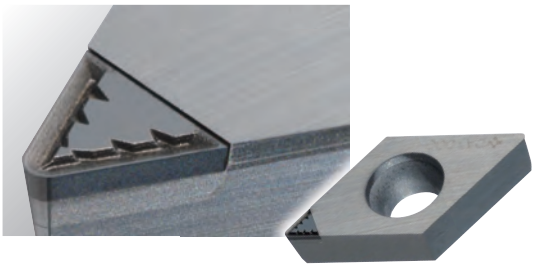


● Cast Aluminum Alloy (ADC12)



LD type Chipbreaker for Finishing

Provides excellent chip control in finishing

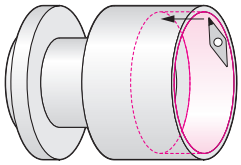


■ Cutting Performance

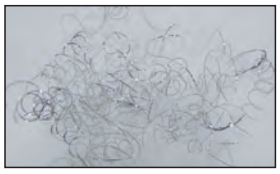
For Wrought Aluminum Alloy Machining

● Machining Application: Internal Boring of Machine Components

Provides good chip control at small depths of cut for wrought materials



BREAK MASTER LD type

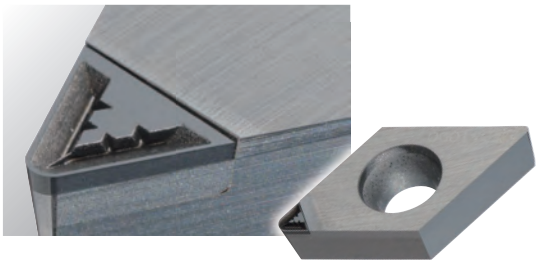


Without Chipbreaker

Work Material : A6061 Tool Cat. No.: NF-VCMT110302N-LD (DA1000)
Cutting Conditions : vc = 200m/min, f = 0.20mm/rev, ap = 0.10mm Wet

GD type Chipbreaker for Medium Finishing

Provides excellent chip control in medium finishing

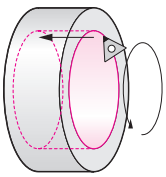


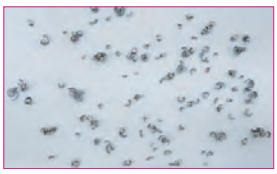
■ Cutting Performance

For Aluminum Alloy Casting Machining

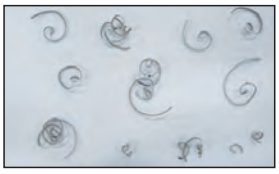
● Machining Application: Internal Boring of Transmission Components

Finely breaks chips in machining of cast materials





BREAK MASTER GD type

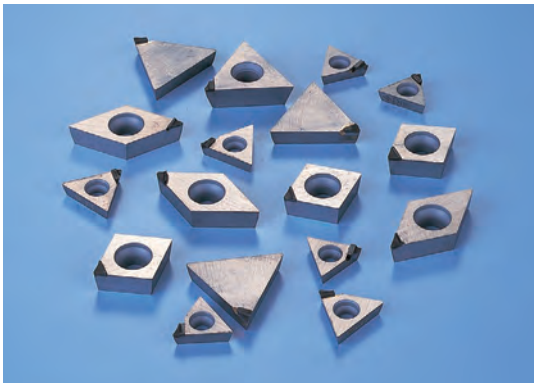


Without Chipbreaker

Work Material : ADC12 Tool Cat. No.: NF-TPMT110304N-GD (DA1000)
Cutting Conditions : vc = 400m/min, f = 0.23mm/rev, ap = 1.20mm Wet

Note: Regrinding this product will adversely affect chip control performance.

DM type



■ Features

● Economy One-Use type

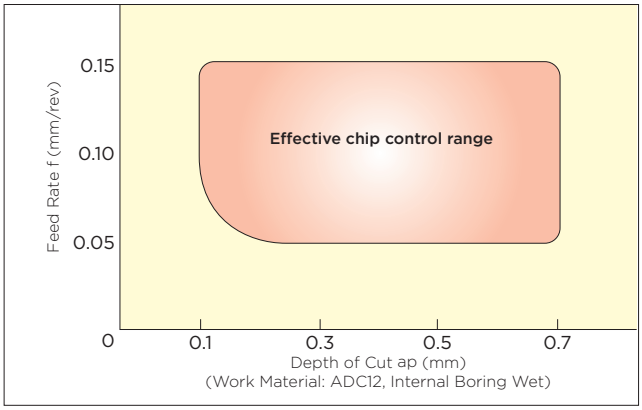
Familiar to users of SUMIBORON one-use inserts, now available in SUMIDIA.

● Cutting Edge with Built-in Chipbreaker for Effective Chip Control

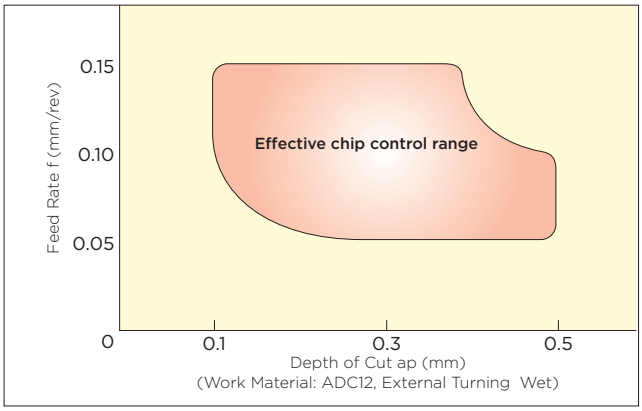
DM type chipbreaker solves chip control problems and greatly improves efficiency.

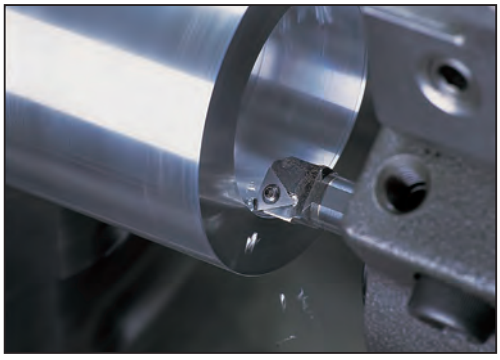
■ Application Range

● For Internal Boring



● External Turning & Facing (Insert Shape: 55°/80° Diamond type)

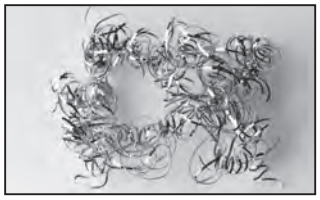




■ Chip Control

● Chips Produced by BREAK MASTER DM type

● Chips with No Chipbreaker



■ Recommended Cutting Conditions

● Internal Boring (Insert Shape: Triangular type)

Feed Rate f	Depth of Cut ap	Coolant
up to 0.15mm/rev	up to 0.7mm	Wet

● External Profiling (Insert Shape: 55°/80° Diamond type)

Feed Rate f	Depth of Cut ap	Coolant
up to 0.15mm/rev	up to 0.5mm	Wet

For facing, depth of cut should be less than 0.4mm.

■ Application Examples

Machining Details	Cutting Conditions	Results
Internal Boring	Work Material: AC2A-T6 vc = 300m/min f = 0.06mm/rev ap = 0.35mm Wet	With the required finished surface roughness of Ra = 1µm or less, the chips curled at lengths of 2mm or so, and did not remain within the work material.

■ Series

Machining Details	Internal Boring	External Turning and Facing
Cartridge Unit	NU-TPMR1103 type	—
	NU-TPMR1603 type	—
Tool Holder	NU-TPMT0802 type	NU-CCMT0602 type
	NU-TPMT0902 type	NU-CCMT09T3 type
	NU-TPMT1102 type	NU-DCMT0702 type
	NU-TPMT1103 type	NU-DCMT11T3 type
	NU-TPMT1604 type	—

Insert Identification Code

Regrindable type

CNMX 120408 (B)

(1) (2)

(1) Insert ISO Code
(ISO Standard Classification) ☞B2, B3

(2) Additional Information
Refer to Table 1

Table 1 (2) Additional Information

Symbol	Code Description
R	Right-handed
L	Left-handed
B	Full-top PCD type
-WF	Edge with Special Land for Glossy Finishing of Aluminum Wheels
RH	Honing (Cutting Edge Treatment)

Single Corner type

NF - CNMX 120408 (P)

(1) (2) (3)

(1) Type Code
Refer to Table 2

(2) Insert ISO Code
(ISO Standard Classification) ☞B2, B3

(3) Additional Information
Refer to Table 3

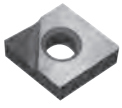
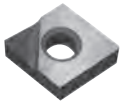
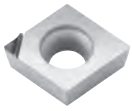
Table 2 (1) Type Code

Symbol	Code Description
NF	NF Insert ☞M6
NU	One-Use Insert (Disposable)

Table 3 (3) Additional Information

Symbol	Code Description
L	Left-handed
P	Full-length Cutting Edge type
N-LD	Chipbreaker type (Neutral) ☞M7
N-GD	
R-DM	Chipbreaker type (Right-handed) ☞M8
L-DM	Chipbreaker type (Left-handed) ☞M8

Insert Shape

Full-top PCD type	Edge With Special Land for Glossy Finishing of Aluminum Wheels	NF Insert	One-Use Insert	Full-length Cutting Edge type	Chipbreaker type
					

C — 80° Diamond type

Neg.-Pos.

CNMX 1204●●

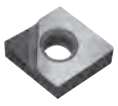
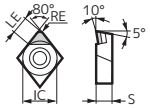
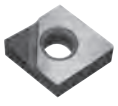
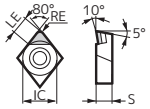
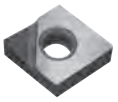
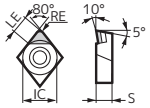
Dimensions (mm)				
	Inscribed Circle IC	12.70	Hole Dia.	5.16
	Thickness S	4.76		

Applicable External Holders ☞ C10 to C12

Applicable Boring Bars ☞ E15, E23 to E25

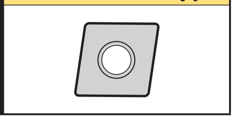
(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-CNMX 120402**	0.2	5.5	—	—	—	—	●	▲
		120404	0.4	5.4	—	—	—	—	●	▲
		120408	0.8	5.4	—	—	—	—	●	▲
		120412	1.2	5.3	—	—	—	—	●	▲
 One-Use		**NU-CNMX 120402**	0.2	2.8	—	—	—	—		
		120404	0.4	2.8	—	—	—	—		
		120408	0.8	2.7	—	—	—	—		
		120412	1.2	2.6	—	—	—	—		
		**CNMX 120402**	0.2	5.5	—				●	
		120404	0.4	5.4	—			●	●	▲
		120408	0.8	5.4	—			●	●	▲
		120412	1.2	5.3	—			●		

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

C 80° Diamond type



7° Positive

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ◕: 1st Recommendation

Recommended Application		NPD10	DA1090	DA90	DA150	DA1000	DA2200
N Non-Ferrous Metal						◕	
Carbide/Hard Brittle Materials		●	◕				

CCMW 03X1●●

Dimensions (mm)	Inscribed Circle IC	3.5	Hole Dia.	1.9
	Thickness S	1.4		

Applicable Boring Bars ☞ E18, E20

CCMW 04X1●●

Dimensions (mm)	Inscribed Circle IC	4.3	Hole Dia.	2.3
	Thickness S	1.8		

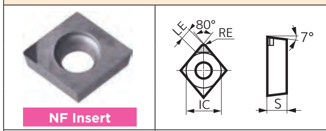
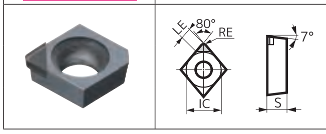
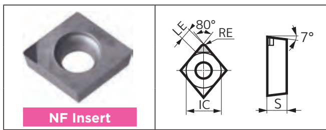
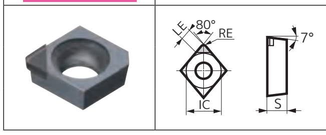
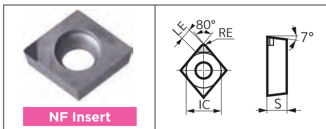
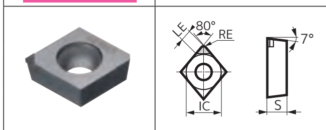
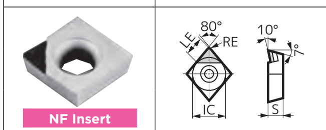
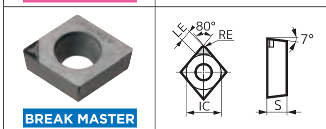
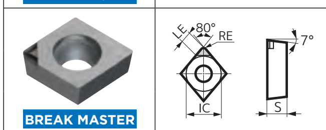
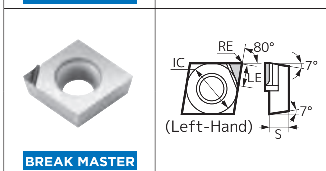
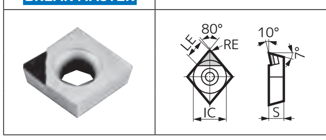
Applicable Boring Bars ☞ E18, E20

CCM■ 0602●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	2.8
	Thickness S	2.38		

Applicable External Holders ☞ C13, D26, D30 to D31, D38
Applicable Boring Bars ☞ E18 to E20

Dimensions (mm) — SUMIDIA

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
	NF-CCMW 03X102	0.2	1.1	—	●	●	—	—	—
	03X104	0.4	1.1	—	●	●	—	—	—
	CCMW 03X102RH	0.2	1.3	●	—	—	—	—	—
	03X104RH	0.4	1.3	●	—	—	—	—	—
	NF-CCMW 04X102	0.2	1.5	—	●	●	—	—	—
	04X104	0.4	1.5	—	●	●	—	—	—
	CCMW 04X102RH	0.2	1.7	●	—	—	—	—	—
	04X104RH	0.4	1.7	●	—	—	—	—	—
	NF-CCMW 060202	0.2	2.4	—	●	●	—	—	—
	060204	0.4	2.4	—	●	●	—	—	—
	CCMW 060202RH	0.2	1.7	●	—	—	—	—	—
	060204RH	0.4	1.7	●	—	—	—	—	—
	NF-CCMT 060201	0.1	2.8	—	—	—	—	●	▲
	060202	0.2	2.8	—	—	—	—	●	▲
	060204	0.4	2.8	—	—	—	—	●	▲
	NF-CCMT 060202N-LD	0.2	2.9	—	—	—	—	●	—
	060204N-LD	0.4	2.9	—	—	—	—	●	—
	NF-CCMT 060202N-GD	0.2	2.9	—	—	—	—	●	—
	060204N-GD	0.4	2.9	—	—	—	—	●	—
	NU-CCMT 060202R-DM	0.2	2.5	—	—	—	●	—	—
	060202L-DM	0.2	2.5	—	—	—	●	—	—
	060204R-DM	0.4	2.5	—	—	—	●	—	—
	060204L-DM	0.4	2.5	—	—	—	●	—	—
	CCMT 060201	0.1	3.3	—			●		
	060202	0.2	3.2	—			●		
	060204	0.4	3.1	—			●		

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

C 80° Diamond type

7° Positive

CCM■ 09T3●●

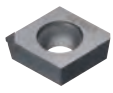
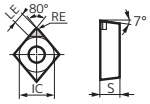
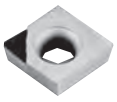
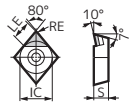
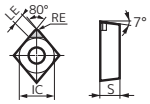
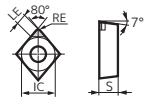
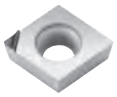
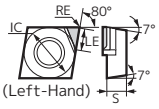
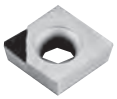
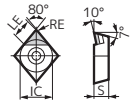
Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	3.97		

Applicable External Holders ☞C13, D26, D30 to D31, D38

Applicable Boring Bars ☞E12, E18 to E20

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

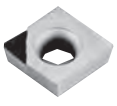
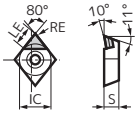
Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		NF-CCMW 09T302	0.2	2.4	—	●	●	—	—	—
		09T304	0.4	2.4	—	●	●	—	—	—
		09T308	0.8	2.3	—	●	●	—	—	—
		CCMW 09T302RH	0.2	1.7	●	—	—	—	—	—
		09T304RH	0.4	1.7	●	—	—	—	—	—
		09T308RH	0.8	1.6	●	—	—	—	—	—
 NF Insert		NF-CCMT 09T301	0.1	2.8	—	—	—	—	●	▲
		09T302	0.2	2.8	—	—	—	—	●	▲
		09T304	0.4	2.8	—	—	—	—	●	▲
		09T308	0.8	2.7	—	—	—	—	●	▲
 BREAK MASTER		NF-CCMT 09T302N-LD	0.2	2.9	—	—	—	—	●	—
		09T304N-LD	0.4	2.9	—	—	—	—	●	—
		09T308N-LD	0.8	2.8	—	—	—	—	●	—
 BREAK MASTER		NF-CCMT 09T302N-GD	0.2	2.9	—	—	—	—	●	—
		09T304N-GD	0.4	2.9	—	—	—	—	●	—
		09T308N-GD	0.8	2.8	—	—	—	—	●	—
 BREAK MASTER	 (Left-Hand)	NU-CCMT 09T302R-DM	0.2	2.5	—	—	—	●	—	—
		09T302L-DM	0.2	2.5	—	—	—	●	—	—
		09T304R-DM	0.4	2.5	—	—	—	●	—	—
		09T304L-DM	0.4	2.5	—	—	—	●	—	—
		CCMT 09T301	0.1	4.2	—			●		
		09T302	0.2	4.2	—			●		
		09T304	0.4	4.2	—			●		

11° Positive

CPMT 0802●●

Dimensions (mm)	Inscribed Circle IC	7.94	Hole Dia.	3.4
	Thickness S	2.38		

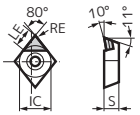
Applicable Boring Bars ☞E21 to E22

		CPMT 080202	0.2	4.2	—				●	▲
		080204	0.4	4.2	—				●	▲
		080208	0.8	4.1	—				●	▲

CPMT 0903●●

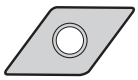
Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	3.18		

Applicable Boring Bars ☞E12, E21 to E22

 NF Insert		NF-CPMT 090302	0.2	2.8	—	—	—	—	●	▲
		090304	0.4	2.8	—	—	—	—	●	▲
		090308	0.8	2.7	—	—	—	—	●	▲

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

D 55° Diamond type



Negative

DNMA 1504●●

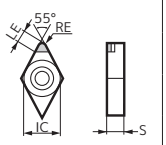
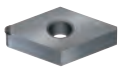
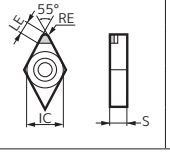
Dimensions (mm)	Inscribed Circle IC	12.70	Hole Dia.	5.6
	Thickness S	4.76		

Applicable External Holders C14 to C16
Applicable Boring Bars E15, E31 to E33

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

Dimensions (mm)

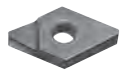
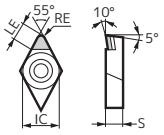
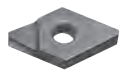
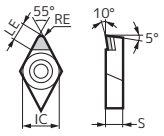
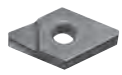
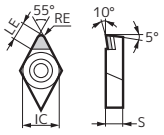
Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-DNMA 150408**	0.8	2.0	—	●	●	—	—	—
		150412	1.2	2.0	—	●	●	—	—	—
		**DNMA 150408RH**	0.8	1.8	●	—	—	—	—	—
		150412RH	1.2	1.8	●	—	—	—	—	—

Neg.-Pos.

DNMX 1504●●

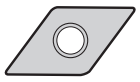
Dimensions (mm)	Inscribed Circle IC	12.70	Hole Dia.	5.16
	Thickness S	4.76		

Applicable External Holders C14 to C16
Applicable Boring Bars E15, E31 to E33

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-DNMX 150402**	0.2	7.4	—	—	—	—	●	▲
		150404	0.4	7.1	—	—	—	—	●	▲
		150408	0.8	6.7	—	—	—	—	●	▲
		150412	1.2	6.2	—	—	—	—	●	▲
 One-Use		**NU-DNMX 150402**	0.2	3.0	—	—	—	—		
		150404	0.4	2.8	—	—	—	—		
		150408	0.8	2.5	—	—	—	—		
		150412	1.2	2.1	—	—	—	—		
		**DNMX 150402**	0.2	6.4	—				●	
		150404	0.4	6.2	—			●	●	▲
		150408	0.8	5.8	—			●	●	▲
		150412	1.2	5.4	—			●	●	▲

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

D 55° Diamond type



7° Positive

DCM■ 0702●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	2.8
	Thickness S	2.38		

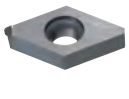
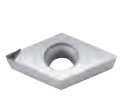
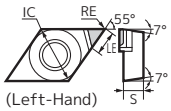
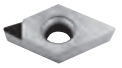
Applicable External Holders C17, D27 to D28, D32 to D33, D39

Applicable Boring Bars E16, E26 to E30

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

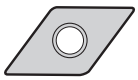
Dimensions (mm)

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-DCMW 070202**	0.2	2.6	—	●	●	—	—	—
		070204	0.4	2.4	—	●	●	—	—	—
		**DCMW 070202RH**	0.2	2.1	●	—	—	—	—	—
		070204RH	0.4	2.0	●	—	—	—	—	—
 NF Insert		**NF-DCMT 070201**	0.1	3.0	—	—	—	—	●	▲
		070202	0.2	3.0	—	—	—	—	●	▲
		070204	0.4	2.8	—	—	—	—	●	▲
 BREAK MASTER		**NF-DCMT 070202N-LD**	0.2	3.1	—	—	—	—	●	—
		070204N-LD	0.4	2.9	—	—	—	—	●	—
 BREAK MASTER		**NF-DCMT 070202N-GD**	0.2	3.1	—	—	—	—	●	—
		070204N-GD	0.4	2.9	—	—	—	—	●	—
 BREAK MASTER	 (Left-Hand)	**NU-DCMT 070202R-DM**	0.2	2.9	—	—	—	●	—	—
		070202L-DM	0.2	2.9	—	—	—	●	—	—
		070204R-DM	0.4	2.7	—	—	—	●	—	—
		070204L-DM	0.4	2.7	—	—	—	●	—	—
		**DCMT 070201**	0.1	4.3	—			●		
		070202	0.2	4.2	—			●		
		070204	0.4	4.0	—			●		

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

SUMIDIA Inserts

D 55° Diamond type



7° Positive

DCM■ 11T3●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	3.97		

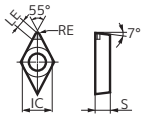
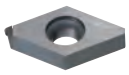
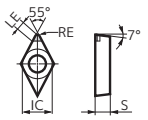
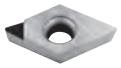
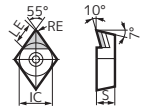
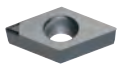
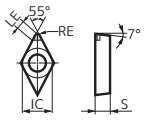
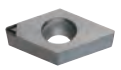
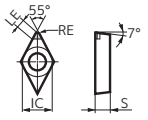
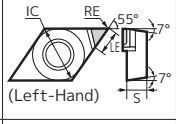
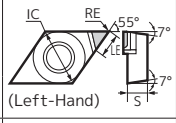
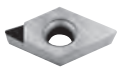
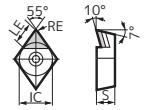
Applicable External Holders ☞ C17, D27 to D28, D32 to D33, D39

Applicable Boring Bars ☞ E13, E26 to E30

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

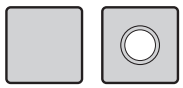
Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

Dimensions (mm)

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-DCMW 11T302**	0.2	2.6	—	●	●	—	—	—
		11T304	0.4	2.4	—	●	●	—	—	—
		11T308	0.8	2.0	—	●	●	—	—	—
		**DCMW 11T302RH**	0.2	2.1	●	—	—	—	—	—
		11T304RH	0.4	1.9	●	—	—	—	—	—
		11T308RH	0.8	1.6	●	—	—	—	—	—
 NF Insert		**NF-DCMT 11T301**	0.1	3.0	—	—	—	—	●	▲
		11T302	0.2	3.0	—	—	—	—	●	▲
		11T304	0.4	2.8	—	—	—	—	●	▲
		11T308	0.8	2.4	—	—	—	—	●	▲
 BREAK MASTER		**NF-DCMT 11T302N-LD**	0.2	3.1	—	—	—	—	●	—
		11T304N-LD	0.4	2.9	—	—	—	—	●	—
		11T308N-LD	0.8	2.5	—	—	—	—	●	—
 BREAK MASTER		**NF-DCMT 11T302N-GD**	0.2	3.1	—	—	—	—	●	—
		11T304N-GD	0.4	2.9	—	—	—	—	●	—
		11T308N-GD	0.8	2.5	—	—	—	—	●	—
 BREAK MASTER	 (Left-Hand)	**NU-DCMT 11T302R-DM**	0.2	2.9	—	—	—	●	—	—
		11T302L-DM	0.2	2.9	—	—	—	●	—	—
 BREAK MASTER	 (Left-Hand)	**NU-DCMT 11T304R-DM**	0.4	2.7	—	—	—	●	—	—
		11T304L-DM	0.4	2.7	—	—	—	●	—	—
		**DCMT 11T301**	0.1	4.3	—			●		
		11T302	0.2	4.2	—			●		
		11T304	0.4	4.0	—			●		

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

S Square type



Negative

SNMA 1204●●

Dimensions (mm)				
	Inscribed Circle IC	12.70	Hole Dia.	4.76
	Thickness S	5.16		

Applicable External Holders ☞C20 to C26
Applicable Boring Bars ☞E37 to E39

7° Positive

SCMT 0702●●

Dimensions (mm)				
	Inscribed Circle IC	7.94	Hole Dia.	3.4
	Thickness S	2.38		

Applicable External Holders ☞D34

11° Positive

SPGN 0903●●

Dimensions (mm)				
	Inscribed Circle IC	9.525	Hole Dia.	—
	Thickness S	3.18		

Applicable Boring Bars ☞E35
Applicable Cartridge: CE type

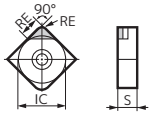
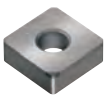
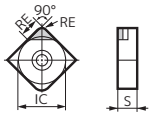
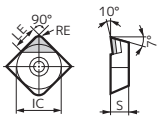
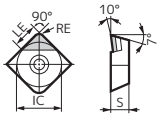
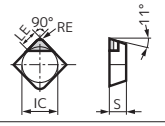
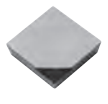
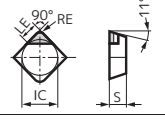
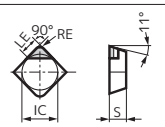
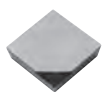
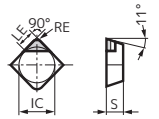
SPGN 1203●●

Dimensions (mm)				
	Inscribed Circle IC	12.70	Hole Dia.	—
	Thickness S	3.18		

Applicable External Holders ☞C27 to C28
Applicable Cartridge: CE type

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-SNMA 120408**	0.8	2.4	—	●	●	—	—	—
		120412	1.2	2.4	—	●	●	—	—	—
		**SNMA 120408RH**	0.8	1.7	●	—	—	—	—	—
		120412RH	1.2	1.7	●	—	—	—	—	—
 NF Insert		**NF-SCMT 070201**	0.1	2.9	—	—	—	—	●	
		070202	0.2	2.9	—	—	—	—	●	
		070204	0.4	2.9	—	—	—	—	●	
		**SCMT 070201**	0.1	2.9	—	—	—	●		
		070202	0.2	2.9	—			●		
		070204	0.4	2.9	—			●		
 NF Insert		**NF-SPGN 090304**	0.4	4.8	—	—	—	—	●	▲
		090308	0.8	4.8	—	—	—	—	●	▲
		**SPGN 090302**	0.2	4.8	—					
		090304	0.4	4.8	—			●		
		090308	0.8	4.8	—					
 NF Insert		**NF-SPGN 120304**	0.4	4.8	—	—	—	—	●	▲
		120308	0.8	4.8	—	—	—	—	●	▲
		**SPGN 120304**	0.4	4.8	—			●		
		120308	0.8	4.8	—					
		120312	1.2	4.8	—					

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

S Square type

20° Positive

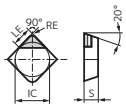
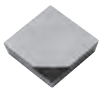
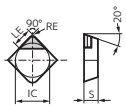
SEGN 0903●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	—
	Thickness S	3.18		

Applicable Cartridge: CE type

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ◕: 1st Recommendation

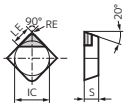
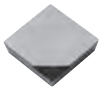
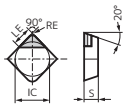
Recommended Application							
	N Non-Ferrous Metal					◕	
	Carbide/Hard Brittle Materials	●	◕				

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	Dimensions (mm) SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-SEGN 090302**	0.2	4.8	—	—	—	—	●	
		**SEGN 090302**	0.2	4.8	—			●		
		090304	0.4	4.8	—					
		090308	0.8	4.8	—					

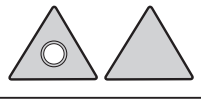
SEGN 1203●●

Dimensions (mm)	Inscribed Circle IC	12.70	Hole Dia.	—
	Thickness S	3.18		

Applicable Cartridge: CE type

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	Dimensions (mm) SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-SEGN 120302**	0.2	4.8	—	—	—	—	●	
		**SEGN 120302**	0.2	4.8	—			●		
		120304	0.4	4.8	—					
		120308	0.8	4.8	—					

T Triangular type



Neg.-Pos.

TNMX 1604●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	3.81
	Thickness S	4.76		

Applicable External Holders ☞C29 to C35, D29, D41
Applicable Boring Bars ☞E15, E45 to E47

5° Positive

TBGW 0601●●

Dimensions (mm)	Inscribed Circle IC	3.97	Hole Dia.	2.2
	Thickness S	1.59		

Applicable Boring Bars ☞E40, E42

TBGN 0601●●

Dimensions (mm)	Inscribed Circle IC	3.97	Hole Dia.	—
	Thickness S	1.59		

Applicable Boring Bars ☞E78

7° Positive

TCMT 0902●●

Dimensions (mm)	Inscribed Circle IC	5.56	Hole Dia.	2.5
	Thickness S	2.38		

Applicable External Holders ☞D35

TCMT 1102●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	2.8
	Thickness S	2.38		

Applicable External Holders ☞D35

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application: N Non-Ferrous Metal ●; Carbide/Hard Brittle Materials ● ●

Dimensions (mm)

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		NF-TNMX 160402	0.2	3.7	—	—	—	—	●	▲
		160404	0.4	3.6	—	—	—	—	●	▲
		160408	0.8	3.3	—	—	—	—	●	▲
 One-Use		NU-TNMX 160402	0.2	3.0	—	—	—	—		
		160404	0.4	2.9	—	—	—	—		
		160408	0.8	2.6	—	—	—	—		
		TNMX 160402	0.2	3.7	—				●	
		160404	0.4	3.6	—			●	●	▲
		160408	0.8	3.3	—			●	●	▲
		160412	1.2	3.0	—					
 NF Insert		NF-TBGW 060102	0.2	2.3	—	—	—	—	●	▲
		060104	0.4	2.2	—	—	—	—	●	▲
		TBGW 060102	0.2	2.3	—			●		
		060104	0.4	2.1	—			●		
 NF Insert		NF-TBGN 060102	0.2	2.1	—	—	—	—	●	▲
		060104	0.4	2.0	—	—	—	—	●	▲
		TBGN 060102B	0.2	6.5	—			●	●	
		060104B	0.4	6.2	—			●	●	
		060108B	0.8	5.7	—					
 NF Insert		NF-TCMT 090202	0.2	2.9	—	—	—	—	●	▲
		090204	0.4	2.8	—	—	—	—	●	▲
		TCMT 090201	0.1	2.8	—	—	—			
		090202	0.2	2.7	—			●		
		090204	0.4	2.6	—			●		
 NF Insert		NF-TCMT 110201	0.1	3.0	—	—	—	—	●	▲
		110202	0.2	2.9	—	—	—	—	●	▲
		110204	0.4	2.8	—	—	—	—	●	▲
		TCMT 110201	0.1	2.8	—	—	—			
		110202	0.2	2.7	—			●		
		110204	0.4	2.6	—			●		

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

T Triangular type

11° Positive

TPGW 0802●●

Dimensions (mm)	Inscribed Circle IC	4.76	Hole Dia.	2.4
	Thickness S	2.38		

Applicable Boring Bars ☞E40 to E43

TPM■ 0802●●

Dimensions (mm)	Inscribed Circle IC	4.76	Hole Dia.	2.4
	Thickness S	2.38		

Applicable Boring Bars ☞E40 to E43

TPGW 0902●●

Dimensions (mm)	Inscribed Circle IC	5.56	Hole Dia.	2.8
	Thickness S	2.38		

Applicable Boring Bars ☞E40

TPMT 0902●●

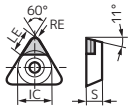
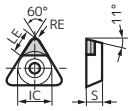
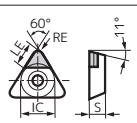
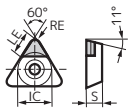
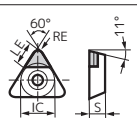
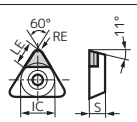
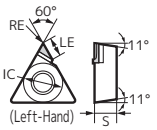
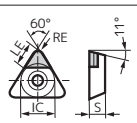
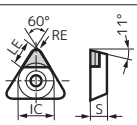
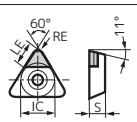
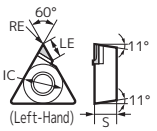
Dimensions (mm)	Inscribed Circle IC	5.56	Hole Dia.	2.8
	Thickness S	2.38		

Applicable Boring Bars ☞E40

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application: N Non-Ferrous Metal ●; Carbide/Hard Brittle Materials ●

Dimensions (mm)

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-TPGW 080201**	0.1	3.1	—	—	—	—	●	▲
		080202	0.2	3.0	—	—	—	—	●	▲
		080204	0.4	2.9	—	—	—	—	●	▲
		**TPGW 080202**	0.2	2.9	—			●		
		080204	0.4	2.7	—			●		
		080208	0.8	2.4	—					
 NF Insert		**NF-TPMW 080202**	0.2	2.5	—	●	●	—	—	—
		080204	0.4	2.4	—	●	●	—	—	—
		**TPMW 080202RH**	0.2	1.2	●	—	—	—	—	—
		080204RH	0.4	1.0	●	—	—	—	—	—
 BREAK MASTER		**NF-TPMT 080202N-LD**	0.2	2.9	—	—	—	—	●	—
		080204N-LD	0.4	2.8	—	—	—	—	●	—
 BREAK MASTER		**NF-TPMT 080202N-GD**	0.2	2.9	—	—	—	—	●	—
		080204N-GD	0.4	2.8	—	—	—	—	●	—
 BREAK MASTER	 (Left-Hand)	**NU-TPMT 080202R-DM**	0.2	2.5	—	—	—		—	—
		080202L-DM	0.2	2.5	—	—	—	●	—	—
		080204R-DM	0.4	2.3	—	—	—		—	—
		080204L-DM	0.4	2.3	—	—	—	●	—	—
 NF Insert		**NF-TPGW 090202**	0.2	3.1	—	—	—	—	●	▲
		090204	0.4	2.9	—	—	—	—	●	▲
 BREAK MASTER		**NF-TPMT 090202N-LD**	0.2	3.1	—	—	—	—	●	—
		090204N-LD	0.4	2.9	—	—	—	—	●	—
 BREAK MASTER		**NF-TPMT 090202N-GD**	0.2	3.1	—	—	—	—	●	—
		090204N-GD	0.4	2.9	—	—	—	—	●	—
 BREAK MASTER	 (Left-Hand)	**NU-TPMT 090202R-DM**	0.2	2.5	—	—	—		—	—
		090202L-DM	0.2	2.5	—	—	—	●	—	—
		090204R-DM	0.4	2.3	—	—	—		—	—
		090204L-DM	0.4	2.3	—	—	—	●	—	—

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

T Triangular type

11° Positive

TPGW 1102●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	2.8
	Thickness S	2.38		

Applicable Boring Bars E40

TPMT 1102●●

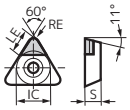
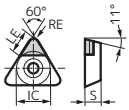
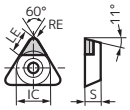
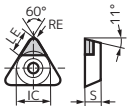
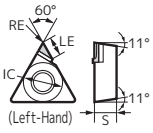
Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	2.8
	Thickness S	2.38		

Applicable Boring Bars E40

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

Dimensions (mm) | SUMIDIA

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-TPGW 110201**	0.1	3.1	—	—	—	—	●	▲
		110202	0.2	3.0	—	—	—	—	●	▲
		110204	0.4	2.9	—	—	—	—	●	▲
		**TPGW 110202**	0.2	3.7	—			●		
		110204	0.4	3.6	—			●		
		110208	0.8	3.3	—					
 BREAK MASTER		**NF-TPMT 110202N-LD**	0.2	3.1	—	—	—	—	●	—
		110204N-LD	0.4	2.9	—	—	—	—	●	—
 BREAK MASTER		**NF-TPMT 110202N-GD**	0.2	3.1	—	—	—	—	●	—
		110204N-GD	0.4	2.9	—	—	—	—	●	—
 BREAK MASTER	 (Left-Hand)	**NU-TPMT 110202R-DM**	0.2	2.5	—	—	—		—	—
		110202L-DM	0.2	2.5	—	—	—	●	—	—
		110204R-DM	0.4	2.3	—	—	—		—	—
		110204L-DM	0.4	2.3	—	—	—	●	—	—

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

T Triangular type

11° Positive

TPGW 1103●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	3.4
	Thickness S	3.18		

Applicable Boring Bars ☞ E14, E40 to E43

TPM■ 1103●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	3.4
	Thickness S	3.18		

Applicable Boring Bars ☞ E14, E40 to E43

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ◕: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					◕	
	Carbide/Hard Brittle Materials	●	◕				

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		NF-TPGW 110301	0.1	3.1	—	—	—	—	●	▲
		110302	0.2	3.0	—	—	—	—	●	▲
		110304	0.4	2.9	—	—	—	—	●	▲
		110308	0.8	2.7	—	—	—	—	●	▲
 NF Insert		NF-TPGW 110304P	0.4	10.4	—	—	—	—	●	—
		110308P	0.8	9.8	—	—	—	—	●	—
		TPGW 110300	0.05	3.8	—	—	—			
		110302	0.2	3.7	—			●		
		110304	0.4	3.6	—			●		
		110308	0.8	3.3	—			●		
 NF Insert		NF-TPMW 110302	0.2	2.5	—	●	●	—	—	—
		110304	0.4	2.4	—	●	●	—	—	—
		110308	0.8	2.1	—	●	●	—	—	—
		TPMW 110302RH	0.2	1.5	●	—	—	—	—	—
		110304RH	0.4	1.3	●	—	—	—	—	—
		110308RH	0.8	1.0	●	—	—	—	—	—
 NF Insert		NF-TPMT 110301	0.1	3.0	—	—	—	—	●	▲
		110302	0.2	2.9	—	—	—	—	●	▲
		110304	0.4	2.8	—	—	—	—	●	▲
		110308	0.8	2.5	—	—	—	—	●	▲
 BREAK MASTER		NF-TPMT 110302N-LD	0.2	3.1	—	—	—	—	●	—
		110304N-LD	0.4	2.9	—	—	—	—	●	—
		110308N-LD	0.8	2.7	—	—	—	—	●	—
 BREAK MASTER		NF-TPMT 110302N-GD	0.2	3.1	—	—	—	—	●	—
		110304N-GD	0.4	2.9	—	—	—	—	●	—
		110308N-GD	0.8	2.7	—	—	—	—	●	—
 BREAK MASTER		NU-TPMT 110302R-DM	0.2	2.5	—	—	—		—	—
		110302L-DM	0.2	2.5	—	—	—	●	—	—
		110304R-DM	0.4	2.3	—	—	—		—	—
		110304L-DM	0.4	2.3	—	—	—	●	—	—
		TPMT 110300	0.05	3.7	—	—	—			▲
		110302	0.2	3.6	—					▲
		110304	0.4	3.5	—					▲
		110308	0.8	3.2	—					▲

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

T Triangular type

11° Positive

TPGW 1603●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	3.18		

Applicable Boring Bars E40

TPGW 1604●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	4.76		

Applicable Boring Bars E14, E40 to E42

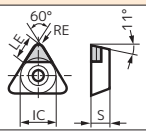
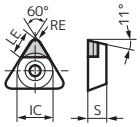
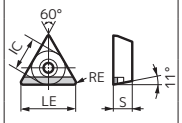
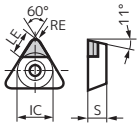
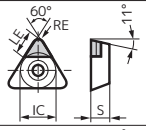
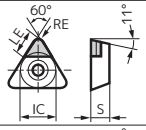
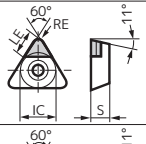
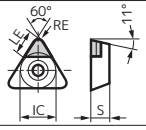
TPM■ 1604●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	4.76		

Applicable Boring Bars E14, E40 to E42

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				
	Dimensions (mm)	SUMIDIA					

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-TPGW 160302**	0.2	3.1	—	—	—	—	●	▲
		160304	0.4	2.9	—	—	—	—	●	▲
		160308	0.8	2.7	—	—	—	—	●	▲
 NF Insert		**NF-TPGW 160401**	0.1	3.1	—	—	—	—	●	▲
		160402	0.2	3.0	—	—	—	—	●	▲
		160404	0.4	2.9	—	—	—	—	●	▲
		160408	0.8	2.7	—	—	—	—	●	▲
 NF Insert		**NF-TPGW 160404P**	0.4	15.9	—	—	—	—	●	—
		160408P	0.8	15.3	—	—	—	—	●	—
		**TPGW 160402**	0.2	3.7	—			●		
		160404	0.4	3.5	—			●		
		160408	0.8	3.3	—			●		
		160412	1.2	3.0	—					
 NF Insert		**NF-TPMW 160402**	0.2	2.5	—	●	●	—	—	—
		160404	0.4	2.4	—	●	●	—	—	—
		160408	0.8	2.1	—	●	●	—	—	—
		**TPMW 160402RH**	0.2	2.2	—	●	●	—	—	—
		160404RH	0.4	2.0	—	●	●	—	—	—
		160408RH	0.8	1.6	—	●	●	—	—	—
 BREAK MASTER		**NF-TPMT 160402N-LD**	0.2	3.1	—	—	—	—	●	—
		160404N-LD	0.4	2.9	—	—	—	—	●	—
		160408N-LD	0.8	2.7	—	—	—	—	●	—
 BREAK MASTER		**NF-TPMT 160402N-GD**	0.2	3.1	—	—	—	—	●	—
		160404N-GD	0.4	2.9	—	—	—	—	●	—
		160408N-GD	0.8	2.7	—	—	—	—	●	—

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

T Triangular type

11° Positive

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ◕: 1st Recommendation

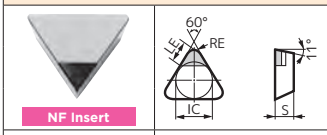
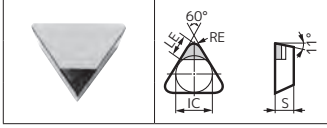
Recommended Application: N Non-Ferrous Metal ◕ | Carbide/Hard Brittle Materials ● ◕

Dimensions (mm)

TPGN 0902●●

Dimensions (mm)	Inscribed Circle IC	5.56	Hole Dia.	—
	Thickness S	2.38		

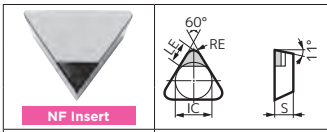
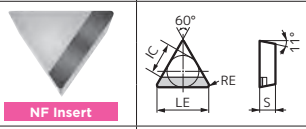
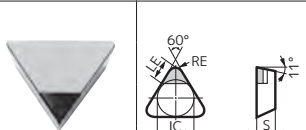
Applicable Cartridge: CP type

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert	NF-TPGN 090202	0.2	3.1	—	—	—	—	●	▲
	090204	0.4	3.0	—	—	—	—	●	▲
	090208	0.8	2.7	—	—	—	—	●	
	TPGN 090202	0.2	3.7	—			●		
	090204	0.4	3.6	—			●		
	090208	0.8	3.2	—					

TPGN 1103●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	—
	Thickness S	3.18		

Applicable Boring Bars E44

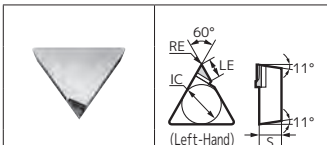
Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert	NF-TPGN 110302	0.2	3.0	—	—	—	—	●	▲
	110304	0.4	2.9	—	—	—	—	●	▲
	110308	0.8	2.7	—	—	—	—	●	▲
 NF Insert	NF-TPGN 110304P	0.4	10.4	—	—	—	—	●	▲
	110308P	0.8	9.8	—	—	—	—	●	▲
	TPGN 110300	0.05	3.8	—	—	—			
	110302	0.2	3.7	—			●		
	110304	0.4	3.6	—			●		
	110308	0.8	3.3	—			●		

Part Number Suffix - P: Full-length Cutting Edge type

TPMR 1103●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	—
	Thickness S	3.18		

Applicable Boring Bars E44

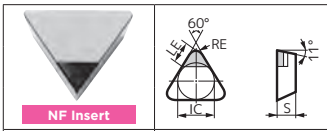
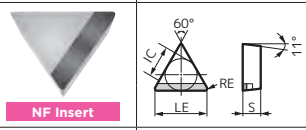
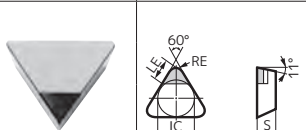
Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 BREAK MASTER	NU-TPMR 110302R-DM	0.2	2.5	—	—	—		—	—
	110302L-DM	0.2	2.5	—	—	—	●	—	—
	110304R-DM	0.4	2.3	—	—	—		—	—
	110304L-DM	0.4	2.3	—	—	—	●	—	—

TPGN 1603●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	—
	Thickness S	3.18		

Applicable External Holders C36 to C37

Applicable Boring Bars E44

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert	NF-TPGN 160302	0.2	3.0	—	—	—	—	●	▲
	160304	0.4	2.9	—	—	—	—	●	▲
	160308	0.8	2.7	—	—	—	—	●	▲
 NF Insert	NF-TPGN 160304P	0.4	15.9	—	—	—	—	●	▲
	TPGN 160302	0.2	3.7	—			●		
	160304	0.4	3.5	—			●		
	160308	0.8	3.3	—			●		
	160312	1.2	3.0	—					

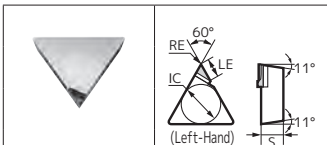
Part Number Suffix - P: Full-length Cutting Edge type

TPMR 1603●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	—
	Thickness S	3.18		

Applicable External Holders C36 to C37

Applicable Boring Bars E44

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 BREAK MASTER	NU-TPMR 160302R-DM	0.2	2.5	—	—	—		—	—
	160302L-DM	0.2	2.5	—	—	—	●	—	—
	160304R-DM	0.4	2.3	—	—	—		—	—
	160304L-DM	0.4	2.3	—	—	—	●	—	—

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

T Triangular type

20° Positive

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application: N Non-Ferrous Metal; Carbide/Hard Brittle Materials

Dimensions (mm)

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert	**NF-TEGN 110202**	0.2	3.1	—	—	—	—	●	▲
	110204	0.4	2.9	—	—	—	—	●	▲
	**TEGN 110202**	0.2	3.7	—			●		
	110204	0.4	3.6	—			●		
	110208	0.8	3.3	—					

TEGN 1102●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	—
	Thickness S	2.38		

Applicable Cartridge: CE type

TEGN 1103●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	—
	Thickness S	3.18		

Applicable Cartridge: CE type

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert	**NF-TEGN 110302**	0.2	3.1	—	—	—	—	●	▲
	110304	0.4	2.9	—	—	—	—	●	▲
	110308	0.8	2.7	—	—	—	—	●	▲
 NF Insert	**NF-TEGN 110304P**	0.4	10.4	—	—	—	—	●	▲
	110308P	0.8	9.8	—	—	—	—	●	▲
	**TEGN 110302**	0.2	3.7	—			●		
	110304	0.4	3.6	—			●		
	110308	0.8	3.3	—					

Part Number Suffix - P: Full-length Cutting Edge type

TEGN 1603●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	—
	Thickness S	3.18		

Applicable Cartridge: CE type

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert	**NF-TEGN 160302**	0.2	3.0	—	—	—	—	●	
	160304	0.4	2.9	—	—	—	—	●	
 NF Insert	**NF-TEGN 160304P**	0.4	15.9	—	—	—	—	●	▲
	**TEGN 160302**	0.2	3.7	—			●		
	160304	0.4	3.6	—			●	●	▲
	160308	0.8	3.3	—					

Part Number Suffix - P: Full-length Cutting Edge type

TEGN 2204●●

Dimensions (mm)	Inscribed Circle IC	12.70	Hole Dia.	—
	Thickness S	4.76		

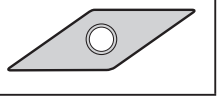
Applicable Cartridge: CE type

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	NPD10	DA1090	DA90	DA150	DA1000	DA2200
	**TEGN 220404**	0.4	3.6	—			●		
	220408	0.8	3.3	—					

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

SUMIDIA Inserts

V 35° Diamond type



Negative

VNMA 1604●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	3.81
	Thickness S	4.76		

Applicable External Holders C38 to C39

Neg.-Pos.

VNMX 1604●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	3.81
	Thickness S	4.76		

Applicable External Holders C38 to C39

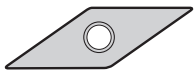
(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

Shape			Cat. No.	Corner Radius RE	Cutting Edge Length LE	Dimensions (mm) SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert			**NF-VNMA 160408**	0.8	1.9	—	●	●	—	—	—
			160412	1.2	1.7	—	●	●	—	—	—
			**VNMA 160408RH**	0.8	1.8	●	—	—	—	—	—
			160412RH	1.2	1.5	●	—	—	—	—	—
 NF Insert			**NF-VNMX 160402**	0.2	6.9	—	—	—	—	●	▲
			160404	0.4	6.4	—	—	—	—	●	▲
			160408	0.8	5.6	—	—	—	—	●	▲
			160412	1.2	4.7	—	—	—	—	●	▲
 One-Use			**NU-VNMX 160402**	0.2	3.6	—	—	—	—		▲
			160404	0.4	3.1	—	—	—	—		▲
			160408	0.8	2.3	—	—	—	—		▲
			160412	1.2	2.3	—	—	—	—		▲
			**VNMX 160402**	0.2	6.9	—			●	●	
			160404	0.4	6.4	—			●	●	▲
			160408	0.8	5.6	—			●	●	▲
			160412	1.2	4.7	—			●	●	▲

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

V — 35° Diamond type



7° Positive

VCMW 0802●●

Dimensions (mm)	Inscribed Circle IC	4.76	Hole Dia.	2.3
	Thickness S	2.38		

Applicable Boring Bars ☞ E49, E52, E55, E58

VCM■ 1103●●

Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	2.8
	Thickness S	3.18		

Applicable External Holders ☞ C40 to C41, D29, D36, D40

Applicable Boring Bars ☞ E52, E55, E58

VCM■ 1604●●

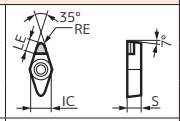
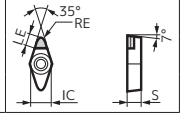
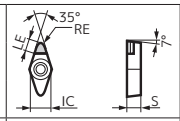
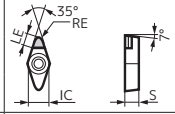
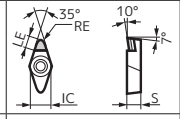
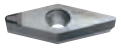
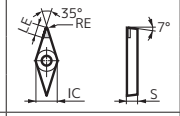
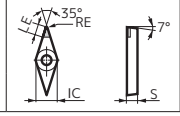
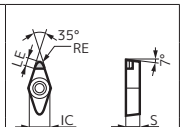
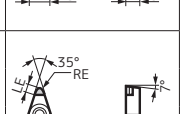
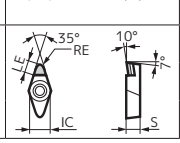
Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	4.76		

Applicable External Holders ☞ C40 to C41

Applicable Boring Bars ☞ E52, E55

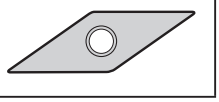
(Legend) Continuous Cutting ●: 1st Recommendation General Machining ◕: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					◕	
	Carbide/Hard Brittle Materials	●	◕				

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		NF-VCMW 080202	0.2	3.2	—	●	●	—	—	—
		080204	0.4	2.8	—	●	●	—	—	—
		VCMW 080201RH	0.1	2.2	●	—	—	—	—	—
		080202RH	0.2	1.9	●	—	—	—	—	—
		080204RH	0.4	1.5	●	—	—	—	—	—
 NF Insert		NF-VCMW 110302	0.2	3.2	—	●	●	—	—	—
		110304	0.4	2.8	—	●	●	—	—	—
		VCMW 110302RH	0.2	2.1	●	—	—	—	—	—
		110304RH	0.4	1.7	●	—	—	—	—	—
 NF Insert		NF-VCMT 110301	0.1	3.5	—	—	—	—	●	▲
		110302	0.2	3.4	—	—	—	—	●	▲
		110304	0.4	3.0	—	—	—	—	●	▲
 BREAK MASTER		NF-VCMT 110302N-LD	0.2	3.8	—	—	—	—	●	—
		110304N-LD	0.4	3.4	—	—	—	—	●	—
 BREAK MASTER		NF-VCMT 110302N-GD	0.2	3.8	—	—	—	—	●	—
		110304N-GD	0.4	3.4	—	—	—	—	●	—
 NF Insert		NF-VCMW 160402	0.2	3.7	—	●	●	—	—	—
		160404	0.4	3.3	—	●	●	—	—	—
		160408	0.8	2.4	—	●	●	—	—	—
		160412	1.2	2.1	—	●	●	—	—	—
		VCMW 160402RH	0.2	2.1	●	—	—	—	—	—
		160404RH	0.4	1.7	●	—	—	—	—	—
		160408RH	0.8	1.8	●	—	—	—	—	—
		160412RH	1.2	1.5	●	—	—	—	—	—
 NF Insert		NF-VCMT 160404	0.4	6.5	—	—	—	—	●	▲
		160408	0.8	5.6	—	—	—	—	●	▲
		160412	1.2	4.6	—	—	—	—	●	▲

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

V — 35° Diamond type



7° Positive

VCMT 1604●●

Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	4.76		

Applicable External Holders ☞C40 to C41

Applicable Boring Bars ☞E52, E55

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ●: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					●	
	Carbide/Hard Brittle Materials	●	●				

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	Dimensions (mm) SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 BREAK MASTER	**NF-VCMT 160404N-LD**	0.4	6.5	—	—	—	—	●	—
	160408N-LD	0.8	5.6	—	—	—	—	●	—
	160412N-LD	1.2	4.8	—	—	—	—	●	—
 BREAK MASTER	**NF-VCMT 160404N-GD**	0.4	6.5	—	—	—	—	●	—
	160408N-GD	0.8	5.6	—	—	—	—	●	—
	160412N-GD	1.2	4.8	—	—	—	—	●	—
	**VCMT 160408**	0.8	5.8	—				●	▲
	160412	1.2	4.9	—				●	▲
	160412-WF	1.2	4.9	—				●	▲

VCMT 2205●●

Dimensions (mm)	Inscribed Circle IC	12.70	Hole Dia.	5.5
	Thickness S	5.56		

Applicable External Holders ☞C45

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	Dimensions (mm) SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
	**VCMT 220520**	2.0	5.0	—				●	▲
	220530	3.0	5.0	—				●	▲

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

W Trigon type

5° Positive

WBMT 0601●●

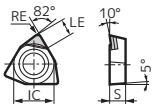
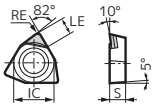
Dimensions (mm)	Inscribed Circle IC	3.97	Hole Dia.	2.2
	Thickness S	1.59		

Applicable Boring Bars E60

(Legend) Continuous Cutting ●: 1st Recommendation General Machining ◕: 1st Recommendation

Recommended Application							
	N Non-Ferrous Metal					◕	
	Carbide/Hard Brittle Materials	●	◕				

Dimensions (mm)

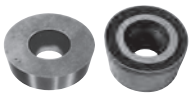
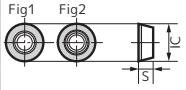
Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA NPD10	DA1090	DA90	DA150	DA1000	DA2200
 NF Insert		**NF-WBMT 060101L**	0.1	1.8	—	—	—	—	●	
		060102L	0.2	1.8	—	—	—	—	●	
		060104L	0.4	1.7	—	—	—	—	●	
		**WBMT 060101L**	0.1	1.8	—	—	—	—		▲
		060102L	0.2	1.8	—	—	—	—		▲
		060104L	0.4	1.7	—	—	—	—		▲

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

For Turning

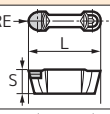
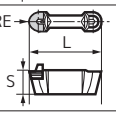
Round Insert

Dimensions (mm)

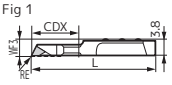
Shape		Cat. No.	SUMIDIA DA1090	DA90	DA150	DA1000	DA2200	Inscribed Circle IC	Thickness S	Cutting Edge Length LE	Corner Radius RE	Hole Dia.	Fig	Applicable Holder
	Fig1 Fig2 	**RPGW 0803M0**				●	▲	8.0	3.18	—	—	3.3	1	Aluminum Wheel Turning SEC-RP Profiling Holder (RP02 series (Made-to-order item))
		RPGT 0803M0-WF						8.0	3.18	—	—	3.3	2	

Part number suffix WF: Edge with Special Land for Aluminum Wheel Gloss Finishing

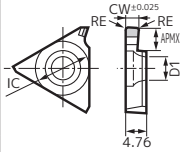
Dogbone Insert

Shape		Cat. No.	DA1090	DA90	DA150	DA1000	DA2200	Overall Length L	Thickness S	Corner Radius RE			Fig	Applicable Holder
	Fig 1 	**MDE 3R**					●	26	8.5	3.0			1	Aluminum Wheel Turning SEC-GD Profiling Holder (GDE series) → C46 to C47
		4R					●	30	8.5	4.0			1	
	Fig 1 	**MDE 3R-AW**					●	26	8.5	3.0			1	
		4R-AW					●	30	8.5	4.0			1	

Very Small Dia. Boring Insert

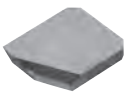
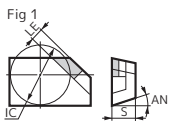
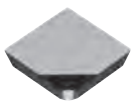
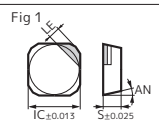
Shape		Cat. No.	DA2200	Min. Bore Dia. DMIN	WF3	Corner Radius RE	L	CDX	Fig	Applicable Holder
	Fig 1 	**KBMX R0311-10**	●	3.0	4.1	0.1	28.5	11.0	1	Very Small Dia. Boring Bar (CKB series) → M33
		R0411-10	●	4.0	4.3	0.1	28.5	11.0	1	
		R0511-10	●	5.0	4.5	0.1	28.5	11.0	1	

Grooving Insert

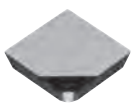
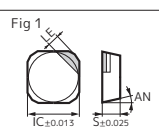
Shape		Cat. No.	DA2200 R	DA2200 L	Inscribed Circle IC	Width of Cut CW	Corner Radius RE	Maximum Groove Depth APMX	Hole Dia. D1	Fig	Applicable Holder
	Fig 1 	**TGA R/L4125**	●		12.70	1.25	0.1	2.0	5.5	1	SEC-Grooving Tools (GWC series, GWCS series, GWCI series) → F4 to F5
		R/L4150	●		12.70	1.50	0.1	3.5	5.5	1	
		R/L4200	●		12.70	2.00	0.1	3.5	5.5	1	
		R/L4250	●		12.70	2.50	0.1	4.0	5.5	1	
		R/L4300	●		12.70	3.00	0.1	4.0	5.5	1	
		R/L4350	●		12.70	3.50	0.1	5.0	5.5	1	
		R/L4400	●		12.70	4.00	0.1	5.0	5.5	1	

For Milling

For SEC-ACE MILL APG series

Shape		Cat. No.	SUMIDIA DA150	DA1000	DA2200	Inscribed Circle IC	Thickness S	Cutting Edge Length LE	Relief Angle AN	Fig	Applicable Cutter/ Endmill
	Fig 1 	**APW 4R**		●	▲	12.70	3.18	2.0	15	1	APG series → H46
		5R				15.875	4.76	2.0	15	1	
	Fig 1 	**NF-SDC 42R**	—	●	▲	12.70	3.18	3.0	15	1	
		SDC 42R	●	●	▲	12.70	3.18	3.0	15	1	
		SDC 53R				15.88	4.76	3.0	15	1	

For SEC-ACE MILL FPG series / SEC-Multi Use Endmill FPE series

	Fig 1 	**NF-SDKN 42M**	—	●	▲	12.70	3.18	3.0	15	1	FPG series → H39 FPE series → H40
		SDKN 42M	●			12.70	3.18	3.0	15	1	
		SDKN 53M				15.88	4.76	3.0	15	1	

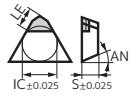
▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

SUMIDIA Inserts

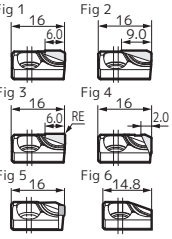
For Milling

Dimensions (mm)

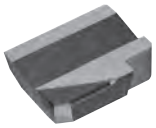
For SEC-ACE MILL CHG series / SEC-Multi Use Endmill CHE series

Shape		Cat. No.	SUMIDIA DA1090	SUMIDIA DA90	SUMIDIA DA150	SUMIDIA DA1000	SUMIDIA DA2200	SUMICRYSTAL SC10*1	SUMICRYSTAL SCV10*1	Inscribed Circle IC	Thickness S	Cutting Edge Length LE	Relief Angle AN	Fig	Applicable Cutter / Endmill
	Fig 1 	**NF-TEEN 22R**	—	—	—	●	▲	—	—	6.35	3.18	4.9	20	1	CHG series →H156 CHE series →H157 to H159
		32R	—	—	—	●	▲	—	—	9.525	3.18	4.9	20	1	
		43R	—	—	—	●	▲	—	—	12.70	4.76	4.8	20	1	
		TEEN 22R	—	—	●		—	—	—	6.35	3.18	4.9	20	1	
		32R	—	—	●		—	—	—	9.525	3.18	4.9	20	1	
		43R	—	—	●		—	—	—	12.70	4.76	4.8	20	1	

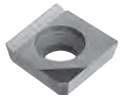
For High-efficiency Cutter for Aluminum Alloys ALNEX ANX series (Blade)

	Fig 1  Fig 2 Fig 3 Fig 4 Fig 5 Fig 6	**ANB 1600R-L**			—	●	—	—	—	—	—	6.0	—	1	ANX series →M36 to M46
		1600R-G			—	●	—	—	—	—	—	6.0	—	1	
		1600R-GB	●	●	—		—	—	—	—	—	6.0	—	1	
		1600R-H	—	—	—	●	—	—	—	—	—	6.0	—	1	
		ANB 1600R-GX			—	●	—	—	—	—	—	9.0	—	2	
		ANB 1604R			—	●	—	—	—	—	—	6.0	—	3	
		1608R			—	●	—	—	—	—	—	6.0	—	3	
		ANB 1600R-W			—	●	—	—	—	—	—	—	—	4	
		ANB 1600R-WS	—	—	—	—	—	—	●	—	—	—	—	5	
		ANBD	—	—	—	—	—	—	●※	—	—	—	—	6	

For High-efficiency Cutter for Aluminum Alloys HF series (Blade)

	Fig 1 Fig 2 Fig 3	**NF-LDEN 12T3ZDFR-L**	—	—	—	●	—	—	—	—	—	6.0	—	1	HF series →M48 to M53
		12T3ZDFR-G	—	—	—	●	—	—	—	—	—	6.0	—	1	
		12T3ZDTR-H	—	—	—	●	—	—	—	—	—	6.0	—	1	
		NF-LDEN 12T3ZDFR-GX	—	—	—	●	—	—	—	—	—	9.0	—	2	
		NF-LDEN 12T3ZDFR-W	—	—	—	●	—	—	—	—	—	—	—	3	

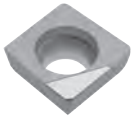
For High-Speed Cutter for Aluminum Alloys RF series (Insert)

	Fig1 LE Fig2 LE AN IC±0.025 IC±0.025 S±0.025	**NF-SNEW 1204ADFR**	—	—	—	●	▲	—	—	12.70	4.76	4.7	15	1	RF series →M54 to M55
		120404ADFR-H	—	—	—	●	—	—	—	12.70	4.76	9.5	15	1	
		NF-SNEW 1204ADFR-W	—	—	—	●	▲	—	—	12.70	4.76	2.3	15	2	
		SNEW 1204ADFR-WS	—	—	—	—	—	●	—	12.70	4.76	1.0	20	2	

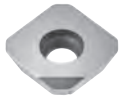
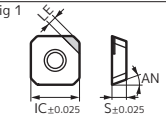
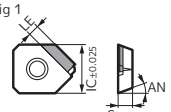
For High-Speed Cutter for Aluminum Alloys RF series (Blade)

	Fig1 Fig2	**RFB**	—	—	—		●	—	—	—	—	6.5	—	1	RF series →M54 to M55
		RFBW	—	—	—		●	—	—	—	—	4.5	—	2	

For Small Diameter Cutter for Aluminum Alloys SRF series

	Fig 1 Fig 2 Fig 3	**NF-SNEW 09T3ADTR**	—	—	—	●	▲	—	—	9.525	3.96	6.0	15	1	SRF series →M56 to M57
		NF-SNEW 09T3ADTR-U	—	—	—	●	▲	—	—	9.525	3.96	6.0	15	2	
		NF-SNEW 09T3ADTR-R	—	—	—	●	▲	—	—	9.525	3.96	6.0	15	3	

For SEC-WaveMill WGC series

	Fig 1 	**NF-SECW13T3AGTN-N**	—	—	—	●	▲	—	—	13.40	3.97	2.1	20	1	WGC series →H26 to H28
	Fig 1 	**NF-XEEW13T3AGFR-W**	—	—	—	●	▲	—	—	13.40	3.97	2.5	20	1	WGC series →H26 to H28

*1: SC10 is SUMICRYSTAL and SCV10 is CVD single-crystal diamond *2: Dummy blade (cemented carbide) for use with WS type

▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

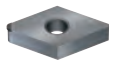
SUMIDIA/SUMIDIA BINDERLESS Inserts

(Legend) Continuous Cutting ●: 1st Recommendation

■ SUMIDIA BINDERLESS NPD10 Negative

Recommended Application: Carbide/Hard Brittle Materials ●

Dimensions (mm)

Shape	Cat. No.	NPD10	Cutting Edge Length	Inscribed Circle IC	Thickness S	Hole Dia. D1	Corner Radius RE
	DNMA 150408RH	●	1.8	12.7	4.76	5.16	0.8
	150412RH	●	1.8	12.7	4.76	5.16	1.2
	SNMA 120408RH	●	1.7	12.7	4.76	5.16	0.8
	120412RH	●	1.7	12.7	4.76	5.16	1.2
	VNMA 160408RH	●	1.8	9.525	4.76	3.81	0.8
	160412RH	●	1.5	9.525	4.76	3.81	1.2

(Legend) General Machining ●: 1st Recommendation

■ SUMIDIA DA90 Neg. NF

Recommended Application: N Non-Ferrous Metal ●; Carbide/Hard Brittle Materials

Dimensions (mm)

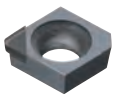
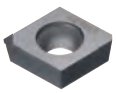
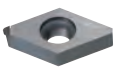
Shape	Cat. No.	DA1090	DA90	Cutting Edge Length	Inscribed Circle IC	Thickness S	Hole Dia. D1	Corner Radius RE
	NF-DNMA 150408	●	●	2.0	12.7	4.76	5.16	0.8
	150412	●	●	2.0	12.7	4.76	5.16	1.2
	NF-SNMA 120408	●	●	2.4	12.7	4.76	5.16	0.8
	120412	●	●	2.4	12.7	4.76	5.16	1.2
	NF-VNMA 160408	●	●	1.9	9.525	4.76	3.81	0.8
	160412	●	●	1.7	9.525	4.76	3.81	1.2

(Legend) Continuous Cutting ●: 1st Recommendation

Positive

Recommended Application: Carbide/Hard Brittle Materials ●

Dimensions (mm)

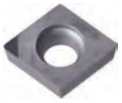
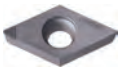
Shape	Relief Angle	Cat. No.	NPD10	Cutting Edge Length	Inscribed Circle IC	Thickness S	Hole Dia. D1	Corner Radius RE
	7°	CCMW 03X102RH	●	1.3	3.5	1.4	1.9	0.2
		03X104RH	●	1.3	3.5	1.4	1.9	0.4
		CCMW 04X102RH	●	1.7	4.3	1.8	2.3	0.2
		04X104RH	●	1.7	4.3	1.8	2.3	0.4
		CCMW 060202RH	●	1.7	6.35	2.38	2.8	0.2
		060204RH	●	1.7	6.35	2.38	2.8	0.4
		CCMW 09T302RH	●	1.7	9.525	3.97	4.4	0.2
		09T304RH	●	1.7	9.525	3.97	4.4	0.4
		09T308RH	●	1.6	9.525	3.97	4.4	0.8
	7°	DCMW 070202RH	●	2.1	6.35	2.38	2.8	0.2
		070204RH	●	2.0	6.35	2.38	2.8	0.4
		DCMW 11T302RH	●	2.1	9.525	3.97	4.4	0.2
		11T304RH	●	1.9	9.525	3.97	4.4	0.4
		11T308RH	●	1.6	9.525	3.97	4.4	0.8
	11°	TPMW 080202RH	●	1.2	4.76	2.38	2.3	0.2
		080204RH	●	1.0	4.76	2.38	2.3	0.4
		TPMW 110302RH	●	1.5	6.35	3.18	3.4	0.2
		110304RH	●	1.3	6.35	3.18	3.4	0.4
		110308RH	●	1.0	6.35	3.18	3.4	0.8
		TPMW 160402RH	●	2.2	9.525	4.76	4.4	0.2
		160404RH	●	2.0	9.525	4.76	4.4	0.4
		160408RH	●	1.6	9.525	4.76	4.4	0.8
	7°	VCMW 080201RH	●	2.2	4.76	2.38	2.3	0.1
		080202RH	●	1.9	4.76	2.38	2.3	0.2
		080204RH	●	1.5	4.76	2.38	2.3	0.4
		VCMW 110302RH	●	2.1	6.35	3.18	2.8	0.2
		110304RH	●	1.7	6.35	3.18	2.8	0.4
		VCMW 160402RH	●	2.1	9.525	4.76	4.4	0.2
		160404RH	●	1.7	9.525	4.76	4.4	0.4
		160408RH	●	1.8	9.525	4.76	4.4	0.8
		160412RH	●	1.5	9.525	4.76	4.4	1.2

(Legend) General Machining ●: 1st Recommendation

Pos. NF

Recommended Application: N Non-Ferrous Metal ●; Carbide/Hard Brittle Materials

Dimensions (mm)

Shape	Relief Angle	Cat. No.	DA1090	DA90	Cutting Edge Length	Inscribed Circle IC	Thickness S	Hole Dia. D1	Corner Radius RE
	7°	NF-CCMW 03X102	●	●	1.1	3.5	1.4	1.9	0.2
		03X104	●	●	1.1	3.5	1.4	1.9	0.4
		NF-CCMW 04X102	●	●	1.5	4.3	1.8	2.3	0.2
		04X104	●	●	1.5	4.3	1.8	2.3	0.4
		NF-CCMW 060202	●	●	2.4	6.35	2.38	2.8	0.2
		060204	●	●	2.4	6.35	2.38	2.8	0.4
		NF-CCMW 09T302	●	●	2.4	9.525	3.97	4.4	0.2
		09T304	●	●	2.4	9.525	3.97	4.4	0.4
		09T308	●	●	2.3	9.525	3.97	4.4	0.8
	7°	NF-DCMW 070202	●	●	2.6	6.35	2.38	2.8	0.2
		070204	●	●	2.4	6.35	2.38	2.8	0.4
		NF-DCMW 11T302	●	●	2.6	9.525	3.97	4.4	0.2
		11T304	●	●	2.4	9.525	3.97	4.4	0.4
		11T308	●	●	2.0	9.525	3.97	4.4	0.8
	11°	NF-TPMW 080202	●	●	2.5	4.76	2.38	2.3	0.2
		080204	●	●	2.4	4.76	2.38	2.3	0.4
		NF-TPMW 110302	●	●	2.5	6.35	3.18	3.4	0.2
		110304	●	●	2.4	6.35	3.18	3.4	0.4
		110308	●	●	2.1	6.35	3.18	3.4	0.8
		NF-TPMW 160402	●	●	2.5	9.525	4.76	4.4	0.2
		160404	●	●	2.4	9.525	4.76	4.4	0.4
		160408	●	●	2.1	9.525	4.76	4.4	0.8
	7°	NF-VCMW 080202	●	●	3.2	4.76	2.38	2.3	0.2
		080204	●	●	2.8	4.76	2.38	2.3	0.4
		NF-VCMW 110302	●	●	3.2	6.35	3.18	2.8	0.2
		110304	●	●	2.8	6.35	3.18	2.8	0.4
		NF-VCMW 160402	●	●	3.7	9.525	4.76	4.4	0.2
		160404	●	●	3.3	9.525	4.76	4.4	0.4
		160408	●	●	2.4	9.525	4.76	4.4	0.8
		160412	●	●	2.1	9.525	4.76	4.4	1.2

The R portion of the cutting edge is cylindrical shaped.

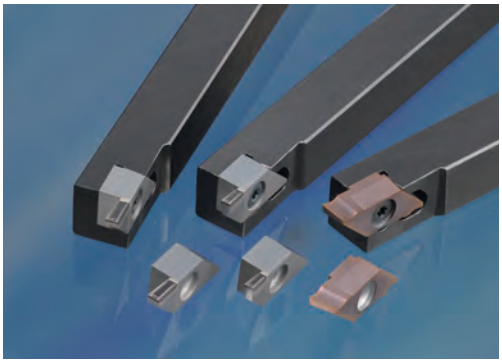
Page for Applicable Holders

Cat. No.	Applicable Holder	Cat. No.	Applicable Holder	Cat. No.	Applicable Holder
(NF-) DNMA1504●●(RH)	C14-C16 E15,E31-E33	(NF-) CCMW03X1●●(RH)	E18,E20	(NF-) TPMW0802●●(RH)	E40-E43
(NF-) SNMA1204●●(RH)	C20-C26 E37-E39	(NF-) CCMW04X1●●(RH)	E18,E20	(NF-) TPMW1103●●(RH)	E14,E40-E44
(NF-) VNMA1604●●(RH)	C38-C39	(NF-) CCMW0602●●(RH)	C13,D26,D30,D31,D38 E18-E20	(NF-) TPMW1604●●(RH)	E14,E40-E42
		(NF-) CCMW09T3●●(RH)	C13,D26,D30,D31,D38 E12,E18-E20	(NF-) VCMW0802●●(RH)	E49,E52,E55,E58
		(NF-) DCMW0702●●(RH)	C17,D27,D28,D32,D33,D39 E16,E26-E30	(NF-) VCMW1103●●(RH)	E52,E55,E58
		(NF-) DCMW11T3●●(RH)	C17,D27,D28,D32,D33,D39 E26-E30	(NF-) VCMW1604●●(RH)	E52,E55

: External Turning : Internal Boring

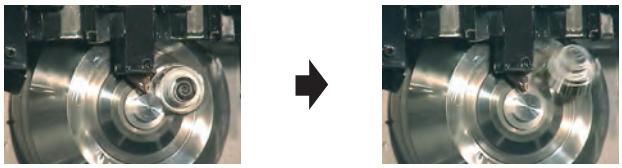
SGW series

VIDEO OF CUTTING



■ Features

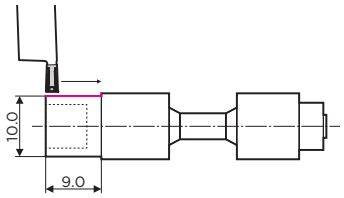
- Enables high-efficiency roughing of long parts
- Coin-shaped chips are less likely to tangle with work material or machinery



■ SUMIDIA Multi-Function Tool with Chipbreaker SUMIDIA BREAK MASTER LD type

- Provides excellent chip control in traverse cutting and grooving of aluminum alloys.
- Solves chip control problems and dramatically improves work efficiency.
- Achieves long, stable tool life by employing high-toughness grade SUMIDIA DA1000.

■ Application Examples



Work Material: Valve (A6061), Tool Cat. No.: KGV R2004-LD (DA1000)
Cutting Conditions: vc = 250m/min, f = 0.10mm/rev, ap = 0.5mm Wet

SGW
External Turning

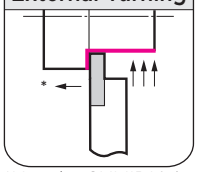
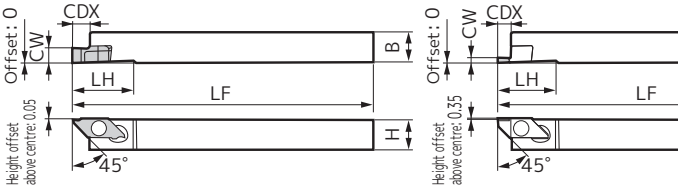


Fig 1



External Multi-purpose type (Grooving/Traverse Cutting) Screw-on

*Use the SUMIDIA insert for traverse cutting.

Holder

Parts

Dimensions (mm)

Cat. No.	Stock	Height H	Width B	Overall Length LF	Maximum Groove Depth CDX	Head Length LH	Fig	Flat Insert Screw	N·m	Wrench (For Torx hole)
SGW R1212	●	12	12	120	7.0	24.5	1	BFTX0410T8R	**1.1**	TRX08
SGW R1616	●	16	16	120	7.0	24.5	1			

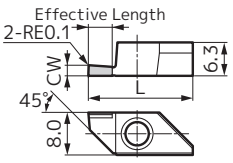
The above dimensions for LF, CDX and LH are values with a carbide insert mounted. (Refer to the table below for dimensions with SUMIDIA insert mounted)

Insert (SUMIDIA) (SUMIDIA)

Dimensions (mm)

Cat. No.	DA1000	Width of Cut CW	Overall Length L	Overall Length LF	Maximum Groove Depth CDX	Head Length LH	Effective Length	Fig
KGV R2004-LD	●	2.0	19.7	118.7	5.0	23.2	4.0	1
KGV R2504-LD	●	2.5	19.7	118.7	5.0	23.2	4.0	1
KGV R2506-LD	●	2.5	21.2	120.2	6.5	24.7	5.5	1

Fig 1



The above dimensions for LF, CDX and LH are the holder dimensions with insert mounted.

Insert (Carbide) (Coated Carbide)

Dimensions (mm)

Cat. No.	AC1030U	AC530U	Width of Cut CW	Overall Length L	Overall Length LF	Maximum Groove Depth CDX	Head Length LH	Effective Length	Fig
KGV R400	●	●	4.0	21.0	120	7.0	24.5	6.3	1
KGV R500	●	●	5.0	21.0	120	7.0	24.5	6.3	1
KGV R600	●	●	6.0	21.0	120	7.0	24.5	6.3	1

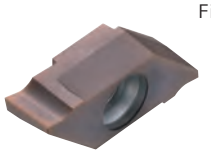
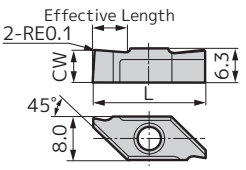


Fig 1



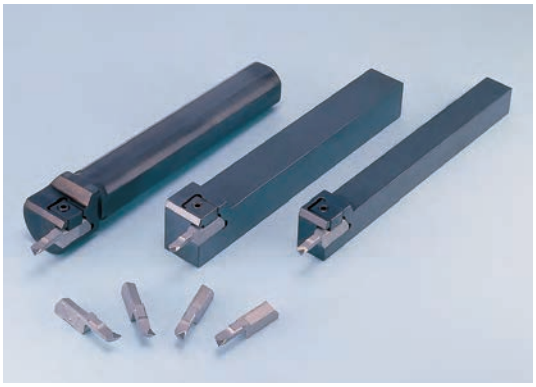
Recommended Cutting Conditions

Work Material	P Steel M Stainless Steel N Non-Ferrous Metal	N Non-Ferrous Metal	
Insert Grade	AC1030U	DA1000	
Machining Details	Grooving	Grooving	Traverse Cutting
Spindle Speed n (min-1)	4,000 to 6,000	4,500 to 8,000	4,500 to 8,000
Feed Rate f (mm/rev)	0.05 to 0.15	0.07 to 0.15	0.07 to 0.15
Coolant	Wet (oil-based)		

Be careful with spindle power during use. For small lathes, insufficient spindle power during machining may cause the machine to stop.
Be careful when machining carbon steel and stainless steel in particular.

N·m Recommended Tightening Torque (N·m) Note: Regrinding the SUMIDIA BREAK MASTER LD type will adversely affect chip evacuation performance.

CKB series

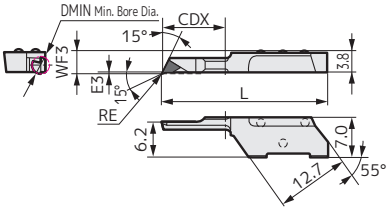


SumiSmall

■ Features

- High indexing accuracy with simple structure design and one-touch clamping.
- Utilises DA2200 grade with excellent edge sharpness.

■ Insert



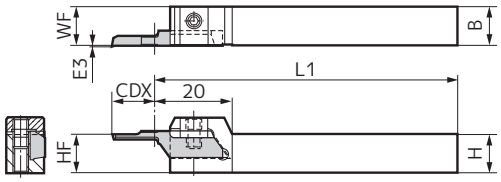
(SUMIDIA)

Dimensions (mm)

Cat. No.	DA2200	Min. Bore Dia. DMIN	Cutting Edge Position WF3	Offset E3	Corner Radius RE	Overall Length L	Depth of Cut CDX
KBMX R0311-10	●	**3.0**	4.1	0.3	0.1	28.5	11
KBMX R0411-10	●	**4.0**	4.3	0.5	0.1	28.5	11
KBMX R0511-10	●	**5.0**	4.5	0.7	0.1	28.5	11

■ Square Shank

Fig 1



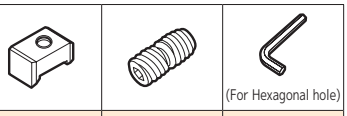
For E3 and CDX, refer to the insert section

Holder

Dimensions (mm)

Cat. No.	Stock	Height H	Width B	Overall Length L1	Cutting Edge Distance WF	Cutting Edge Height HF	Fig	Clamp Plate	Double Screw	Wrench
CKB R1010-16	●	10	10	100	10	10	1	CKBW16	WB4-8	LH020
CKB R1212-16	●	12	12	125	12	12	1			
CKB R1616-16	●	16	16	125	16	16	1			
CKB R2020-16	●	20	20	125	20	20	1			
CKB R2525-16		25	25	150	25	25	1			

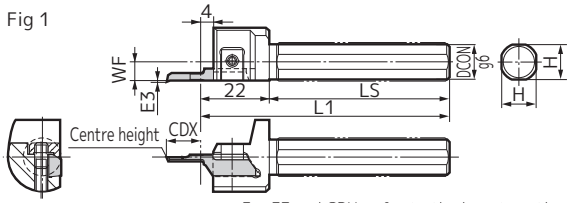
Parts



*Inserts are not included in the tool holders.

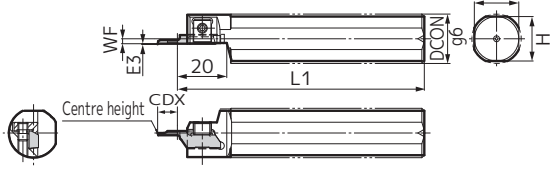
■ Round Shank

Fig 1

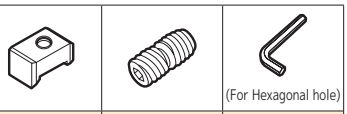


For E3 and CDX, refer to the insert section

Fig 2 (Small offset type)



Parts



Holder

Dimensions (mm)

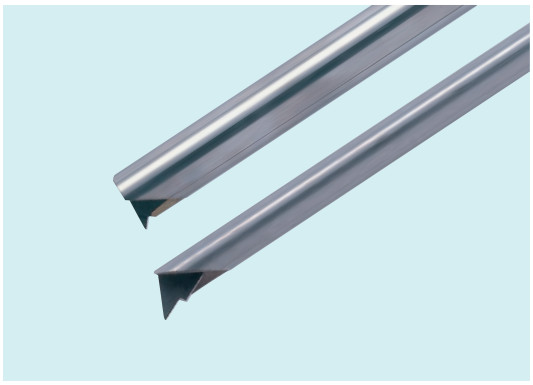
Cat. No.	Stock	Diameter DCON	Height H	Overall Length L1	Length LS	Cutting Edge Distance WF	Fig	Clamp Plate	Double Screw	Wrench
S10F-CKB R-16	●	10	9	80	58	5	1	CKBW16	WB4-8	LH020
S12F-CKB R-16	●	12	11	80	58	6	1			
S16H-CKB R-16	●	16	15	100	78	8	1			
S19K-CKB R-16	●	19.05	17	125	103	8	1			
S20K-CKB R-16	●	20	18	125	103	10	1			
S1905H-CKB RS-16	●	19.05	17	100	—	2	2			
S20H-CKB RS-16	●	20	18	100	—	2	2			
S22K-CKB RS-16	●	22	19	125	—	2	2			
S25K-CKB RS-16	●	25	23	125	—	2	2			
S254K-CKB RS-16	●	25.4	23	125	—	2	2			

*Inserts are not included in the tool holders.

■ Recommended Cutting Conditions

Work Material	Spindle Speed	Depth of Cut ap	Feed Rate f	Coolant
N Aluminum Alloy	Above 2,000 min^{-1}	0.1mm or below	0.1mm/rev or below	Wet

DABB series



■ Features

SumiSmall

- **Small Diameter Boring Bars for Aluminum Alloy**
  Supports general boring and necking operations with a minimum machining diameter of ø3.0mm.
- **Utilises High Strength PCD Grade DA2200 for Cutting Edge**

For general boring with minimum bore diameter ø10 to ø22mm range, use the BNB series small diameter Boring Bar + SUMIDIA Insert (See page L138 for details)

PCD

DABB-C

Stop-Boring, Through-Boring and Back Chamfering

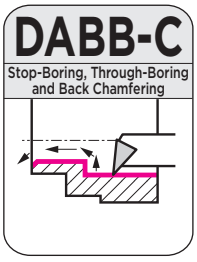
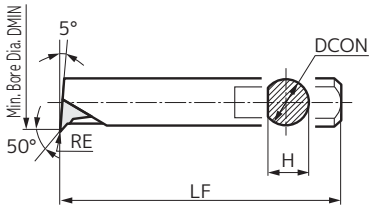


Fig 1



SumiSmall

Holder (SUMIDIA)

Dimensions (mm)

Cat. No.	DA2200	Min. Bore Dia. DMIN	Diameter DCON	Height H	Overall Length LF	Corner Radius RE	Applicable Adapter Sleeve	Fig
DABB 025CR	●	**3.0**	2.5	2.2	60	0.1	HBB 2516	1
DABB 035CR	●	**4.0**	3.5	3.2	60	0.1	HBB 3516	1
DABB 045CR	●	**5.0**	4.5	4.1	80	0.1	HBB 4516	1
DABB 060CR	●	**7.0**	6.0	5.2	80	0.1	HBB 616	1

PCD

DABB-N

Stop-Boring, Through-Boring and Necking

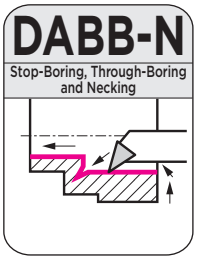
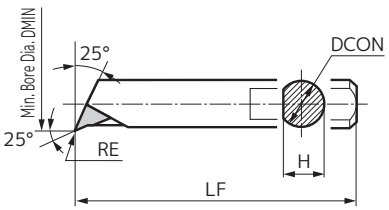


Fig 1



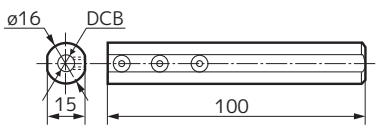
SumiSmall

Holder (SUMIDIA)

Dimensions (mm)

Cat. No.	DA2200	Min. Bore Dia. DMIN	Diameter DCON	Height H	Overall Length LF	Corner Radius RE	Applicable Adapter Sleeve	Fig
DABB 025NR	●	**3.0**	2.5	2.2	60	0.1	HBB 2516	1
DABB 035NR	●	**4.0**	3.5	3.2	60	0.1	HBB 3516	1
DABB 045NR	●	**5.0**	4.5	4.1	80	0.1	HBB 4516	1
DABB 060NR	●	**7.0**	6.0	5.2	80	0.1	HBB 616	1

Fig 1



Adapter Sleeve

Dimensions (mm)

Cat. No.	Stock	Bore Dia. DCB	Fig	Set Screw	Wrench
					 (For Hexagonal hole)
HBB 2516	●	2.5	1	BT0404	LH020
HBB 3516	●	3.5	1		
HBB 4516	●	4.5	1		
HBB 616	●	6.0	1		

HBX type adapter sleeve can also be used.

■ Recommended Cutting Conditions

Work Material	Spindle Speed	Depth of Cut ap	Feed Rate f	Coolant
N Aluminum Alloy	Above 2,000min^{-1}	0.1mm or below	0.1mm/rev or below	Wet

DABX series

■ Features

- **Utilising a high-rigidity shank design and nano-polycrystalline diamond for high-precision small diameter boring of cemented carbides**

SUMIDIA BINDERLESS
Brazed

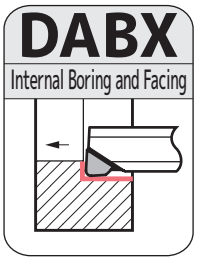
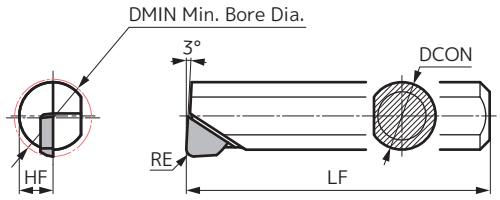


Fig 1



Holder (SUMIDIA)

Dimensions (mm)

Cat. No.	NPD10	Min. Bore Dia. DMIN	Diameter DCON	Cutting Edge Height HF	Overall Length LF	Corner Radius RE	Applicable Adapter Sleeve	Fig
DABX025R-01	●	**3**	2.5	1.25	40	0.1	HBX2516	1
DABX025R-02	●	**3**	2.5	1.25	40	0.2	HBX2516	1
DABX025R-04	●	**3**	2.5	1.25	40	0.4	HBX2516	1
DABX035R-01	●	**4**	3.5	1.75	40	0.1	HBX3516	1
DABX035R-02	●	**4**	3.5	1.75	40	0.2	HBX3516	1
DABX035R-04	●	**4**	3.5	1.75	40	0.4	HBX3516	1

DABX bars can be used with HBB type adapter sleeves, but HBX type adapter sleeves are recommended for machining when rigidity is required.

Fig 1

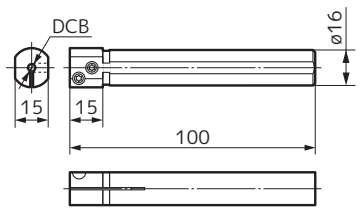
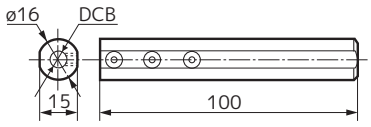


Fig 2



Adapter Sleeve (HBX type)

Dimensions (mm)

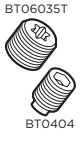
Cat. No.	Stock	Bore Dia. DCB	Applicable Tool Holder	Fig
HBX 2516	●	2.5	DABX 025R	1
HBX 3516	●	3.5	DABX 035R	1

Adapter Sleeve (HBB type)

Dimensions (mm)

Cat. No.	Stock	Bore Dia. DCB	Applicable Tool Holder	Fig
HBB 2516	●	2.5	DABX 025R	2
HBB 3516	●	3.5	DABX 035R	2

Parts (for Adapter Sleeve)

Applicable Adapter Sleeve	Flat Insert Screw		Set Screw	Wrench
		N·m		
HBX 2516	BFTX0409N	**1.5**	BT06035T	TRD15
HBX 3516	BFTX0409N	**3.0**	BT06035T	TRD15
HBB ○○○○	—	—	BT0404	LH020

N·m Recommended Tightening Torque (N·m)

High-efficiency Cutter for Aluminum Alloys

ALNEX ANX series

VIDEO OF CUTTING

Expansion

■ Features

- **Drastically Reduced Runout Adjustment Time**
  Simple screw-fastening structure enables fine adjustments to be made easily
- **Through-Blade Coolant**
  Ensures coolant supply to the cutting edge and breaks chips
- **Lightweight Aluminum Alloy Body (ANXA type)**
  Utilises aluminum alloy to achieve a total weight of less than 1.3kg for a ø125mm cutter with 22 teeth
- **High-strength CVD Single Crystal Diamond SCV10**
  Wiper Blade WS type lineup

■ Product Range

Type	Cat. No.	Body Material	Max. Diameter (mm) ø25	ø30	ø32	ø40	ø50	ø63	ø80	ø100	ø125	ø160
Shell	ANXA 16000R (Inch)	Aluminum Alloy							6 10 14	8 12 18	10 14 22	12 20 28
Shell	ANXA 16000RS	Aluminum Alloy							6 10 14	8 12 18	10 14 22	12 20 28
Shell	ANXS 16000R (Inch)	Steel						6 8 12	6 10 14	8 12 18	10 14 22	
Shell	ANXS 16000RS	Steel				4 6	4 6 9	6 8 12	6 10 14	8 12 18	10 14 22	
Shank	ANXS 16000E	Steel	2	3 4	3 4	4 6	4 6 9					
Modular	ANXS 16000M	Steel	2	3 4	3 4	4 6						

Number in ●●● shows the number of teeth (Inch) Inch Bore

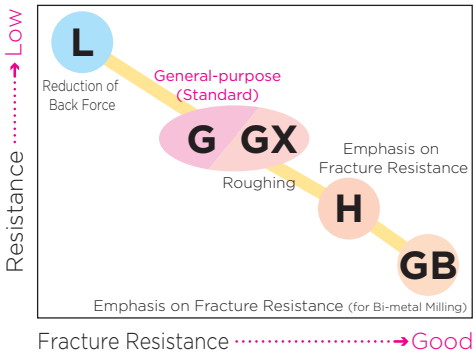
Modular type ☞M46

■ Blade Selection Guide

Work Material	N								
Applications	Finishing/ Light Cutting	General-purpose	Roughing		Composite Milling *1	Corner Radius Milling	Corner Radius Milling	Finishing	Burr-free Mirror Finish
Features	Low Cutting Force	Standard	Long Edge	High Strength	High Strength	Corner Radius 0.4	Corner Radius 0.8	Wiper	Wiper
Cutting Edge Shape	L	G	GX	H	GB	—	—	W	WS
Edge Length (*2)	6.0mm	6.0mm	9.0mm	6.0mm	6.0mm	6.0mm	6.0mm	2.0mm	1.0mm

*1 Machining of components combining aluminum alloy and cast iron. W type and WS type cannot be used together.

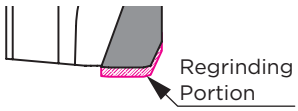
■ Blade Selection Reference

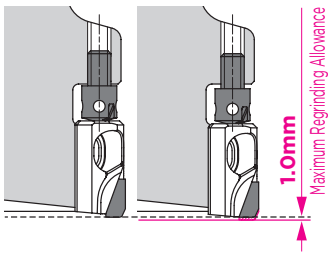


*2 Edge length

● **Regrinding possible up to 1.0mm. Reduced running costs**

Assuming 0.2mm of regrinding each time, an edge can be used up to 6 times.
(Peripheral cutting edge and WS type cannot be reground.)



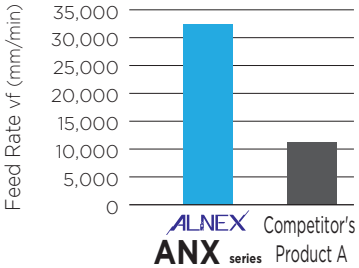


■ High-speed, High-efficiency Cutting

Realises ultra-high-efficiency machining with vf = 30,000mm/min

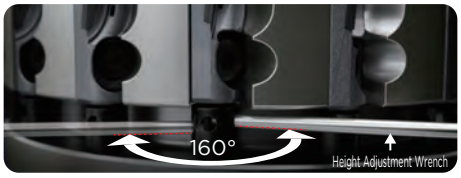
Cutter diameter ø100mm comparison

	Spindle Speed min⁻¹	Number of Teeth	Feed Rate vf(mm/min)
ALNEX ANX series	18,000	18	32,400
Competitor's Product A	9,500	12	11,400



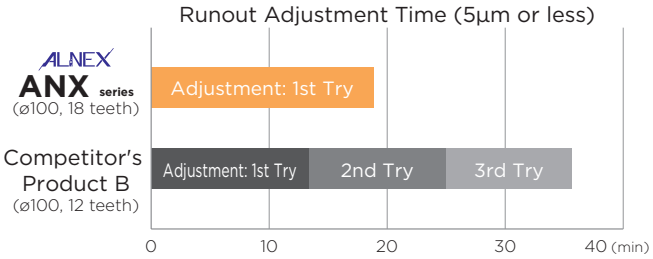
■ Drastically Reduced Runout Adjustment Time

● Simple screw-fastening structure ● Enables fine adjustments to be made easily ● High-rigidity body (reduces deformation due to tightening)



Adjustment is easy thanks to the large movable range of the height adjustment wrench.

We recommend keeping cutting edge height variation during runout adjustment to within 5µm.

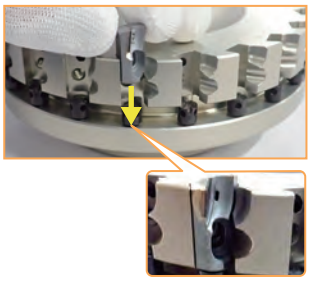


Completed on 1st Try, Adjustment Time Reduced

* Because the cutting edge chips off easily, care is required when mounting on the cutter body. Use a non-contact tool presetter.

■ Blade Mounting/Runout Adjustment

(1)



(1) Slide the blade into the cutter teeth groove.

(2)

(2) Lightly tighten the cap screw while pressing the blade against the restraining face. (1N·m)

(3)

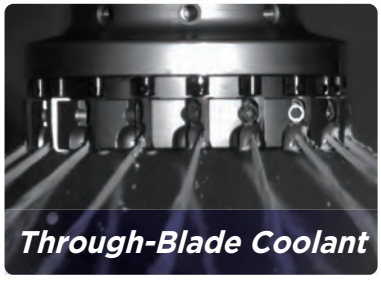
(3) Adjust the blade to the required height by using the dedicated wrench to turn the height adjustment screw.

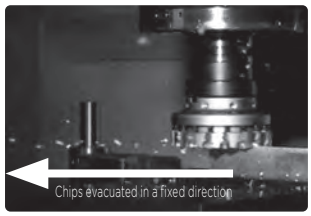
(4)

(4) Perform final tightening of the cap screw. (2N·m)

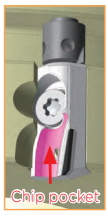
■ Chip Control

Through-Blade Coolant chip breaking





Controls the chips' scatter direction.



The chip pocket catches the chips and suppresses damage to the body.

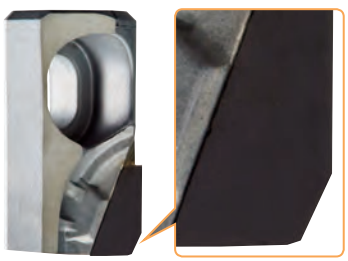
ALNEX ANX series

Competitor's Product C

Work Material: ADC12 Cutting Conditions: vc = 2,500m/min, fz = 0.05mm/t, ap = 0.5mm, Wet

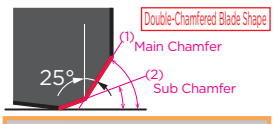
■ Burr Control

Reduces burrs by using a double-chamfered cutting edge (L/G/GX/H/GB type)

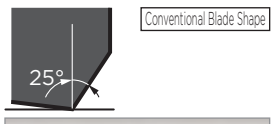


Drastically reduces burrs by preventing plastic deformation that causes burrs.

Work Material: A6061 Rolled Steel
Cutting Conditions: vc = 3,142m/min,
fz = 0.10mm/t ap = 0.5mm, Dry



ALNEX ANX series

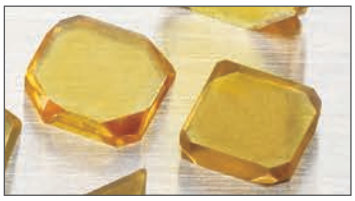


Conventional Tool

CVD Single Crystal Diamond SCV10 Wiper Blade WS type

- Wiper blade adopts high-strength single-crystal diamond using Sumitomo Electric Hardmetal's vapour phase synthesis technology
- Sharp cutting edge achieves burr-free mirror finish in aluminum alloy machining
- Superior wear resistance maintains cutting edge sharpness for a long time, reducing total tool costs

Conventional single-crystal diamond

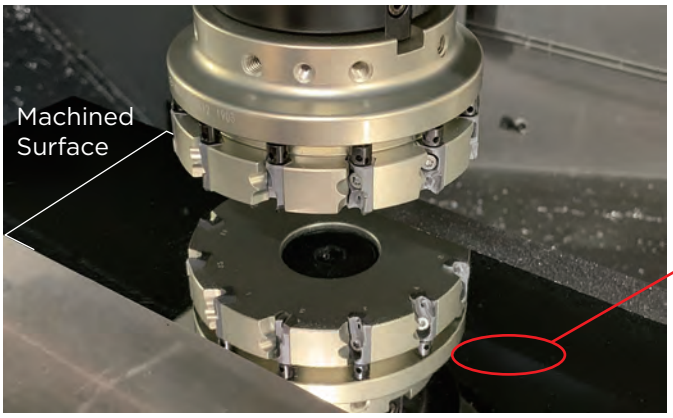


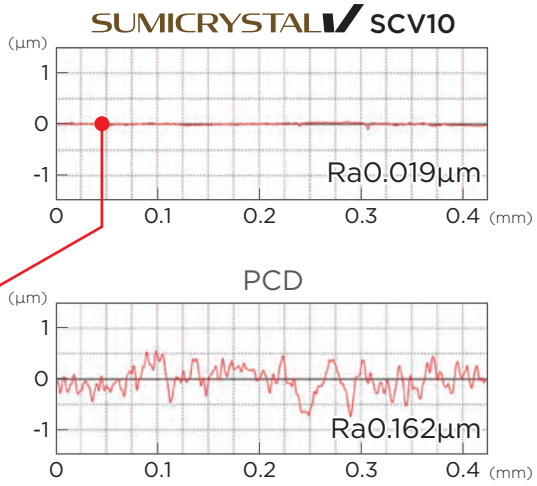
◆ Superb mirror surface and burr control through sharp cutting edge

Realizes a mirror finish in milling of aluminum alloys, copper alloys, and other non-ferrous metals, with long-term burr control

■ Mirror Finish (Wiper Blade WS type)

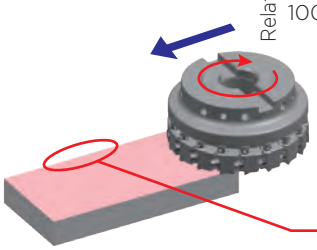
Sharp cutting edge achieves mirror finish with cutting alone



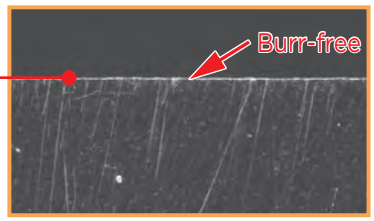


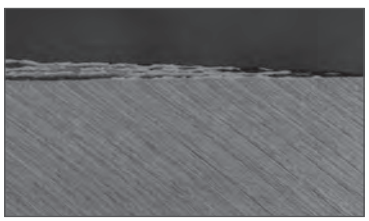
■ Burr-Free (Wiper Blade WS type)

Sharp cutting edge and excellent wear resistance suppress burrs over a long period



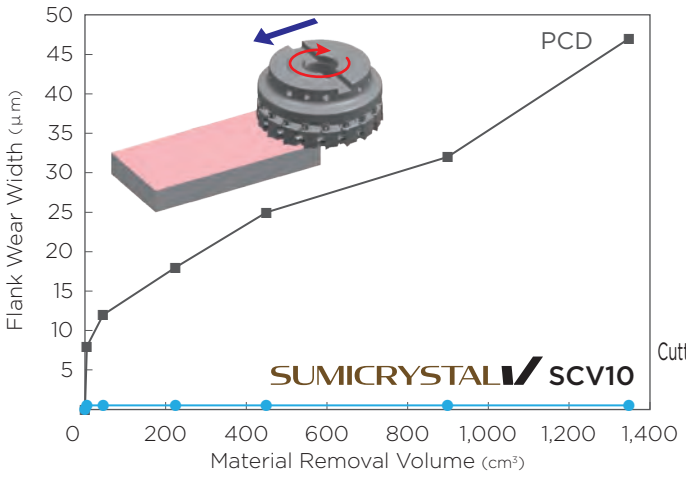
Edge Burr





◆ Superior wear resistance maintains cutting edge sharpness for a long time

Wear resistance evaluation in high-silicon aluminum alloy machining

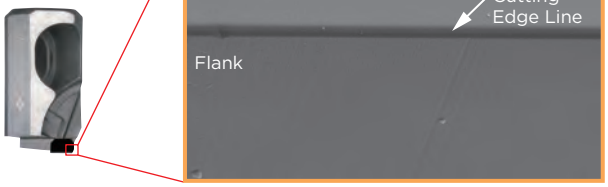


Work Material: Al-17wt.% Si alloy
Cutting Conditions: vc = 800m/min, fz = 1.0mm/t, ap = 0.03mm
Wet (water soluble)
*Evaluated with 1 wiper blade (dummy blade used in opposite position)

PCD

SUMICRYSTAL SCV10

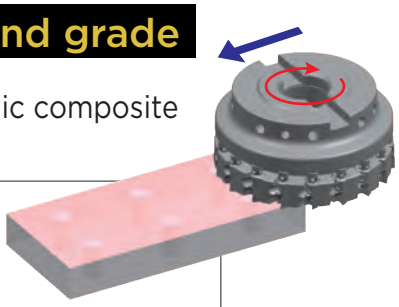
Cutting Edge Photo (After use)

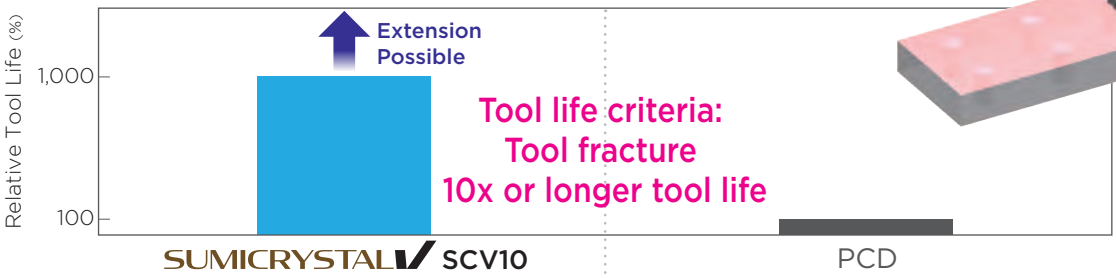


No progression of flank wear, consistent mirror finish with burr suppression

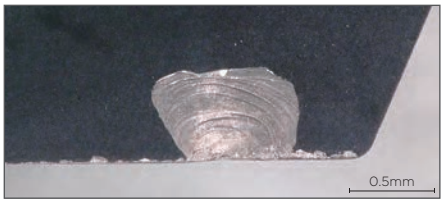
◆ Jet-black high-strength single-crystal diamond grade

Fracture resistance evaluation in machining aluminum alloy-ceramic composite





Cutting Edge Photo (after evaluation)



Work Material: Aluminum Alloy + Ceramic Composite
Cutting Conditions: vc = 2,500m/min, fz = 1.0mm/t, ap = 0.03mm
Wet (water soluble)
*Evaluated with 1 wiper blade (dummy blade used in opposite position)

10x or more fracture resistance compared to PCD in finishing at low depths of cut (0.05 mm or less)

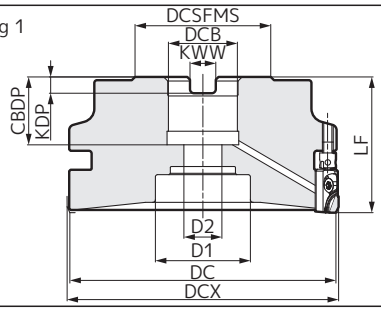
ANXA 16000R(S) type

Rake Angle		
Radial	+5°	
Axial	+5°	

3mm 90°

Face Milling | Shoulder Milling | Groove Milling

Fig 1



Body (Aluminum Alloy)

Dimensions (mm)

	Cat. No.	Stock	Max. Dia. DCX	Dia. DC	Boss Dia. DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CBDP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
Metric	**ANXA 16080RS06**	●	**80**	78	50	50	**27**	12.4	7	22	35	14	6	0.5	1
	16080RS10	●	**80**	78	50	50	**27**	12.4	7	22	35	14	10	0.5	1
	16080RS14	●	**80**	78	50	50	**27**	12.4	7	22	35	14	14	0.5	1
	16100RS08	●	**100**	98	50	50	**27**	12.4	7	22	35	14	8	0.8	1
	16100RS12	●	**100**	98	50	50	**27**	12.4	7	22	35	14	12	0.8	1
	16100RS18	●	**100**	98	50	50	**27**	12.4	7	22	35	14	18	0.8	1
	16125RS10	●	**125**	123	50	50	**27**	12.4	7	22	35	14	10	1.2	1
	16125RS14	●	**125**	123	50	50	**27**	12.4	7	22	35	14	14	1.2	1
	16125RS22	●	**125**	123	50	50	**27**	12.4	7	22	35	14	22	1.3	1
	16160RS12	●	**160**	158	80	63	**40**	16.4	9	29	52	29	12	2.6	1
	16160RS20	●	**160**	158	80	63	**40**	16.4	9	29	52	29	20	2.6	1
	16160RS28	●	**160**	158	80	63	**40**	16.4	9	29	52	29	28	2.6	1
Inch	**ANXA 16080R06**	●	**80**	78	50	50	**25.4**	9.5	6	25	35	14	6	0.5	1
	16080R10	●	**80**	78	50	50	**25.4**	9.5	6	25	35	14	10	0.5	1
	16080R14	●	**80**	78	50	50	**25.4**	9.5	6	25	35	14	14	0.5	1
	16100R08	●	**100**	98	50	50	**25.4**	9.5	6	25	35	14	8	0.8	1
	16100R12	●	**100**	98	50	50	**25.4**	9.5	6	25	35	14	12	0.9	1
	16100R18	●	**100**	98	50	50	**25.4**	9.5	6	25	35	14	18	0.9	1
	16125R10	●	**125**	123	50	50	**25.4**	9.5	6	25	35	14	10	1.2	1
	16125R14	●	**125**	123	50	50	**25.4**	9.5	6	25	35	14	14	1.2	1
	16125R22	●	**125**	123	50	50	**25.4**	9.5	6	25	35	14	22	1.3	1
	16160R12	●	**160**	158	80	63	**38.1**	15.9	10	35.5	55	30	12	2.3	1
	16160R20	●	**160**	158	80	63	**38.1**	15.9	10	35.5	55	30	20	2.4	1
	16160R28	●	**160**	158	80	63	**38.1**	15.9	10	35.5	55	30	28	2.6	1

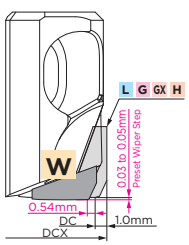
Blades are sold separately.
If using blades with corner radius (ANB1604R/ANB1608R), DC = DCX.
Weight indicated includes the weight with blades and other spare parts (excluding the centre bolt).
All aluminum alloy cutter bodies from (DCX) ø80 to ø125 have similar bore diameter (DCB) (metric ø27/inch ø25.4).

Identification Code

ANX	A	16	100	R	S	18
Series Code	Aluminum Alloy Body	Blade Size	Max. Dia.	Feed Direction	Metric Bore	Number of Teeth

■ Precautions When Using Wiper Blades

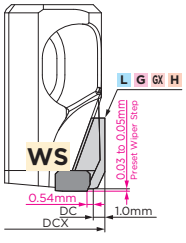
· W type Setting



⚠ Precautions

In order to maintain cutter balance when using the W type wiper blade, use a cutter with an even-number of cutting teeth and place another W type wiper blade at the opposite teeth position.

· WS type Setting



⚠ Precautions

(For more details, refer to the instruction manual included with the product)

In order to maintain cutter balance when using the WS type (SCV10 wiper blade), use a cutter with an even-number of cutting teeth and place another WS type wiper blade (or dummy blade ANBD) at opposite teeth positions.

*The dummy blade is dedicated for use with WS type.

ANXA 1600OR(S) type

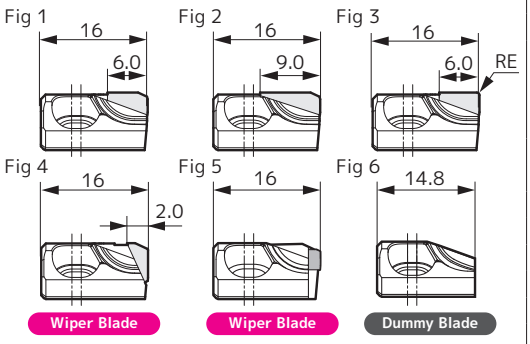
Expansion

Blade

Dimensions (mm)

Grade Classification		SUMIDIA			SUMICRYSTAL V
Process	High-speed/Light Cutting	N	KN	KN	N
	Medium Cutting	N	KN	KN	
	Roughing	N	KN	KN	

Cat. No.	DA1000	DA1090 (New)	DA90	SCV10	Cutting Edge Length	Corner Radius RE	Wiper Edge Shape	Applications	Fig
ANB 1600R-L	●			—	6.0	—	Linear	Low Cutting Force	1
ANB 1600R-G	●			—	6.0	—	Arc-Shaped	General-purpose	1
ANB 1600R-GB		●	●	—	6.0	—	Arc-Shaped	Composite Milling*1	1
ANB 1600R-H	●	—	—	—	6.0	—	Arc-Shaped	Strong Edge	1
ANB 1600R-GX	●			—	9.0	—	Arc-Shaped	Long Edge	2
ANB 1604R	●			—	6.0	0.4	Linear	Corner Radius	3
ANB 1608R	●			—	6.0	0.8	Linear	Corner Radius	3
ANB 1600R-W	●			—	—	—	Arc-Shaped	Wiper	4
ANB 1600R-WS	—	—	—	●*2	—	—	Arc-Shaped	Wiper	5
ANBD	—	—	—	●*2	—	—	—	Dummy Blade	6



*1 Cast iron/aluminum alloy *2 Dummy blade (cemented carbide) for use with WS type, refer to page M40 "Precautions When Using Wiper Blades" (Mounting Precautions).

Recommended Cutting Conditions

Si Content of 12.6% or less

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	—	2,000 - **2,500** - 3,000	0.05 - **0.13** - 0.20	DA1000 SCV10

Si Content of over 12.6%

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	—	400 - **600** - 800	0.05 - **0.13** - 0.20	DA1000 DA90 SCV10

Combined Milling of Cast Iron/Aluminum Alloy

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
K N	Cast Iron/ Aluminum Alloy	—	300 - **400** - 500	0.05 - **0.13** - 0.20	DA90

Note
- The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors. For combined milling of cast iron/aluminum alloy, we recommend DA90.
- When using wiper blade WS type, see the table below for the feed rate.

Maximum Allowable Spindle Speed

Cat. No.	n max(min^{-1})
ANXA 16080RS06	20,000
16080RS10	20,000
16080RS14	20,000
16100RS08	18,000
16100RS12	18,000
16100RS18	18,000
16125RS10	16,000
16125RS14	16,000
16125RS22	16,000
16160RS12	14,000
16160RS20	14,000
16160RS28	14,000
ANXA 16080R06	20,000
16080R10	20,000
16080R14	20,000
16100R08	18,000
16100R12	18,000
16100R18	18,000
16125R10	16,000
16125R14	16,000
16125R22	16,000
16160R12	14,000
16160R20	14,000
16160R28	14,000

*The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.

Parts

Applicable Cutter	Cap Screw	N·m	Wrench	Adjustment Screw	Adjustment Wrench	Centre Bolt	N·m
ANXA 16080R(S)○○	BXA0310IP	2.0	TRXW10IP	HFJ	ANT	BXH1235-D33	50
ANXA 16100R(S)○○							
ANXA 16125R(S)○○							
ANXA 16160R(S)○○						BXH2036-D50	200

The adjustment wrench (ANT) can also be used for height adjustment of the High-speed Cutter RF series and High-efficiency Cutter HF series.

■ Wiper Blade WS type Recommended Feed Rate

WS Cutting Edge Feed Rate per Tooth*1 fzws (mm/tws)	D ≤ 0.5	0.5 < D ≤ 1.7	1.7 < D
Burr-free Finish	◎ Excellent		Impossible
Mirror Finishing	◎ Excellent	○ Good	
Target Surface Roughness Ra (μm)	0.015 to 0.05	up to 0.6	

*1 Feed Rate per WS Cutting Edge Tooth f_{zws}

$$f_{zws}\ (mm/t_{ws}) = \frac{f_z \times (\text{Total No. of Teeth})^{*2}}{(\text{WS type No. of Teeth})^{*3}}$$

Feed Rate per Tooth fz

$$f_z\ (mm/t) = \frac{\text{Feed Rate (vf) (mm/min)}}{\text{Spindle Speed n (min}^{-1}\text{)} \times (\text{Total No. of Teeth})}$$

*2 Total number of teeth includes dummy blade and wiper blade (WS type).

*3 WS type number of teeth does not include dummy blade.

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item (new product/expanded item)

ANXS 16000R(S) type

Rake Angle	Radial	+5°
	Axial	+5°

3mm 90°

Face Milling | Shoulder Milling | Groove Milling

Fig 1

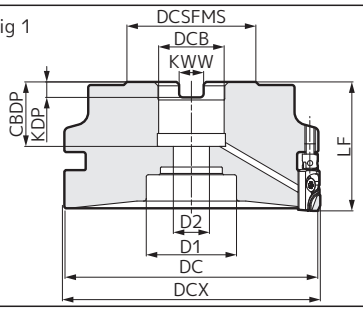
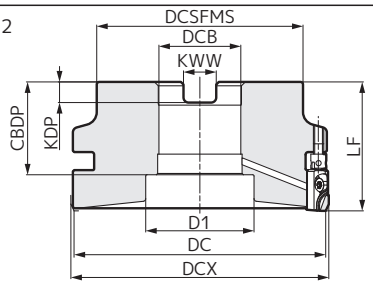


Fig 2



Body (Steel)

Dimensions (mm)

	Cat. No.	Stock	Max. Dia. DCX	Dia. DC	Boss Dia. DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CBDP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
Metric	**ANXS 16040RS04**	●	**40**	38	38.5	40	**16**	8.4	5.6	18	14	9	4	0.3	1
	16040RS06	●	**40**	38	38.5	40	**16**	8.4	5.6	18	14	9	6	0.3	1
	16050RS04	●	**50**	48	48.5	40	**22**	10.4	6.3	20	18	11	4	0.4	1
	16050RS06	●	**50**	48	48.5	40	**22**	10.4	6.3	20	18	11	6	0.4	1
	16050RS09	●	**50**	48	48.5	40	**22**	10.4	6.3	20	18	11	9	0.4	1
	16063RS06	●	**63**	61	50	40	**22**	10.4	6.3	20	18	11	6	0.7	1
	16063RS08	●	**63**	61	50	40	**22**	10.4	6.3	20	18	11	8	0.7	1
	16063RS12	●	**63**	61	50	40	**22**	10.4	6.3	20	18	11	12	0.7	1
	16080RS06	●	**80**	78	50	50	**27**	12.4	7	22	35	14	6	1.2	1
	16080RS10	●	**80**	78	50	50	**27**	12.4	7	22	35	14	10	1.2	1
	16080RS14	●	**80**	78	50	50	**27**	12.4	7	22	35	14	14	1.2	1
	16100RS08	●	**100**	98	80	50	**32**	14.4	8	32	46	—	8	1.9	2
	16100RS12	●	**100**	98	80	50	**32**	14.4	8	32	46	—	12	2.0	2
	16100RS18	●	**100**	98	80	50	**32**	14.4	8	32	46	—	18	2.0	2
	16125RS10	●	**125**	123	80	63	**40**	16.4	9	29	52	29	10	3.8	1
	16125RS14	●	**125**	123	80	63	**40**	16.4	9	29	52	29	14	3.9	1
	16125RS22	●	**125**	123	80	63	**40**	16.4	9	29	52	29	22	3.9	1
Inch	**ANXS 16063R06**	●	**63**	61	50	50	**25.4**	9.5	6	25	20	14	6	0.9	1
	16063R08	●	**63**	61	50	50	**25.4**	9.5	6	25	20	14	8	0.9	1
	16063R12	●	**63**	61	50	50	**25.4**	9.5	6	25	20	14	12	0.9	1
	16080R06	●	**80**	78	50	50	**25.4**	9.5	6	25	35	14	6	1.2	1
	16080R10	●	**80**	78	50	50	**25.4**	9.5	6	25	35	14	10	1.2	1
	16080R14	●	**80**	78	50	50	**25.4**	9.5	6	25	35	14	14	1.2	1
	16100R08	●	**100**	98	80	50	**31.75**	12.7	8	36	42	—	8	1.9	2
	16100R12	●	**100**	98	80	50	**31.75**	12.7	8	36	42	—	12	2.0	2
	16100R18	●	**100**	98	80	50	**31.75**	12.7	8	36	42	—	18	2.0	2
	16125R10	●	**125**	123	80	63	**38.1**	15.9	10	35.5	52	29	10	3.9	1
	16125R14	●	**125**	123	80	63	**38.1**	15.9	10	35.5	52	29	14	3.9	1
	16125R22	●	**125**	123	80	63	**38.1**	15.9	10	35.5	52	29	22	3.9	1

Blades are sold separately.
If using blades with corner radius (ANB1604R/ANB1608R), DC = DCX.
Weight indicated includes the weight with blades and other spare parts (excluding the centre bolt).

Identification Code

ANX	S	16	100	R	S	18
Series Code	Steel Body	Blade Size	Max. Dia.	Feed Direction	Metric Bore	Number of Teeth

ANXS 16000R(S) type

Expansion

Blade

Dimensions (mm)

Grade Classification		SUMIDIA			SUMICRYSTAL V
Process	High-speed/Light Cutting	N	KN	KN	N
	Medium Cutting	N	KN	KN	
	Roughing	N	KN	KN	

Cat. No.	DA1000	DA1090 (New)	DA90	SCV10	Cutting Edge Length	Corner Radius RE	Wiper Edge Shape	Applications	Fig
ANB 1600R-L	●			—	6.0	—	Linear	Low Cutting Force	1
ANB 1600R-G	●			—	6.0	—	Arc-Shaped	General-purpose	1
ANB 1600R-GB		●	●	—	6.0	—	Arc-Shaped	Composite Milling*1	1
ANB 1600R-H	●	—	—	—	6.0	—	Arc-Shaped	Strong Edge	1
ANB 1600R-GX	●			—	9.0	—	Arc-Shaped	Long Edge	2
ANB 1604R	●			—	6.0	0.4	Linear	Corner Radius	3
ANB 1608R	●			—	6.0	0.8	Linear	Corner Radius	3
ANB 1600R-W	●			—	—	—	Arc-Shaped	Wiper	4
ANB 1600R-WS	—	—	—	●*2	—	—	Arc-Shaped	Wiper	5
ANBD	—	—	—	●*2	—	—	—	Dummy Blade	6

Fig 1

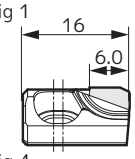


Fig 2

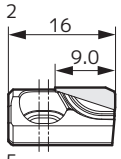


Fig 3

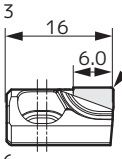
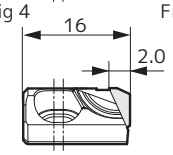
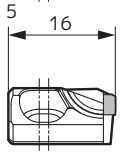


Fig 4



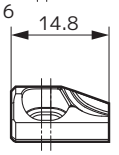
Wiper Blade

Fig 5



Wiper Blade

Fig 6



Dummy Blade

*1 Cast iron/aluminum alloy *2 Dummy blade (cemented carbide) for use with WS type, refer to page M40 "Precautions When Using Wiper Blades" (Mounting Precautions).

Recommended Cutting Conditions

Si Content of 12.6% or less

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	—	2,000 - **2,500** - 3,000	0.05 - **0.13** - 0.20	DA1000 SCV10

Si Content of over 12.6%

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	—	400 - **600** - 800	0.05 - **0.13** - 0.20	DA1000 DA90 SCV10

Combined Milling of Cast Iron/Aluminum Alloy

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
KN	Cast Iron/ Aluminum Alloy	—	300 - **400** - 500	0.05 - **0.13** - 0.20	DA90

Note
- The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors. For combined milling of cast iron/aluminum alloy, we recommend DA90.
- When using wiper blade WS type, refer to page M41.

Maximum Allowable Spindle Speed

Cat. No.	n max(min^{-1})
ANXS 16040RS04	25,000
16040RS06	25,000
16050RS04	25,000
16050RS06	25,000
16050RS09	25,000
16063RS06	22,000
16063RS08	22,000
16063RS12	22,000
16080RS06	20,000
16080RS10	20,000
16080RS14	20,000
16100RS08	18,000
16100RS12	18,000
16100RS18	18,000
16125RS10	16,000
16125RS14	16,000
16125RS22	16,000
ANXS 16063R06	22,000
16063R08	22,000
16063R12	22,000
16080R06	20,000
16080R10	20,000
16080R14	20,000
16100R08	18,000
16100R12	18,000
16100R18	18,000
16125R10	16,000
16125R14	16,000
16125R22	16,000

*The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.

Parts

Applicable Cutter	Cap Screw	N·m	Wrench	Adjustment Screw	Adjustment Wrench	Centre Bolt	N·m
ANXS 16040RS○○	BXA0310IP	2.0	TRXW10IP	HFJ	ANT	BXH0825-D13	15
ANXS 16050RS○○						BXH1030-D16	25
ANXS 16063RS○○							
ANXS 16080RS○○						BXH1235-D33	50
ANXS 16100RS○○						BXH1635-D40	100
ANXS 16125RS○○						BXH2036-D50	200
ANXS 16063R○○	BXA0310IP	2.0	TRXW10IP	HFJ	ANT	BXH1235-D18	40
ANXS 16080R○○						BXH1235-D33	50
ANXS 16100R○○						BXH1635-D40	100
ANXS 16125R○○						BXH2036-D50	200

The adjustment wrench (ANT) can also be used for height adjustment of the High-speed Cutter RF series and High-efficiency Cutter HF series.

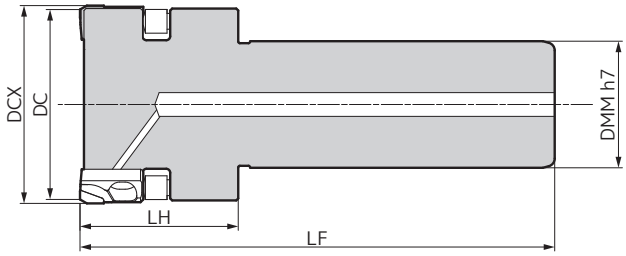
ANXS 16000E type

Rake Angle	Radial	-2° to 0°
	Axial	+5°

3mm 90°

Face Milling Shoulder Milling Groove Milling

Fig 1



Body (Steel)

Dimensions (mm)

Cat. No.	Stock	Max. Dia. DCX	Dia. DC	Shank Dia. DMM	Head LH	Overall Length LF	Number of Teeth	Weight (kg)	Fig
ANXS 16025E02	●	**25**	23	20	35	95	2	0.2	1
16030E03	●	**30**	28	20	35	95	3	0.3	1
16030E04	●	**30**	28	20	35	95	4	0.3	1
16032E03	●	**32**	30	20	35	95	3	0.3	1
16032E04	●	**32**	30	20	35	95	4	0.3	1
16040E04	●	**40**	38	20	40	100	4	0.4	1
16040E06	●	**40**	38	20	40	100	6	0.5	1
16050E04	●	**50**	48	32	40	120	4	1.0	1
16050E06	●	**50**	48	32	40	120	6	1.0	1
16050E09	●	**50**	48	32	40	120	9	1.0	1

Blades are sold separately.
If using blades with corner radius (ANB1604R/ANB1608R), DC = DCX.
Weight indicated includes the weight with blades and other spare parts.

Identification Code

ANX	S	16	032	E	04
Series Code	Steel Body	Blade Size	Max. Dia.	Shank type	Number of Teeth

ANXS 16000E type

Expansion

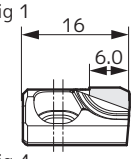
Blade

Dimensions (mm)

Grade Classification		SUMIDIA			SUMICRYSTAL V
Process	High-speed/Light Cutting	N	KN	KN	N
	Medium Cutting	N	KN	KN	
	Roughing	N	KN	KN	

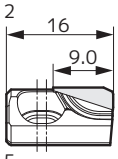
Cat. No.	DA1000	DA1090 (New)	DA90	SCV10	Cutting Edge Length	Corner Radius RE	Wiper Edge Shape	Applications	Fig
ANB 1600R-L	●			—	6.0	—	Linear	Low Cutting Force	1
ANB 1600R-G	●			—	6.0	—	Arc-Shaped	General-purpose	1
ANB 1600R-GB		●	●	—	6.0	—	Arc-Shaped	Composite Milling*1	1
ANB 1600R-H	●	—	—	—	6.0	—	Arc-Shaped	Strong Edge	1
ANB 1600R-GX	●			—	9.0	—	Arc-Shaped	Long Edge	2
ANB 1604R	●			—	6.0	0.4	Linear	Corner Radius	3
ANB 1608R	●			—	6.0	0.8	Linear	Corner Radius	3
ANB 1600R-W	●			—	—	—	Arc-Shaped	Wiper	4
ANB 1600R-WS	—	—	—	●*2	—	—	Arc-Shaped	Wiper	5
ANBD	—	—	—	●*2	—	—	—	Dummy Blade	6

Fig 1



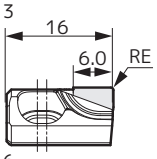
Wiper Blade

Fig 2



Wiper Blade

Fig 3



Dummy Blade

Fig 4

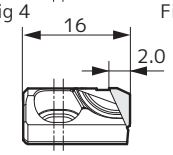


Fig 5

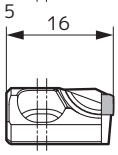
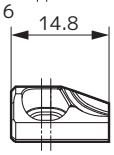


Fig 6



*1 Cast iron/aluminum alloy *2 Dummy blade (cemented carbide) for use with WS type, refer to page M40 "Precautions When Using Wiper Blades" (Mounting Precautions).

Recommended Cutting Conditions

Si Content of 12.6% or less

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	—	2,000 - **2,500** - 3,000	0.05 - **0.13** - 0.20	DA1000 SCV10

Si Content of over 12.6%

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	—	400 - **600** - 800	0.05 - **0.13** - 0.20	DA1000 DA90 SCV10

Combined Milling of Cast Iron/Aluminum Alloy

ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
K N	Cast Iron/ Aluminum Alloy	—	300 - **400** - 500	0.05 - **0.13** - 0.20	DA90

Note
- The above are the recommended conditions for ANX series overall. Use within the maximum allowable spindle speed.
- The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors. For combined milling of cast iron/aluminum alloy, we recommend DA90.
- When using wiper blade WS type, refer to page M41.

Maximum Allowable Spindle Speed

Cat. No.	n max(min^{-1})
ANXS 16025E02	10,000
16030E03	10,000
16030E04	10,000
16032E03	10,000
16032E04	10,000
16040E04	10,000
16040E06	10,000
16050E04	10,000
16050E06	10,000
16050E09	10,000

*The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.

Parts

Cap Screw		Wrench	Adjustment Screw	Adjustment Wrench
				
BXA0310IP	2.0	TRXW10IP	HFJ	ANT

The adjustment wrench (ANT) can also be used for height adjustment of the High-speed Cutter RF series and High-efficiency Cutter HF series.

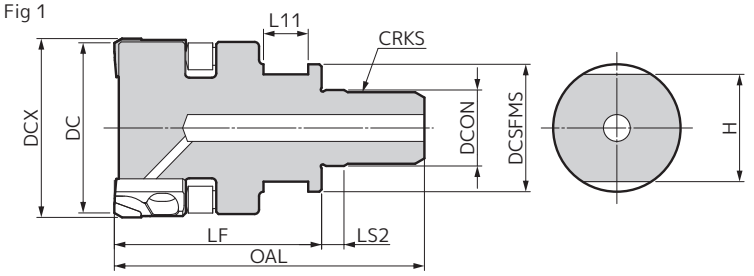
ANXS 16000M type

Rake Angle	Radial	-2° to 0°
	Axial	+5°

3mm 90°

Face Milling | Shoulder Milling | Groove Milling

Fig 1



Body (Steel)

Dimensions (mm)

	Cat. No.	Stock	Max. Dia. DCX	Dia. DC	Boss DCSFMS	Mounting Dia. DCON	Screw CRKS	Overall Length OAL	Effective Length LF	Length LS2	Flat L11	Width H	Number of Teeth	Weight (kg)	Fig
Metric	**ANXS 16025M12Z02**	●	**25**	23	23.0	12.5	**M12**	61	40	5	10	19	2	0.1	1
	16030M16Z03	●	**30**	28	28.5	17.0	**M16**	70	47	5	10	24	3	0.2	1
	16030M16Z04	●	**30**	28	28.5	17.0	**M16**	70	47	5	10	24	4	0.2	1
	16032M16Z03	●	**32**	30	28.5	17.0	**M16**	70	47	5	10	24	3	0.3	1
	16032M16Z04	●	**32**	30	28.5	17.0	**M16**	70	47	5	10	24	4	0.3	1
	16040M16Z04	●	**40**	38	28.5	17.0	**M16**	70	47	5	10	24	4	0.4	1
	16040M16Z06	●	**40**	38	28.5	17.0	**M16**	70	47	5	10	24	6	0.4	1

Blades are sold separately.
If using blades with corner radius (ANB1604R/ANB1608R), DC = DCX.
Weight indicated includes the weight with blades and other spare parts.

Arbors H253

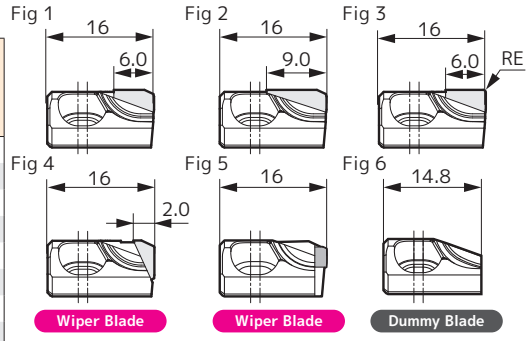
Expansion

Blade

Dimensions (mm)

Grade Classification		SUMIDIA			SUMICRYSTAL V
Process	High-speed/Light Cutting	N	KN	KN	N
	Medium Cutting	N	KN	KN	
	Roughing	N	KN	KN	

Cat. No.	DA1000	DA1090 (New)	DA90	SCV10	Cutting Edge Length	Corner Radius RE	Wiper Edge Shape	Applications	Fig
ANB 1600R-L	●			—	6.0	—	Linear	Low Cutting Force	1
ANB 1600R-G	●			—	6.0	—	Arc-Shaped	General-purpose	1
ANB 1600R-GB		●	●	—	6.0	—	Arc-Shaped	Composite Milling*1	1
ANB 1600R-H	●	—	—	—	6.0	—	Arc-Shaped	Strong Edge	1
ANB 1600R-GX	●			—	9.0	—	Arc-Shaped	Long Edge	2
ANB 1604R	●			—	6.0	0.4	Linear	Corner Radius	3
ANB 1608R	●			—	6.0	0.8	Linear	Corner Radius	3
ANB 1600R-W	●			—	—	—	Arc-Shaped	Wiper	4
ANB 1600R-WS	—	—	—	●	—	—	Arc-Shaped	Wiper	5
ANBD	—	—	—	●*2	—	—	—	Dummy Blade	6



*1 Cast iron/aluminum alloy
*2 Dummy blade (cemented carbide) for use with WS type, refer to page M40 "Precautions When Using Wiper Blades" (Mounting Precautions).

Recommended Cutting Conditions M45

Identification Code

ANX	S	16	032	M16	Z03
Series Code	Steel Body	Blade Size	Max. Dia.	Screw Size	Number of Teeth

Maximum Allowable Spindle Speed

Cat. No.	n max(min^{-1})
ANXS 16025M12Z02	10,000
16030M16Z03	10,000
16030M16Z04	10,000
16032M16Z03	10,000
16032M16Z04	10,000
16040M16Z04	10,000
16040M16Z06	10,000

*The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.

Parts

Cap Screw		Adjustment Screw	Wrench	Adjustment Wrench
	N·m			
BXA0310IP	**2.0**	HFJ	TRXW10IP	ANT

The adjustment wrench (ANT) can also be used for height adjustment of the High-speed Cutter RF series and High-efficiency Cutter HF series.

N·m Recommended Tightening Torque (N·m) ● mark: Standard stocked item (new product/expanded item)

MEMO

HF series

VIDEO OF CUTTING

■ Features

The HF series high-efficiency cutter for aluminum alloys employs a unique blade design to achieve machining without burrs.
HFFH type with coolant holes is now available as a BBT30 (BIG-PLUS™) arbor integrated version.

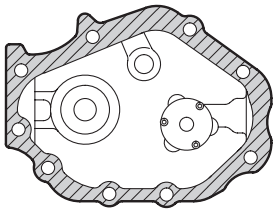
Work Material

· Aluminum and aluminum alloys
· Other non-ferrous metals

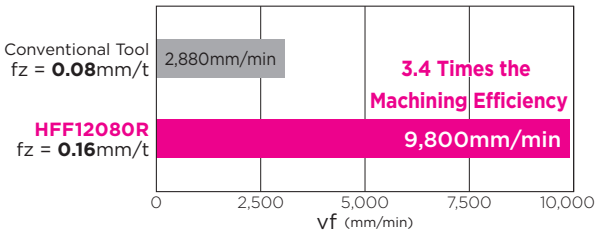
(Not suited for cast iron or steel.)

● Achieves high-efficiency milling with vf of over 20,000 mm/min thanks to its multi-blade design (3 teeth per inch)

High-feed, High-efficiency Milling with Multi-blade Design



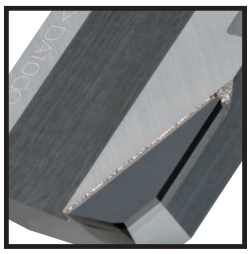
Workpiece: Aluminum Case (Frame Milling)
Tool: **HFF12080R-25.4** (ø80 10-tooth), Conventional Tool (ø80 6-tooth)



● Maximum Allowable Spindle Speed and Feed Rate

Cutter Dia. (mm)	nmax (min⁻¹)	vc (m/min)	fz (mm/t)	Max. No. of Teeth (pcs.)	vf (mm/min)
ø80	11,000	2,763	up to 0.2	10	up to 22,000
ø100	9,500	2,983	up to 0.2	12	up to 22,800
ø125	7,500	2,944	up to 0.2	15	up to 22,500

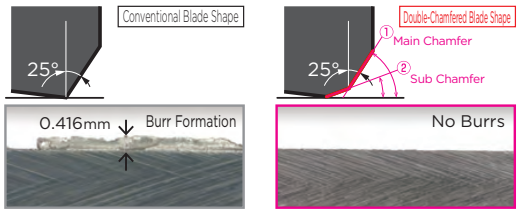
*The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.



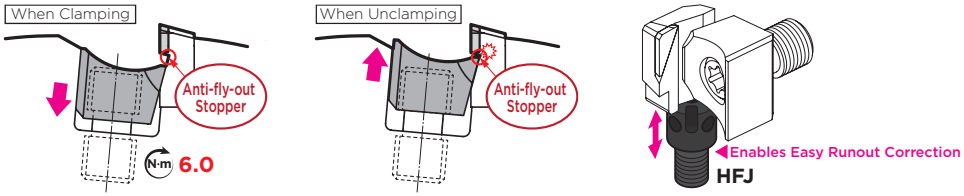
● Reduces burrs by using a double-chamfered blade type

Drastically reduces burrs by preventing plastic deformation that causes burrs.

Work Material: **A6061** Rolled Steel
Cutting Conditions: vc = **3,142**m/min, fz = **0.10**mm/t, ap = **0.5**mm, Dry



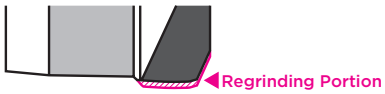
● Wedge clamp with anti-fly-out mechanism ensures safety and operability

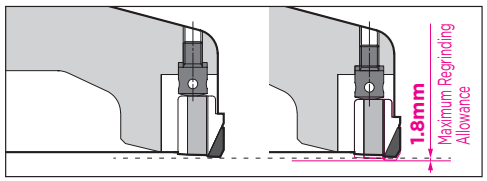


Ensure that the maximum allowable spindle speed (n max) specified for each cutter diameter is not exceeded. (See the table at upper right)

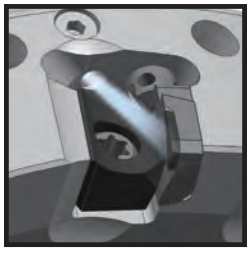
● Reduces running costs by drastically increasing blade regrinding allowance (to 1.8mm)

Assuming 0.2mm of regrinding each time, an edge can be used up to 10 times.
(Given conditions of normal wear with ap = **1.4**mm or less)





The regrinding allowance has been drastically increased compared to conventional screw-lock types.



● Internal coolant improves chip evacuation performance (HFFH type, HFFH-BBT30 type)

The internal coolant effectively prevents chips from becoming clogged or biting into the work material and achieves longer tool life. (Use an internal coolant compatible arbor)

*1: BIG-PLUS™ is a registered trademark of BIG DAISHOWA Co., Ltd.
*2: Can also be used with BT30 spindle machines.

N·m Recommended Tightening Torque (N·m)

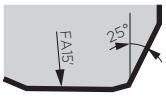
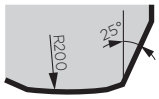
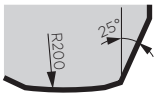
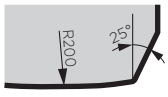
HF series

■ Product Range

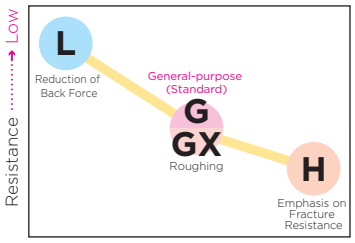
Type	Cat. No.	Dia. (mm) ø80	ø100	ø125
Shell	HFM 12000RS	6*	8	10*
	HFM 12000R (inch)	6	8*	10*
	HFF 12000RS	10*	12	15*
	HFF 12000R (inch)	10	12*	15*
	HFFH 12000RS	10*	12	15*
	HFFH 12000R (inch)	10	12*	15*
	HFFH 12000R-BBT30	10	12	15

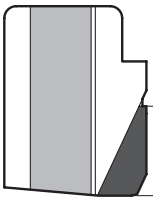
Number in ● shows the number of teeth (inch) Inch Bore *mark: Different diameter shanks available

■ Blade Selection Guide

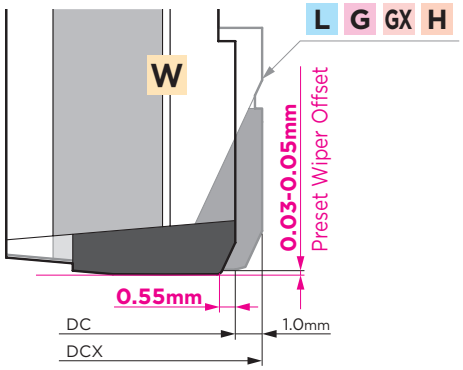
Work Material	N				
Applications	Reduction of Back Force	General-purpose	Roughing	Emphasis on Fracture Resistance	Finishing
Features	Low Cutting Force	Standard	Long Edge	High Strength	Wiper
Type	L type	G type	GX type	H type	W type
Cutting Edge Shape					
Edge Length (*)	6.0mm	6.0mm	9.0mm	6.0mm	2.0mm

■ Blade Selection Reference



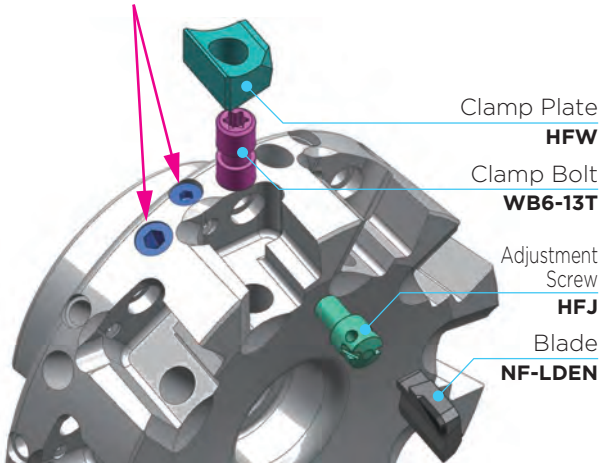


■ Wiper Blade Offset Position



■ Structure of HF series

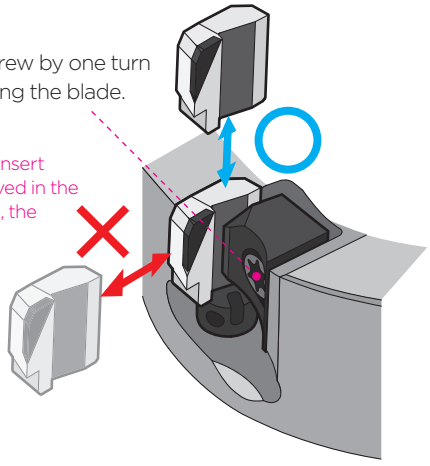
The axial set screw and balance adjustment screw hole have an embedded special material that prevents the insertion of screwdrivers or hex wrenches.



■ Blade Mounting Direction

Loosen the screw by one turn before removing the blade.

⚠ Note that if the insert is forcibly removed in the wrong direction, the part may break.



High-efficiency Cutter for Aluminum Alloys

HFM 12000RS/R type

Rake Angle		
Radial	4°	
Axial	10°	

3mm 90°

Face Milling

Fig 1

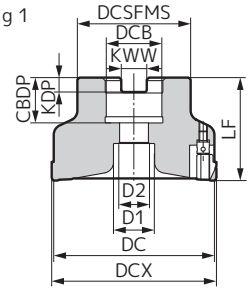


Fig 2

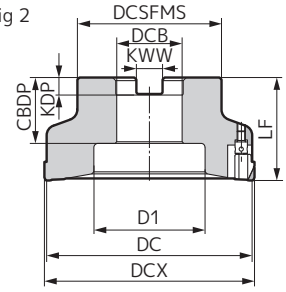
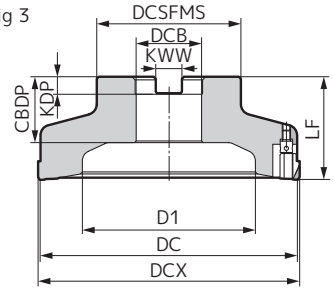


Fig 3



Body (Fine Pitch: 2-teeth/Inch)

Dimensions (mm)

	Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Boss DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CBDP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
Metric	**HFM 12080RS-22**	●	**80**	82	50	40	**22**	10.4	6.3	20	18	11	6	1.0	1
	12080RS-27	●	**80**	82	55	50	**27**	12.4	7	22	20	14	6	1.2	1
	12100RS-32	●	**100**	102	70	50	**32**	14.4	8	32	54	—	8	1.7	2
	12125RS-32	●	**125**	127	70	50	**32**	14.4	8	32	84	—	10	2.2	3
	12125RS-40	●	**125**	127	90	63	**40**	16.4	9	35	84	—	10	2.8	3
Inch	**HFM 12080R-25.4**	●	**80**	82	50	50	**25.4**	9.5	6	30	35	—	6	1.0	2
	12100R-25.4	●	**100**	102	50	50	**25.4**	9.5	6	30	54	—	8	1.5	2
	12100R-31.75	●	**100**	102	70	50	**31.75**	12.7	8	32	54	—	8	1.7	2
	12125R-25.4	●	**125**	127	50	50	**25.4**	9.5	6	30	84	—	10	2.0	3
	12125R-31.75	●	**125**	127	70	50	**31.75**	12.7	8	32	84	—	10	2.2	3
	12125R-38.1	●	**125**	127	80	63	**38.1**	15.9	10	36	84	—	10	2.5	3

Blades are sold separately.

Blade

Dimensions (mm)

Grade Classification		SUMIDIA
Process	High-speed/Light Cutting	N
	Medium Cutting	N
	Roughing	N

Cat. No.	DA1000	Cutting Edge Length	Wiper Edge Shape	Applications	Fig
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Cutting Force	1
12T3ZDFR-G	●	6.0	Arc-Shaped	General-purpose	1
12T3ZDTR-H	●	6.0	Arc-Shaped	Strong Edge	1
12T3ZDFR-GX	●	9.0	Arc-Shaped	Long Edge	2
12T3ZDFR-W	●	2.0	Arc-Shaped	Wiper	3

Fig 1

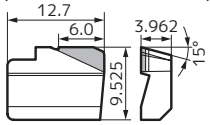


Fig 2

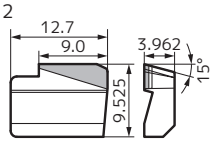
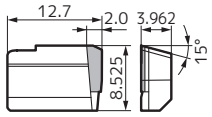


Fig 3 Wiper Blade



Parts

(Sold Separately)

Clamp Plate	Bolt		Adjustment Screw	Wrench	Wrench	Assembly Wrench
						
HFW	WB6-13T	6.0	HFJ	TTX20	RFT	HFVT

Identification Code

HF M 12 080 R S - 22

Series Code	Fine Pitch	Blade Size	Dia.	Feed Direction	Metric Bore	Hole Dia.

Recommended Cutting Conditions

Si Content of 12.6% or less

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	2,000-**2,500**-3,000	0.05-**0.13**-0.20	DA1000

Note
- The cutting conditions are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.
- The above are the recommended conditions for HF series overall. Use within the maximum allowable spindle speed.

Si Content of over 12.6%

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	400-**600**-800	0.05-**0.13**-0.20	DA1000

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

N·m Recommended Tightening Torque (N·m)

HFF 12000RS/R type

Rake Angle		
	Radial	4°
	Axial	10°

3mm 90°

Face Milling

Fig 1

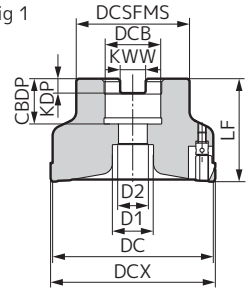


Fig 2

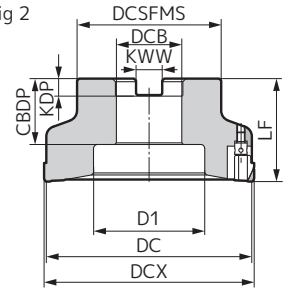
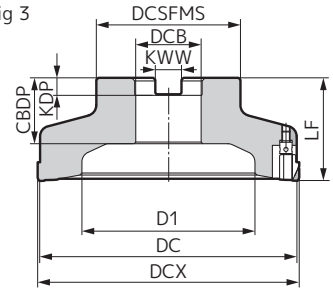


Fig 3



Body (Extra Fine Pitch: 3-teeth/Inch)

Dimensions (mm)

	Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Boss DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CBDP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
Metric	**HFF 12080RS-22**	●	**80**	82	50	40	**22**	10.4	6.3	20	18	11	10	1.0	1
	12080RS-27	●	**80**	82	55	50	**27**	12.4	7	22	20	14	10	1.2	1
	12100RS-32	●	**100**	102	70	50	**32**	14.4	8	32	54	—	12	1.7	2
	12125RS-32	●	**125**	127	70	50	**32**	14.4	8	32	84	—	15	2.2	3
	12125RS-40	●	**125**	127	90	63	**40**	16.4	9	35	84	—	15	2.8	3
Inch	**HFF 12080R-25.4**	●	**80**	82	50	50	**25.4**	9.5	6	30	35	—	10	1.0	2
	12100R-25.4	●	**100**	102	50	50	**25.4**	9.5	6	30	54	—	12	1.5	2
	12100R-31.75	●	**100**	102	70	50	**31.75**	12.7	8	32	54	—	12	1.7	2
	12125R-25.4	●	**125**	127	50	50	**25.4**	9.5	6	30	84	—	15	2.0	3
	12125R-31.75	●	**125**	127	70	50	**31.75**	12.7	8	32	84	—	15	2.2	3
	12125R-38.1	●	**125**	127	80	63	**38.1**	15.9	10	36	84	—	15	2.5	3

Blades are sold separately.

Blade

Dimensions (mm)

Grade Classification		SUMIDIA
Process	High-speed/Light Cutting	N
	Medium Cutting	N
	Roughing	N

Cat. No.	DA1000	Cutting Edge Length	Wiper Edge Shape	Applications	Fig
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Cutting Force	1
12T3ZDFR-G	●	6.0	Arc-Shaped	General-purpose	1
12T3ZDTR-H	●	6.0	Arc-Shaped	Strong Edge	1
12T3ZDFR-GX	●	9.0	Arc-Shaped	Long Edge	2
12T3ZDFR-W	●	2.0	Arc-Shaped	Wiper	3

Fig 1

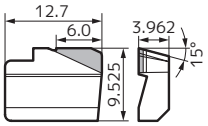


Fig 2

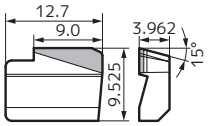
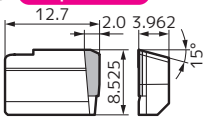


Fig 3 Wiper Blade



Parts

(Sold Separately)

Clamp Plate	Bolt		Adjustment Screw	Wrench	Wrench	Assembly Wrench
		N·m				
HFW	WB6-13T	6.0	HFJ	TTX20	RFT	HFVT

Identification Code

HF F 12 080 R S - 22

Series Code	Extra Fine Pitch	Blade Size	Dia.	Feed Direction	Metric Bore	Hole Dia.

Recommended Cutting Conditions

Si Content of 12.6% or less

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	2,000-**2,500**-3,000	0.05-**0.13**-0.20	DA1000

Note
- The cutting conditions are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.
- The above are the recommended conditions for HF series overall. Use within the maximum allowable spindle speed.
- For groove milling, adjust the feed rate to around 70% of the above values.

Si Content of over 12.6%

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	400-**600**-800	0.05-**0.13**-0.20	DA1000

Note
- The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.
- For groove milling, adjust the feed rate to around 70% of the above values.

N·m Recommended Tightening Torque (N·m)

High-efficiency Cutter for Aluminum Alloys

HFFH 12000RS/R type

Rake Angle		
Rake	Radial	4°
Angle	Axial	10°

3mm 90°

Face Milling

Fig 1

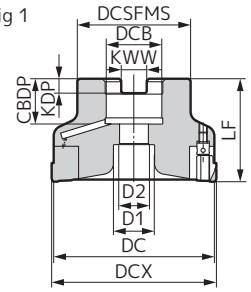


Fig 2

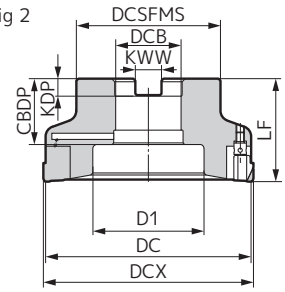
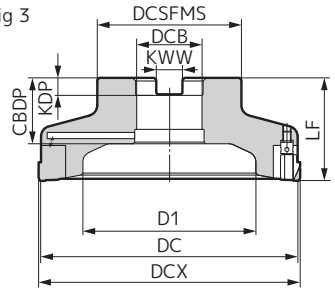


Fig 3



Body (Extra Fine Pitch: 3-teeth/Inch) With Coolant Holes

Dimensions (mm)

	Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Boss DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CBDP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
Metric	**HFFH 12080RS-22**	●	**80**	82	50	40	**22**	10.4	6.3	20	18	11	10	1.0	1
	12080RS-27	●	**80**	82	55	50	**27**	12.4	7	22	20	14	10	1.2	1
	12100RS-32	●	**100**	102	70	50	**32**	14.4	8	32	54	—	12	1.7	2
	12125RS-32	●	**125**	127	70	50	**32**	14.4	8	32	84	—	15	2.2	3
	12125RS-40	●	**125**	127	90	63	**40**	16.4	9	35	84	—	15	2.8	3
Inch	**HFFH 12080R-25.4**	●	**80**	82	50	50	**25.4**	9.5	6	30	35	—	10	1.0	2
	12100R-25.4	●	**100**	102	50	50	**25.4**	9.5	6	30	54	—	12	1.5	2
	12100R-31.75	●	**100**	102	70	50	**31.75**	12.7	8	32	54	—	12	1.7	2
	12125R-25.4	●	**125**	127	50	50	**25.4**	9.5	6	30	84	—	15	2.0	3
	12125R-31.75	●	**125**	127	70	50	**31.75**	12.7	8	32	84	—	15	2.2	3
	12125R-38.1	●	**125**	127	80	63	**38.1**	15.9	10	36	84	—	15	2.5	3

Blades are sold separately.

Blade

Dimensions (mm)

Grade Classification		SUMIDIA
Process	High-speed/Light Cutting	N
	Medium Cutting	N
	Roughing	N

Cat. No.	DA1000	Cutting Edge Length	Wiper Edge Shape	Applications	Fig
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Cutting Force	1
12T3ZDFR-G	●	6.0	Arc-Shaped	General-purpose	1
12T3ZDTR-H	●	6.0	Arc-Shaped	Strong Edge	1
12T3ZDFR-GX	●	9.0	Arc-Shaped	Long Edge	2
12T3ZDFR-W	●	2.0	Arc-Shaped	Wiper	3

Fig 1

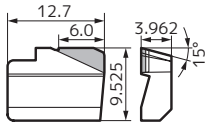


Fig 2

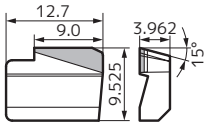
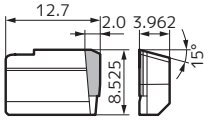


Fig 3 Wiper Blade



Parts

(Sold Separately)

Clamp Plate	Bolt		Wrench	Adjustment Screw	Wrench	Assembly Wrench
		N·m				
HFW	WB6-13T	6.0	TTX20	HFJ	RFT	HFVT

Identification Code

HF	F	H	12	080	R	S	-	22
Series Code	Extra Fine Pitch	With Oil Hole	Blade Size	Dia.	Feed Direction	Metric Bore		Hole Dia.

Recommended Cutting Conditions

Si Content of 12.6% or less

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	2,000-**2,500**-3,000	0.05-**0.13**-0.20	DA1000

Note
- The above are the recommended conditions for HF series overall. Use within the maximum allowable spindle speed.
- The cutting conditions are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

Si Content of over 12.6%

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	400-**600**-800	0.05-**0.13**-0.20	DA1000

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

N·m Recommended Tightening Torque (N·m)

High-efficiency Cutter for Aluminum Alloys

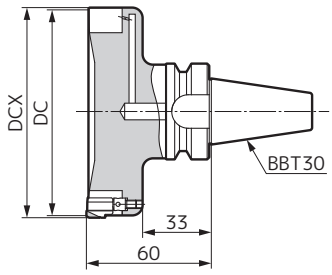
HFFH 12000R-BBT30 type

Rake Angle	Radial	4°
	Axial	10°

3mm 90°

Face Milling

Fig 1



Body (Extra Fine Pitch: 3-teeth/Inch) With Coolant Holes

Dimensions (mm)

	Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Number of Teeth	Weight (kg)	Fig
Inch	**HFFH 12080R-BBT30**	●	**80**	82	10	1.6	1
	12100R-BBT30	●	**100**	102	12	2.4	1
	12125R-BBT30	●	**125**	127	15	2.6	1

Blades are sold separately.

Blade

Dimensions (mm)

Grade Classification		SUMIDIA
Process	High-speed/Light Cutting	N
	Medium Cutting	N
	Roughing	N

Cat. No.	DA1000	Cutting Edge Length	Wiper Edge Shape	Applications	Fig
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Cutting Force	1
12T3ZDFR-G	●	6.0	Arc-Shaped	General-purpose	1
12T3ZDTR-H	●	6.0	Arc-Shaped	Strong Edge	1
12T3ZDFR-GX	●	9.0	Arc-Shaped	Long Edge	2
12T3ZDFR-W	●	2.0	Arc-Shaped	Wiper	3

Fig 1

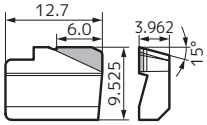


Fig 2

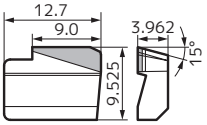
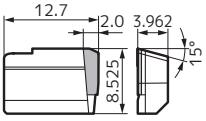


Fig 3 Wiper Blade



Parts

(Sold Separately)

Clamp Plate	Bolt		Wrench	Adjustment Screw	Wrench	Assembly Wrench
		N·m				
HFW	WB6-13T	6.0	TTX20	HFJ	RFT	HFVT

Identification Code

HF Series Code | **F** Extra Fine Pitch | **H** With Oil Hole | **12** Blade Size | **080** Dia. | **R** Feed Direction | **- BBT30** Supported Arbor Symbol

Recommended Cutting Conditions

Si Content of 12.6% or less

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	2,000-**2,500**-3,000	0.05-**0.13**-0.20	DA1000

Note
- The above are the recommended conditions for HF series overall. Use within the maximum allowable spindle speed.
- The cutting conditions are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

Si Content of over 12.6%

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Blade Grade
N	Aluminum Alloy	400-**600**-800	0.05-**0.13**-0.20	DA1000

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

* BIG-PLUS™ is a registered trademark of BIG DAISHOWA Co., Ltd.
* Can also be used with BT30 spindle machines.

N·m Recommended Tightening Torque (N·m)

RF series

■ Features

The RF series cutter has a lightweight body designed for high-speed, high-performance roughing to finish milling of aluminum alloys and other non-ferrous metals.

■ Work Material

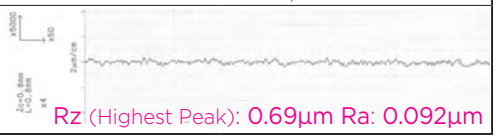
- Aluminum and aluminum alloys
- Other Non-Ferrous Metals

(Not suited for cast iron or steel.)

- **From Roughing to Finishing Processes:** Roughing: Economical carbide insert / Finishing: High-precision SUMIDIA insert
- **Strong and Lightweight Body:** Special aluminum alloy body. 40% lighter than steel cutters. Hard anodizing. Improved efficiency with higher spindle speeds, lower spindle loads and shorter tool change time
- **Safety Design:** Prevents inserts from dislodging from cutter due to centrifugal force. (Speeds must be within max. recommended conditions)
  To prevent warping, wedges are not used in the cutter construction
- **Easy Runout Adjustment:** External setting gauge is used for easy tool presetting. High-precision cutter construction - units fitted are within 10µm runout even before setting

■ Surface Finish

- Process: Finish Milling
- Machine: Vertical Machining Centre
- Arbor: HSK63A
- Work Material: Si 10 to 12% Al Alloy
- Cutter: RF4100R 6-teeth (1 Wiper)
- Grade: SUMIDIA (DA1000)
- vc = 4,990m/min
- n = 15,900min^{-1}
- vf = 11,400mm/min
- fz = 0.12mm/t
- ap = 0.5mm, Wiper ap = 0.03mm, Dry



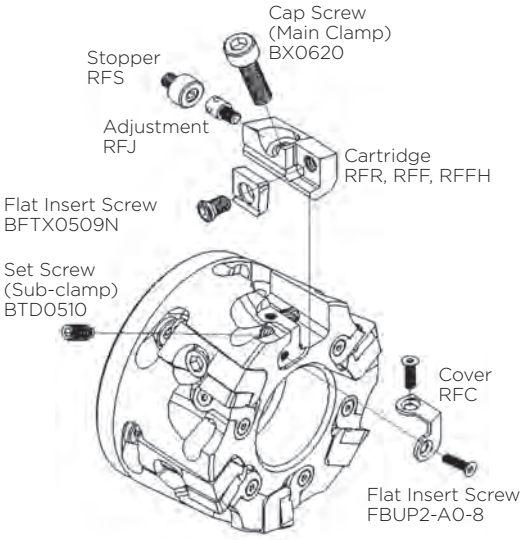
Rz (Highest Peak): 0.69µm Ra: 0.092µm

● Maximum Allowable Spindle Speed

Cat. No.	n max (min $^{-1}$)
RF4080R	17,000
RF4100R	15,900
RF4125R	13,500
RF4160R	11,000
RF4200R	9,000
RF4250R	7,600
RF4315R	6,000

*The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.

■ Structure of RF series



■ Recommended Cutting Conditions

Si Content of 12% or less

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Insert Grade
N	Aluminum Alloy	2,000-**2,500**-3,000	0.05-**0.13**-0.20	DA1000 DA2200
		300-**650**-1,000	0.05-**0.13**-0.20	H1

Note
- The above are the recommended conditions for RF series overall. Use within the maximum allowable spindle speed.
- The cutting conditions are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

Si Content of over 12%

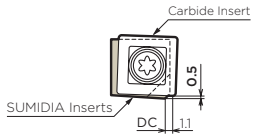
ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Insert Grade
N	Aluminum Alloy	400- **600** -800	0.05- **0.13** -0.20	DA1000 DA2200
		200- **300** -400	0.05- **0.13** -0.20	H1

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

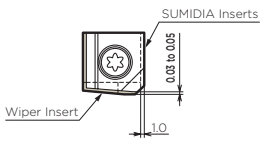
● Recommended Cutting Edge Position

We recommend positioning as in the figure below when mounting carbide inserts or SUMIDIA inserts (blades).

● When roughing and finishing in the same process



● When using wiper edge



■ Product Range

Type	Cat. No.	Dia. (mm)						
		ø80	ø100	ø125	ø160	ø200	ø250	ø315
Shell	RF 4000R (Inch)	6	6	8	10	12	16	18

Number in ●○ shows the number of teeth (Inch) Inch Bore

⚠ CAUTIONS (For more details, refer to the instruction manual included with the product)

As it is possible to mix different types of inserts/blades, it is important to take note of the following.

- Do not mix reground and new inserts or inserts with a different regrinding allowance on the same cutter.
- Carbide and SUMIDIA inserts must be arranged alternately.
- When using a combination of SUMIDIA blades and inserts, ensure proper balance by mounting the same type of cutting edges on opposite sides of the cutter.

RF 4000R type

Rake Angle		
Radial	4°	
Axial	10°	

3mm 90° (SUMIDIA Insert) 10mm 87° (Carbide Insert) Face Milling

RF4080R only

Fig 1

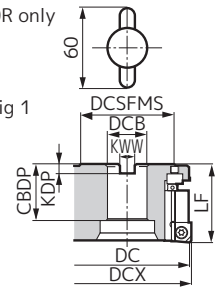
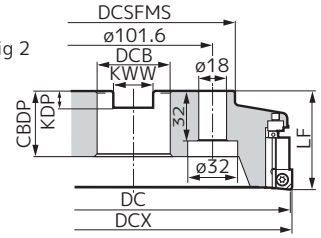


Fig 2



Body

Dimensions (mm)

	Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Boss DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CBDP	Number of Teeth	Weight (kg)	Fig
Inch	**RF 4080R**	●	**80**	82	60	50	**25.4**	9.5	6	30	6	0.7	1
	4100R	●	**100**	102	75	50	**31.75**	12.7	8	38	6	1.0	1
	4125R	●	**125**	127	75	63	**38.1**	15.9	10	38	8	1.6	1
	4160R	●	**160**	162	100	63	**50.8**	19.1	11	38	10	2.6	1
	4200R	●	**200**	202	130	63	**47.625**	25.4	14	42	12	3.6	2
	4250R		**250**	252	130	63	**47.625**	25.4	14	42	16	6.0	2
	4315R		**315**	317	240	80	**47.625**	25.4	14	42	18	11.0	2

Cartridges, blades and inserts are sold separately.
Use a flanged bolt to mount the cutter to the arbor.

Insert/Cartridge

Dimensions (mm)

Grade Classification		Cemented Carbide	DLC	SUMIDIA		SUMICRYSTAL
Process	High-speed/Light Cutting	N	N	N	N	N
	Medium Cutting	N	N	N	N	
	Roughing	N	N	N	N	

Refer to page M68 for details of SUMICRYSTAL.

*When using large depth of cut (ap = 3mm or longer) with RF4080R, use the RFFH cartridge. (RFF is possible for normal cutting.)

Cat. No.	H1	DL1000	DA1000	DA2200	SC10	Fig	Cartridges Cat. No.	Cartridges Stock	Fig
SDET 1204ZDFR	●	●	—	—	—	3	RFR	●	1
NF-SNEW 1204ADFR	—	—	●	▲	—	4	RFF	●	2
120404ADFR-H	—	—	●	—	—	5	RFF (Others) *RFFH(RF4080R)	●	2
1204ADFR-W	—	—	●	▲	—	6	RFF	●	2
SNEW 1204ADFR-WS	—	—	—	—	●	7	RFF	●	2

Cartridges

Fig 1(RFR)

Fig 2(RFF)

Fig 3

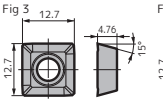


Fig 4

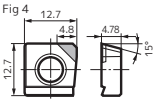


Fig 5

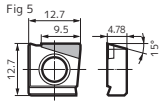


Fig 6 Wiper Insert

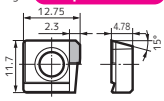
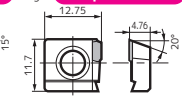
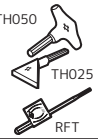


Fig 7 Wiper Insert



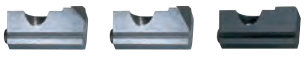
An "H" at the end of the part number indicates large depth of cut type, while "W" or "WS" indicates a wiper insert.

Parts

Cover	Stopper	Cap Screw		Set Screw		Flat Insert Screw	Adjustment	Flat Insert Screw		Wrench	Wrench
		Main Clamp 	N·m	Sub-clamp 	N·m	Cover Mounting 			N·m	TH050 TH025 RFT 	
RFC	RFS	BX0620	**10.0**	BTD0510	**3.0**	FBUP2-A0-8	RFJ	BFTX0509N	**5.0**	TH050 TH025 RFT	TTX20

Blades/Dummy Blades

RFB RFBW RFD



Product Name	Cat. No.	SUMIDIA DA2200
SUMIDIA Blade	RFB	●
SUMIDIA Wiper Blade	RFBW	●
Dummy Blade	RFD	●(Steel)

Use dummy blades for unused teeth to protect the body as well as maintaining balance.

Setting Parts

Inserts can be set in the cartridge with high precision outside the machine in advance.

Setting Gauge
RF-SET
(Sold Separately/ Standard Stock)
*Dial gauge is not included.

Clamp Jig
RF-JIG
(Sold Separately/ Standard Stock)

Internal Coolant Attachments

For internal coolant supply, use an internal coolant holder or a commercially available clamp bolt with coolant holes. Typical examples are given in the table below. For specifications, contact each manufacturer directly.

Body Cat. No.	Internal Coolant Holder	Standard Clamp Bolt with Coolant Hole (Example)	
		MST Corporation	BIG DAISHOWA
RF 4080R	—	MBC-M12	TMBA-M12
RF 4100R	—	MBC-M16	TMBA-M16
RF 4125R	—	MBC-M20	TMBA-M20
RF 4160R	—	MBC-M24	TMBA-M24
RF 4200R	RF-CLT	—	—
RF 4250R	RF-CLT	—	—
RF 4315R	RF-CLT	—	—

Direction of Coolant Streams

Internal Coolant Holders
RF-CLT (Standard Stock)

Standard Clamp Bolt with Coolant Hole
[Typical Example] MBC-M12 to M24
(Sold Separately)

N·m Recommended Tightening Torque (N·m) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

SRF series

■ Features

The SRF series is ideal for aluminum alloy machining on high-performance small machines.

- **Ideal for small machines**
  Especially reliable on BT30 class small machines.
- **From roughing to finishing processes**
  Utilises SUMIDIA DA1000 inserts with effective cutting edge length of 5mm.
- **Economical NF type inserts:**
  NF type SUMIDIA inserts with tough DA1000 grade lower tooling costs.
- **High-speed cutting with SUMIDIA:**
  Maximum spindle speeds of up to n = 20,000min^{-1}
  (Please operate within the maximum allowable spindle speed of the machine and holder used)
  *The maximum allowable spindle speeds are set to prevent the inserts from dislodging by centrifugal force.
- **Simple runout adjustment mechanism:**
  Simple direct insert mounting design with easy fine-adjustment for runout precision.

■ Recommended Cutting Conditions

Si Content of 12% or less

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Insert Grade
N	Aluminum Alloy	2,000- **3,000** -4,000	0.05-**0.13**-0.20	DA1000

Note
- The above are the recommended conditions for SRF series overall. Use within the maximum allowable spindle speed.
- The cutting conditions are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

Si Content of over 12%

ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Insert Grade
N	Aluminum Alloy	400-**600**-800	0.05-**0.13**-0.20	DA1000

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

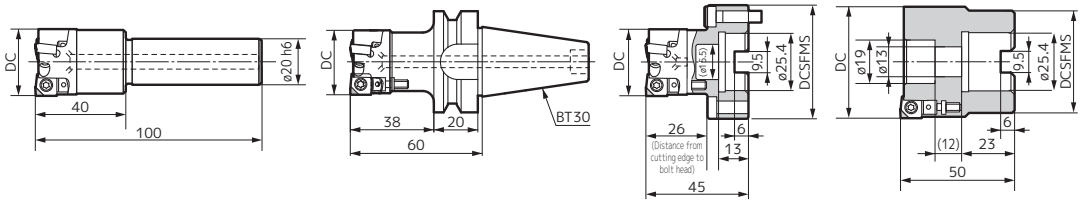
SRF series

Rake Angle	Radial	-2° to 4°
	Axial	6°

5mm 90°

Face Milling Shoulder Milling

Fig 1 Fig 2 Fig 3 Fig 4



Body

Dimensions (mm)

	Cat. No.	Stock	Dia. DC	Boss DCSFMS	Number of Teeth	Weight (kg)	Fig
Inch	SRF 30R-ST	●	30	—	3	0.34	1
	40R-ST	●	40	—	4	0.50	1
	SRF 30R-BT30	●	30	—	3	0.57	2
	40R-BT30	●	40	—	4	0.72	2
	SRF 30R	●	30	50.0	3	0.27	3
	40R	●	40	50.0	4	0.35	3
	50R	●	*50	46.5	5	0.59	4
	63R	●	*63	45.0	6	0.67	4

Inserts are sold separately.

■ Product Range

Type	Cat. No.	Dia. (mm) ø30	ø40	ø50	ø63
Shell	SRF 30R(-ST)	3			
	SRF 40R(-ST)		4		
	SRF 30R-BT30	3			
	SRF 40R-BT30		4		
	SRF 50R (inch)			5	
	SRF 63R (inch)				6

Number in ● shows the number of teeth (inch) Inch Bore

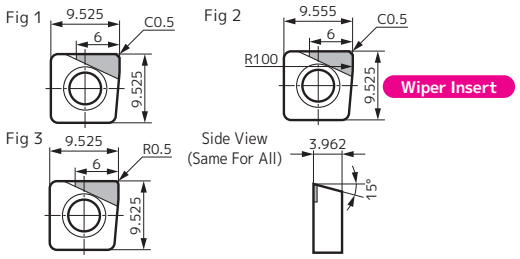
Note For mounting the cutters marked with * to an arbor, use a hex socket bolt (JIS B1176) M12 x 30 to 35mm.

Insert

Dimensions (mm)

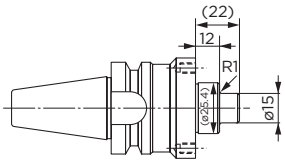
Grade Classification		SUMIDIA	
Process	High-speed/Light Cutting	N	N
	Medium Cutting	N	N
	Roughing	N	N

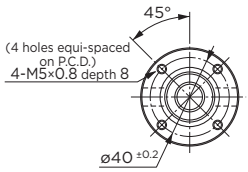
Cat. No.	DA1000	DA2200	Cutting Edge Shape	Fig
NF-SNEW 09T3ADTR	●	▲	Standard	1
09T3ADTR-U	●	▲	Wiper Flat	2
09T3ADTR-R	●	▲	Corner Radius	3



Recommended Cutting Conditions H240

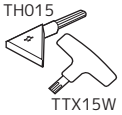
- Standard inserts and wiper inserts can be used on the same cutter body.
- Standard inserts with corner radius should be used where chatter is present. These cannot be used with wiper inserts.
- Inserts can be reground 3 times (up to minimum IC diameter of 9.225mm), but the cutting edge height changes by the reground amount.
- Do not mix new and reground inserts or inserts with different regrind amounts on the same cutter.
- When using reground inserts, it is advisable to re-confirm cutting edge position with a tool pre-setter.
- Arbor for SRF30R, SRF40R

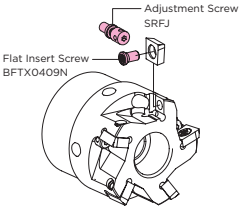




When using SRF30R and SRF40R cutters, the arbor needs to be modified as shown above.
(1. Reduce part of the arbor's adapter shaft length from ø25.4 to ø15.
2. Add 4 tap holes for (M5) mounting bolts.) Use hex socket bolts M5 × 20mm for securing the body.

Parts

Flat Insert Screw		Adjustment Screw	Wrench
	N·m		 TH015 TTX15W
BFTX0409N	4.0	SRFJ	TH015 TTX15W

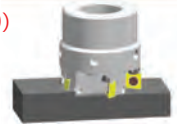


Maximum Depth of Cut (SRF50R, 5-teeth)

The table below contains guidelines on the maximum depth of cut, determined from internal tests. 'O' marks indicate the possible application range. Actual cutting conditions should be set based on the actual machine and workpiece characteristics.

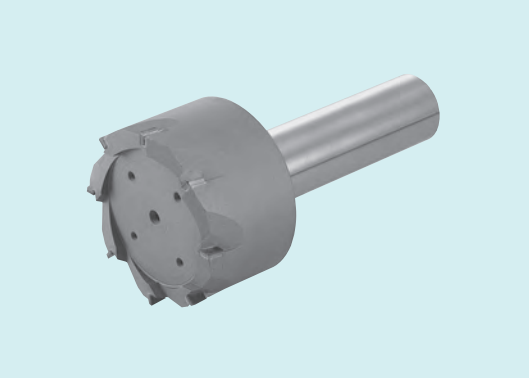
Depth of Cut ap (mm) \ Feed Rate	Feed Rate (vf) (mm/min) 2,500	4,000	5,000
	Feed Rate Per Tooth (fz) (mm/t) 0.05	0.08	0.10
0.5	○	○	○
1.0	○	○	○
1.5	○	○	○
2.0	○	○	○
2.5	○	○	○
3.0	○	○	○
3.5	○	○	—
4.0	○	—	—
4.5	○	—	—
5.0	○	—	—

Cutting Conditions
Cutter : SRF50R
Insert : NF-SNEW 09T3ADTR (DA1000)
n = 10,000min^{-1}
Arbor : BT30 FMA25.4-45
Workpiece : A-5052
Width : Maximum depth of cut at 35mm



(N·m) Recommended Tightening Torque (N·m) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability)

DFE series



■ Features

- Supports small machines. Small diameter shank type cutter.
- Multiple brazed teeth for high feed milling.
- With excellent fracture resistance and sharpness, DA2200 is optimal for milling of aluminum and non-ferrous metals.
- Through-tool oil holes for high speed machining.

■ Body

Fig 1

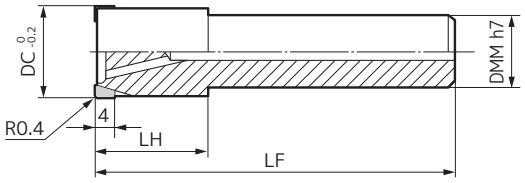
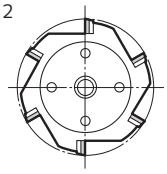


Fig 2



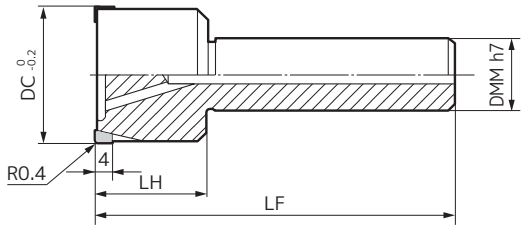
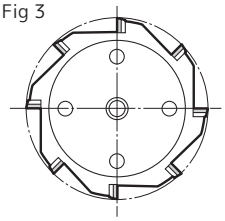
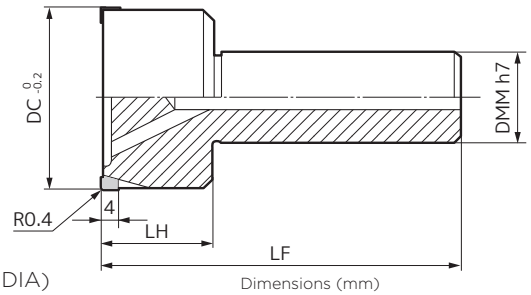


Fig 3





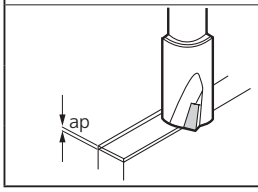
(SUMIDIA)

Dimensions (mm)

Cat. No.	DA2200	Dia. DC	Overall Length LF	Head LH	Shank Dia. DMM	Number of Teeth	Fig
DFE 4200GS	●	**20**	80	25	16	4	1
DFE 6250GS	●	**25**	80	25	16	6	2
6300GS	●	**30**	80	25	16	6	2
DFE 8400GS	●	**40**	80	25	16	8	3
8500GS	●	**50**	80	25	20	8	3

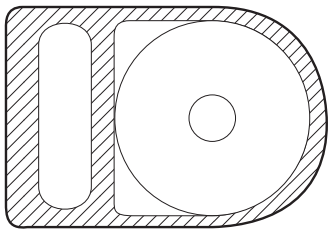
■ Recommended Cutting Conditions

Tooling



ISO	Work Material	Cutting Speed vc (m/min) Min. - **Optimum** - Max.	Feed Rate fz (mm/t) Min. - **Optimum** - Max.	Insert Grade
N	Aluminum Alloy	200-**800**-2,000	0.02-**0.05**-0.10	DA2200

■ Application Examples



Work Material	Cutting Conditions	Results
ADC12 Aluminum Alloy Motor Casing Part	Tool: DFE8400GS Cutting Conditions: vc = 1,500m/min n = 11,940min^{-1} fz = 0.03mm/t vf = 2,865mm/min ap = 0.5mm Wet	· Good machined surface as burrs do not occur. · More cutting teeth than indexable type cutters, and cycle time is much shorter.

SUMIDIA BINDERLESS Endmill series

VIDEO OF CUTTING

■ General Features

SUMIDIA BINDERLESS is polycrystalline diamond that directly binds nano-sized diamond particles with high strength without using any binders. Harder than single-crystal diamond, it has no cleavability, enabling machining of hard brittle materials such as cemented carbide and making new machining methods possible.

■ Features

● **Ideal for Finishing of Hard Brittle Materials Including Cemented Carbide**
Provides excellent machined surface quality thanks to a sharp cutting edge and optimised edge treatment.

● **Enables High-precision Machining and Achieves Long Tool life.**
Maintains excellent dimensional tolerance for a long time thanks to the high contour accuracy of the cutting edge and excellent wear resistance of the diamond material.

SUMIDIA BINDERLESS Radius Endmills

NPDRS type

Corner r

For Side Milling and Rounded Base Milling

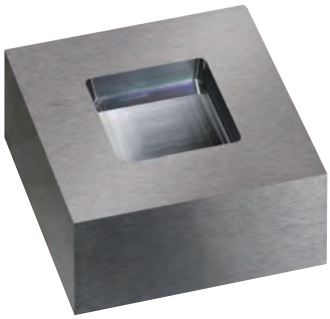
SUMIDIA BINDERLESS Ballnose Endmills

NPDBS type/NPDB type

Ballnose R

For Spherical Milling

● **Pocketing**



Work Material	: Cemented Carbide AF1 (Ultra-fine Grained Carbide)
Tool Used	: NPDRS1100R005-030
Cutting Conditions	: 10mm × 10mm × Depth 2mm
Cutting Conditions	: n = 40,000min^{-1}, vf = 200mm/min pf = 0.005mm, Oil Mist
Surface Roughness	: Ra 0.015μm
Cutting Time	: 2 Hours

● **Application to Optical Use (Fly-Eye Lens Mold)**

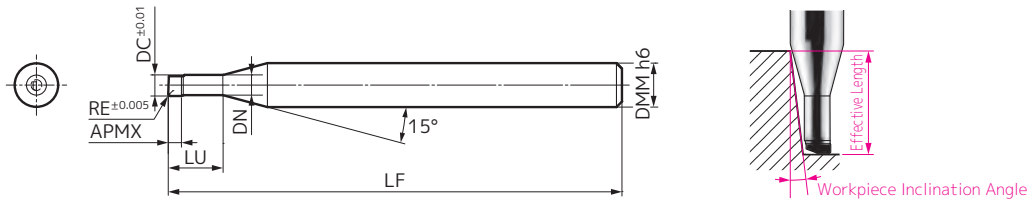
Work Material	: Cemented Carbide AF1 (Ultra-fine Grained Carbide)
Tool	: Finishing NPDB 1050-020 (R0.5) Roughing: Diamond-Coated Endmill (R0.5)
Cutting Conditions	: n = 60,000min^{-1}, vf = 300mm/min pf = 0.005mm, Oil Mist
Surface Roughness	: Ra 0.015μm
Cutting Time	: Finishing 2 Hours 40 Minutes Roughing 55 Minutes

NPDRS type

Cemented Carbide | Hard Brittle Materials

1 Flute | Binderless PCD | Corner R | Shoulder Milling | Face Milling | Profiling

Fig 1



Body

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Corner Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Effective Length for Workpiece Inclination Angle 0.5°	1°	1.5°	2°	3°	Wiper Edge	Fig
NPDRS 1020R002-006	●	0.2	0.02	0.1	0.6	40	0.175	4	0.63	0.65	0.67	0.70	0.75	No	1
1020R005-006	●	0.2	0.05	0.1	0.6	40	0.175	4	0.63	0.65	0.67	0.69	0.74	No	1
1030R002-010	●	0.3	0.02	0.15	1.0	40	0.27	4	1.04	1.08	1.11	1.15	1.24	No	1
1030R005-010	●	0.3	0.05	0.15	1.0	40	0.27	4	1.04	1.08	1.11	1.15	1.23	No	1
1050R005-015	●	0.5	0.05	0.25	1.5	40	0.47	4	1.56	1.61	1.66	1.72	1.84	No	1
NPDRS 1050R010-015	●	0.5	0.10	0.25	1.5	40	0.47	4	1.56	1.60	1.65	1.71	1.83	No	1
1100R005-030	●	1.0	0.05	0.55	3.0	40	0.95	4	3.14	3.24	3.35	3.46	3.72	No	1
1100R010-030	●	1.0	0.10	0.55	3.0	40	0.95	4	3.14	3.24	3.34	3.46	3.71	No	1
1100R020-030	●	1.0	0.20	0.55	3.0	40	0.95	4	3.14	3.23	3.33	3.44	3.69	No	1
1200R005-040	●	2.0	0.05	0.55	4.0	40	1.95	4	4.17	4.31	4.45	4.60	4.94	No	1
NPDRS 1200R010-040	●	2.0	0.10	0.55	4.0	40	1.95	4	4.17	4.30	4.44	4.60	4.93	No	1
1200R020-040	●	2.0	0.20	0.55	4.0	40	1.95	4	4.17	4.30	4.43	4.58	4.91	No	1

Grade: NPD10

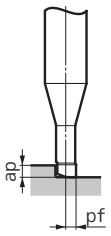
Identification Code

NPDR S 1 020 R002 - 006

NPDR	S	1	020	R002	006
Series Code	For Standard Finishing	No. of Flutes	Dia.	Corner Radius	Neck Length

Recommended Cutting Conditions

1. Use a machine with high accuracy for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply. As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine specs and other conditions may vary.
5. The cutting parameters shown are for reference only. Adjust the cutting conditions to the desired machined surface finish.



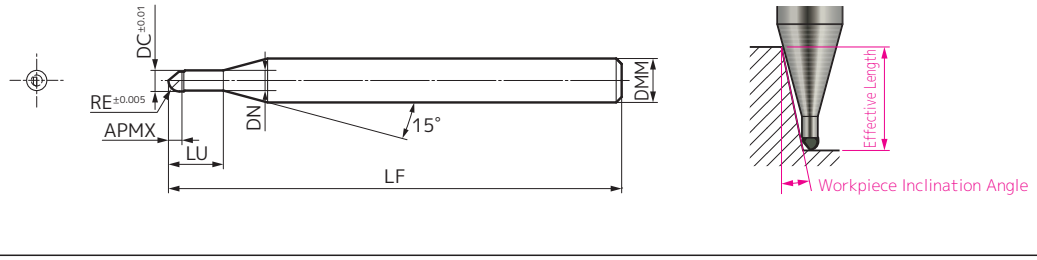
Work Material		Cemented Carbide			
DC (mm)	LU (mm)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.2	0.6	40,000	100	0.001	0.001
0.3	1.0	40,000	150	0.002	0.001
0.5	1.5	40,000	200	0.003	0.001
1.0	3.0	40,000	400	0.005	0.003
2.0	4.0	40,000	600	0.010	0.005

NPDBS type

Cemented Carbide | Hard Brittle Materials

1 Flute | Binderless PCD | Ballnose R | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1



Body (for Standard Finishing)

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Effective Length for Workpiece Inclination Angle 0.5°	1°	1.5°	2°	3°	Fig
NPDBS 1010-004	●	**0.1**	**0.2**	0.1	0.4	40	0.18	4	0.42	0.43	0.44	0.46	0.48	1
1020-008	●	**0.2**	**0.4**	0.2	0.8	40	0.38	4	0.83	0.85	0.87	0.90	0.95	1
1030-010	●	**0.3**	**0.6**	0.3	1.0	40	0.58	4	1.03	1.06	1.08	1.11	1.17	1
1050-020	●	**0.5**	**1.0**	0.5	2.0	40	0.95	4	2.10	2.15	2.20	2.26	2.39	1
1100-030	●	**1.0**	**2.0**	1.0	3.0	40	1.95	4	3.11	3.18	3.25	3.33	3.51	1

Grade: NPD10

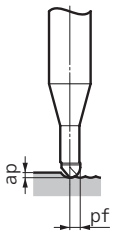
Identification Code

NPDB S 1 010 - 004

- NPDB: Series Code
- S: For Standard Finishing
- 1: No. of Flutes
- 010: Ballnose Radius
- 004: Neck Length

Recommended Cutting Conditions

1. Use a machine with high accuracy for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply. As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine specs and other conditions may vary.
5. The cutting parameters shown are for reference only. Adjust the cutting conditions to the desired machined surface finish.



Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.1	0.4	40,000	100	0.001	0.001
0.2	0.8	40,000	150	0.002	0.001
0.3	1.0	40,000	200	0.003	0.001
0.5	2.0	40,000	400	0.005	0.003
1.0	3.0	40,000	600	0.010	0.005

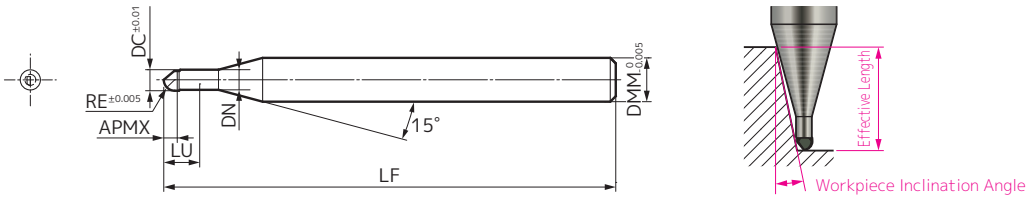
*Radius accuracy inspection report is included inside the case. I129
*Long neck type is also available depending on the size. Please consult us separately.

NPDB type

Cemented Carbide | Hard Brittle Materials

1 Flute | Binderless PCD | Ballnose R | Shoulder Milling | Face Milling | R-Grooving | Profiling

Fig 1



Body (for Precise Finishing)

Dimensions (mm)

Cat. No.	Stock	Ballnose Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Neck Dia. DN	Shank Dia. DMM	Effective Length for Workpiece Inclination Angle 0.5°	1°	1.5°	2°	3°	Fig
NPDB 1010-004	●	**0.1**	**0.2**	0.1	0.4	40	0.18	4	0.42	0.43	0.44	0.46	0.48	1
1020-008	●	**0.2**	**0.4**	0.2	0.8	40	0.38	4	0.83	0.85	0.87	0.90	0.95	1
1030-010	●	**0.3**	**0.6**	0.3	1.0	40	0.58	4	1.03	1.06	1.08	1.11	1.17	1
1050-020	●	**0.5**	**1.0**	0.5	2.0	40	0.95	4	2.10	2.15	2.20	2.26	2.39	1
1100-030	●	**1.0**	**2.0**	1.0	3.0	40	1.95	4	3.11	3.18	3.25	3.33	3.51	1

Grade: NPD10

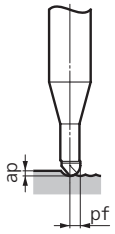
Identification Code

NPDB 1 010 - 004

Series Code | No. of Flutes | Ballnose Radius | Neck Length

Recommended Cutting Conditions

1. Use a machine with high accuracy for stable cutting.
2. Non-water-soluble cutting oil is recommended. Use as a mist or with external coolant supply. As sparks or tool breakage during machining may cause fire, be sure to take appropriate fire prevention measures.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as machine specs and other conditions may vary.
5. The cutting parameters shown are for reference only. Adjust the cutting conditions to the desired machined surface finish.



Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)	ap(mm)	pf(mm)
0.1	0.4	40,000	100	0.001	0.001
0.2	0.8	40,000	150	0.002	0.001
0.3	1.0	40,000	200	0.003	0.001
0.5	2.0	40,000	400	0.005	0.003
1.0	3.0	40,000	600	0.010	0.005

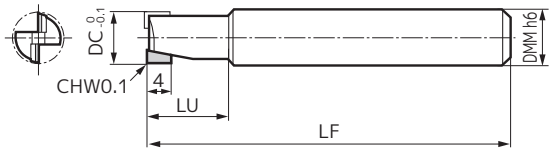
*Radius accuracy inspection report is included inside the case. I129
*Long neck type is also available depending on the size. Please consult us separately.

DFE series

Aluminum Alloy | Copper Alloy | Graphite

2 Flutes | PCD | Shoulder Milling | Face Milling

Fig 1



Body

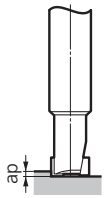
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LU	Overall Length LF	Shank Dia. DMM	Fig
DFE 2040S	●	**4.0**	15	50	6	1
2050S	●	**5.0**	15	50	6	1
2080S	●	**8.0**	15	60	10	1
2090S	●	**9.0**	15	70	10	1
2100S	●	**10.0**	15	70	10	1

Grade: DA2200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Face Milling (2 Flutes)

Work Material / Cutting Conditions		Aluminum Alloy Copper Alloy	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)
4.0		40,000	4,000
5.0		32,000	3,200
8.0		20,000	2,000
9.0		17,800	1,780
10.0		16,000	1,600
Standard Depth of Cut	ap	0.4DC	

4 Flutes | PCD | Shoulder Milling | Face Milling

Fig 1

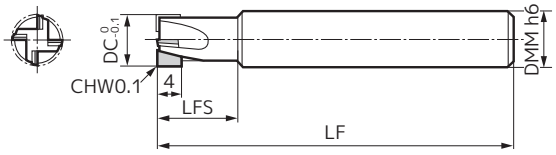
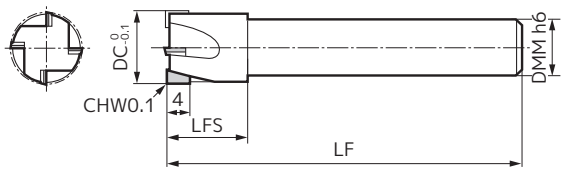


Fig 2



Body

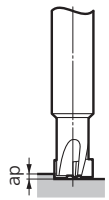
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DFE 4090S	●	**9.0**	15	70	10	1
4100S	●	**10.0**	15	70	10	1
4130GS	●	**13.0**	15	70	10	2

Grade: DA2200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



Face Milling (4 Flutes)

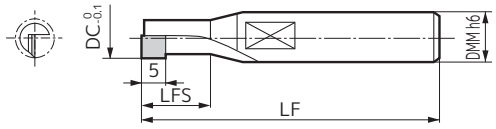
Work Material / Cutting Conditions		Aluminum Alloy Copper Alloy	
DC(mm)		Spindle Speed (min^{-1})	Feed Rate (mm/min)
9.0		17,800	3,560
10.0		16,000	3,200
13.0		12,300	2,460
Standard Depth of Cut	ap	0.4DC	

DAE series

Aluminum Alloy | Copper Alloy | Graphite

1 Flute | PCD | Shoulder Milling | Face Milling

Fig 1



Body

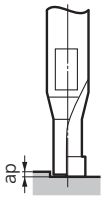
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DAE 1040	●	**4.0**	10	45	6	1
1050	●	**5.0**	12	50	6	1

Grade: DA200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.

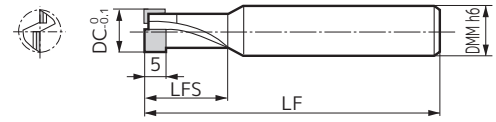


Face Milling (1 Flute)

Work Material / Cutting Conditions	Aluminum Alloy Copper Alloy	
DC(mm)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)
4.0	6,000	210
5.0	5,000	175
Standard Depth of Cut ap	0.4DC	

2 Flutes | PCD | Shoulder Milling | Face Milling

Fig 1



Body (2 Flutes)

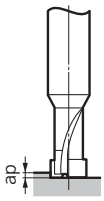
Dimensions (mm)

Cat. No.	Stock	Dia. DC	Neck Length LFS	Overall Length LF	Shank Dia. DMM	Fig
DAE 2060	●	**6.0**	20	50	6	1
2070	●	**7.0**	20	60	8	1
2080	●	**8.0**	20	60	8	1
2090	●	**9.0**	25	71	10	1
2100	●	**10.0**	25	71	10	1
DAE 2110	●	**11.0**	25	75	12	1
2120	●	**12.0**	25	75	12	1

Grade: DA200

Recommended Cutting Conditions

1. If the machine cannot achieve the recommended spindle speed, please use the maximum spindle speed available.
2. If cutting noise and vibration occur, please reduce the cutting conditions accordingly.



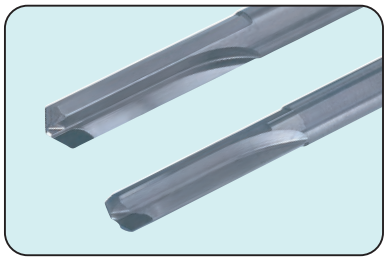
Face Milling (2 Flutes)

Work Material / Cutting Conditions	Aluminum Alloy Copper Alloy	
DC(mm)	Spindle Speed (min⁻¹)	Feed Rate (mm/min)
6.0	6,400	580
7.0	5,500	500
8.0	5,400	500
9.0	5,300	480
10.0	4,800	440
11.0	4,400	400
12.0	4,000	360
Standard Depth of Cut ap	0.4DC	

DAL / DDL series

Aluminum Alloy | Composite CFRP

PCD 3D



From General to High Precision Drilling of Aluminum Alloys

- High precision DAL series is able to produce holes of IT Class of 7 to 8.
- General DDL series is able to produce holes of IT class 11 to 12, mainly for pre-tap hole drilling.

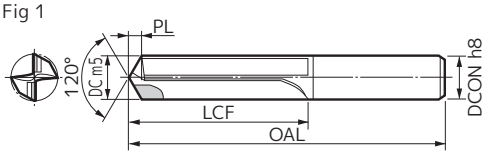
DAL series

*For tolerances, refer to Chapter N - References. Dimensions (mm)

Grade Classification		SUMIDIA
Process	High-speed/Light Cutting	N
	Medium Cutting	
	Roughing	

Cat. No.	DA2200	Dia. (Shank Dia.) DC(DCON)	Flute Length LCF	Overall Length OAL	Tip PL	Fig
DAL 0500H to 0600H		ø5 ≤ DC ≤ ø6	31.6	81.6	1.6	1
0601H to 0700H		ø6 < DC ≤ ø7	36.9	91.9	1.9	1
0701H to 0800H		ø7 < DC ≤ ø8	37.2	92.2	2.2	1
0801H to 0900H		ø8 < DC ≤ ø9	42.5	102.5	2.5	1
0901H to 1000H		ø9 < DC ≤ ø10	42.8	102.8	2.8	1
1001H to 1100H		ø10 < DC ≤ ø11	53.1	113.1	3.1	1
1101H to 1200H		ø11 < DC ≤ ø12	53.4	113.4	3.4	1

Fig 1



Ordering numbers should be handled according to this example: ø6.05mm drill → DAL0605H.

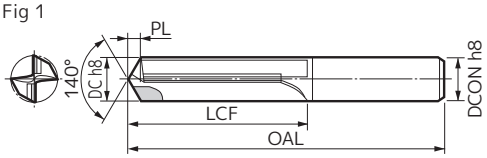
DDL series

*For tolerances, refer to Chapter N - References. Dimensions (mm)

Grade Classification		SUMIDIA
Process	High-speed/Light Cutting	N
	Medium Cutting	
	Roughing	

Cat. No.	DA2200	Dia. (Shank Dia.) DC(DCON)	Flute Length LCF	Overall Length OAL	Tip PL	Fig
DDL 050V to 060V		ø5 ≤ DC ≤ ø6	31.5	81.0	1.0	1
061V to 070V		ø6 < DC ≤ ø7	36.2	91.2	1.2	1
071V to 080V		ø7 < DC ≤ ø8	36.4	91.4	1.4	1
081V to 090V		ø8 < DC ≤ ø9	41.6	101.6	1.6	1
091V to 100V		ø9 < DC ≤ ø10	41.7	101.7	1.7	1
101V to 110V		ø10 < DC ≤ ø11	51.9	111.9	1.9	1
111V to 120V		ø11 < DC ≤ ø12	52.1	112.1	2.1	1

Fig 1



Ordering numbers should be handled according to this example: ø10.5mm drill → DDL105V.

Recommended Cutting Conditions

(n: Spindle Speed min^{-1} vc: Cutting Speed m/min f: Feed Rate mm/rev)

Diameter DC (mm)	Cutting Conditions	DAL series	DDL series	Depth of Cut	Oil
ø8.0	n	4,000	8,000	L/D= Below 3	Emulsion type
	vc	80 - **100** - 150	150 - **200** - 250		
	f	0.05 - **0.1** - 0.15	0.1 - **0.15** - 0.25		
ø12.0	n	2,700	5,300		
	vc	80 - **100** - 150	150 - **200** - 250		
	f	0.08 - **0.13** - 0.2	0.15 - **0.2** - 0.3		

Min. - **Optimum** - Max.

Important Notes

- When using DAL series for high-precision machining, select a high rigidity machine and high precision holder.
- Supply coolant generously at the entrance of the hole.