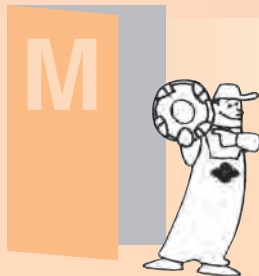


SUMIDIA/SUMIDIA BINDERLESS SUMICRYSTAL

M



SUMIDIA

M

SUMIDIA
SUMIDIA
BINDERLESS

SUMICRYSTAL

C

D

S

T

V

W

Grades	SUMIDIA Series M2
	SUMIDIA BINDERLESS NPD10/SUMIDIA DA90 M4
	SUMIDIA DA1000 M6
Inserts	SUMIDIA BREAK MASTER LD Type/GD Type M7
	SUMIDIA BREAK MASTER DM Type M8
	SUMIDIA Insert Cat. No. Identification Table M9
	Stock Table for SUMIDIA Indexable Inserts M10
	Stock Table for SUMIDIA/SUMIDIA BINDERLESS Indexable Inserts M28
Holders	SEC-Wide-Cut Holders SGW Type M29
	SUMIDIA Very Small Diameter Boring Bars CKB Type M30
	SUMIDIA Small Diameter Boring Bars DABB Type M31
Cutters/ Endmills	 High-efficiency Cutter for Aluminum Alloys ALNEX ANX Type M32
	High-efficiency Cutter for Aluminum Alloys HF Type M40
	High-Speed Aluminum Alloy Cutter RF Type M46
	High-efficiency Cutter for Aluminum Alloys SRF Type M48
	SUMIDIA Cutter FAM Type/SAM Type M50
	SUMIDIA Cutter SAM-E Type M51
	SUMIDIA Mini-Cutter DFE Type M52
	SUMIDIA BINDERLESS Endmills NPDRS Type/NPDBS Type/NPDB Type M53
	SUMIDIA Endmill DFE Type M57
SUMIDIA Endmill DAE Type M58	
Drills	SUMIDIA Drill DAL Type M59
	SUMIDIA Drill DDL Type M59

M SUMICRYSTAL

SUMICRYSTAL	M62
SUMICRYSTAL PD/PDX	M63
SUMICRYSTAL UP	M64
SUMICRYSTAL UP (Half Cut)	M65
SUMICRYSTAL UPT	M66
SUMICRYSTAL CD	M67

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

M1

SUMIDIA Series



General Features

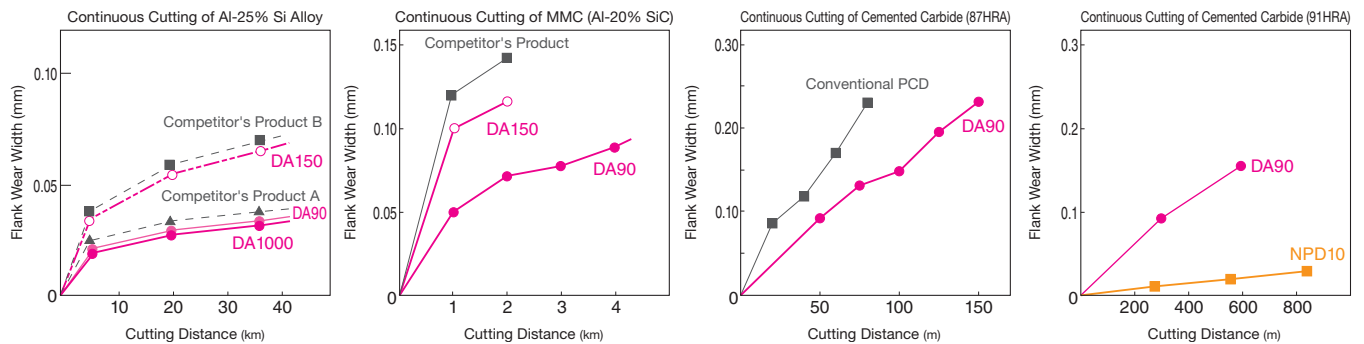
Our SUMIDIA sintered diamond series has 4 grades (DA90, DA150, DA2200, DA1000) with individual features depending on the optimum combination of diamond particle size and binder, as well as the NPD10 grade (nano-polycrystalline diamond) where nano-order diamond particles are directly bound with high strength 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-order diamond particles with high strength. Demonstrates optimum wear and fracture resistance as well as the best edge sharpness.	<ul style="list-style-type: none"> Finishing of Cemented Carbide Machining of Hard Brittle Material (Ceramics) 	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.	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.	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.	5	50 to 60	≈ 1.95
	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.	up to 50	50 to 65	≈ 1.10

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

Performance



<p>Work Material : Al-25% Si alloy Tool Cat. No. : SPGN 120304 Cutting Conditions : $v_c=500\text{m/min}$, $f=0.1\text{mm/rev}$, $a_p=0.2\text{mm Dry}$</p>	<p>Work Material : MMC (Al-20%SiC) Tool Cat. No. : CNMX 120408 Cutting Conditions : $v_c=350\text{m/min}$, $f=0.2\text{mm/rev}$, $a_p=0.18\text{mm Wet}$</p>	<p>Work Material : Cemented carbide (87HRA) Tool Cat. No. : NF-DCMW 070204 Cutting Conditions : $v_c = 20\text{m/min}$, $f = 0.1\text{mm/rev}$, $a_p = 0.2\text{mm Wet}$</p>	<p>Work Material : Cemented carbide (91HRA) Tool Cat. No. : DCMW 11T304RH (NPD10) NF-DCMW 11T304(DA90) Cutting Conditions : $v_c = 20\text{m/min}$, $f = 0.05\text{mm/rev}$, $a_p = 0.05\text{mm Dry}$</p>
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SUMIDIA Series

Application Range

Aluminum

Machinability	Work Material	Turning		Milling	Example Parts
		Roughing	Finishing		
Good ↑ ↓ Difficult	Sintered Aluminum				Piston Liners
	Wrought Aluminum Alloy			Machine Parts, etc.	
	Alloys for Die Casting			Transmission Case, Oil Pan, Cylinder Block, Aluminum Wheel, HDD	
	Alloys for Casting Low Si (≤12%)			Cylinder Head	
	Alloys for Casting High Si (>12%)			Cylinder Block	

Recommended Cutting Conditions

Work Material	Cutting Speed v_c (m/min)	Feed Rate f (mm/rev)	Depth of Cut a_p (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

Non-aluminum

Machinability	Work Material	Turning		Milling	Example Parts
		Roughing	Finishing		
Good ↑ ↓ Difficult	Non-ferrous Sintered Alloy				Bush
	Gunmetal Carbon			Connecting Rod	
	Carbide	DA90	NPD10		Punches, Dies, Rolls
	Fe Combined	DA90	DA150		Cylinder Block, Bearing Cap

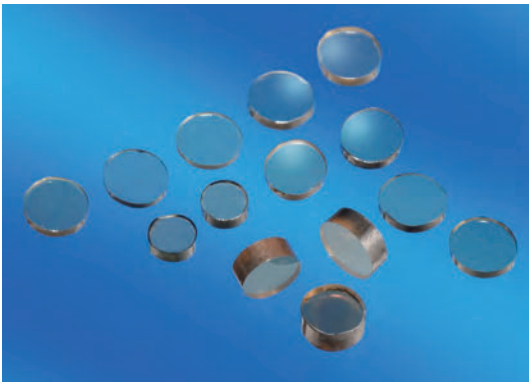
SUMIDIA Grinding Method

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
Grinding Conditions	Dressing: Use a WA stick with a mesh of about 400.
	Peripheral Speed: 800 to 1,000m/min
	Table Rocking: 30 to 60 cycle/min
Others	Grinding Fluid: Water-soluble Grinding Fluid (Solution Type)
	(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.

SUMIDIA BINDERLESS

Nano-polycrystalline Diamond

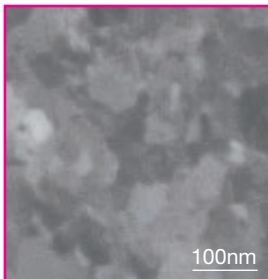


General Features

Nano-polycrystalline diamond is polycrystalline diamond that directly binds nano-order 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. SUMIDIA BINDERLESS tools use this super-high-performance nano-polycrystalline diamond material in their cutting edges.

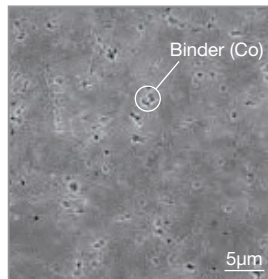
Comparison of Structures

Nano-polycrystalline Diamond Tool SEM Profile



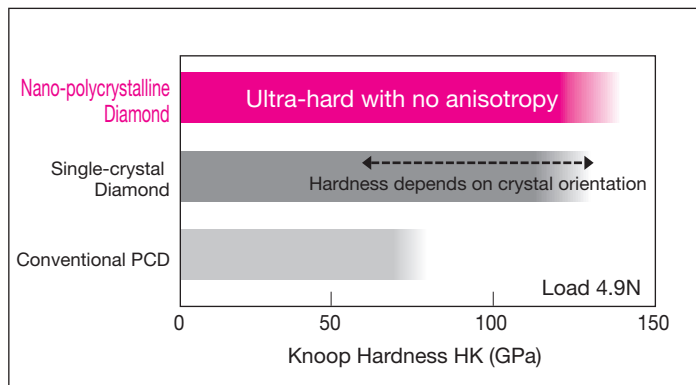
Diamond Particles (30 to 50nm)

Conventional PCD SEM Profile



Diamond Particles (1 to 10µm)

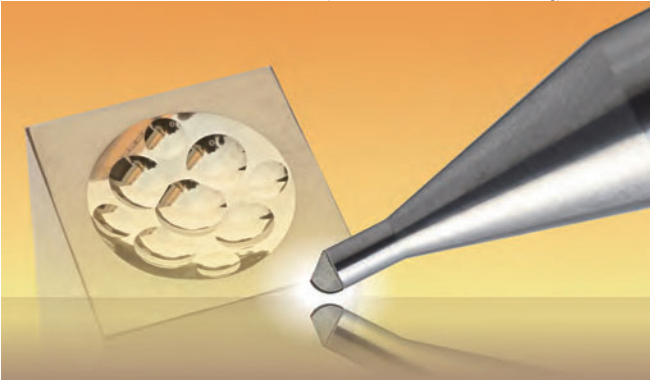
Hardness



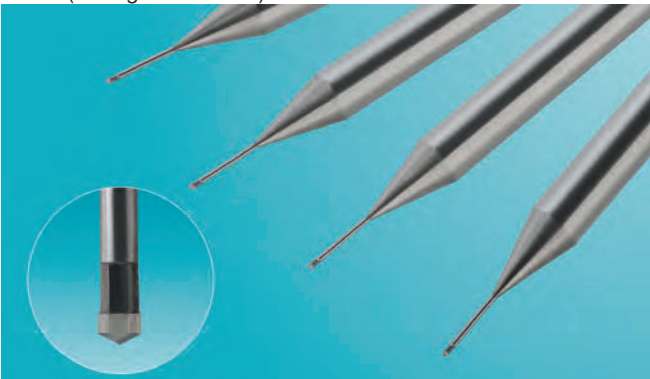
SUMIDIA BINDERLESS

Application Examples

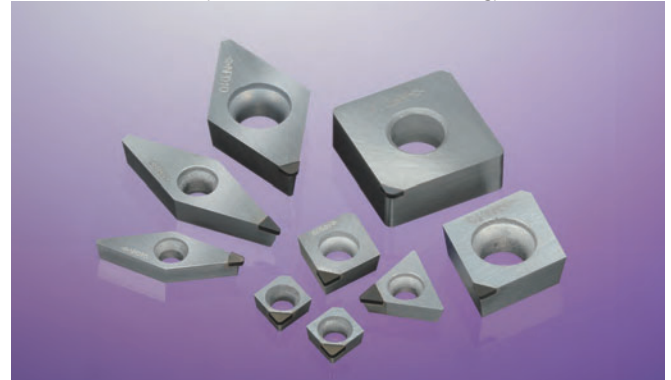
● Ballnose Endmills and Radius Endmills (Cemented Carbide Machining) **M53**



● Drill (Drilling of Ceramics)



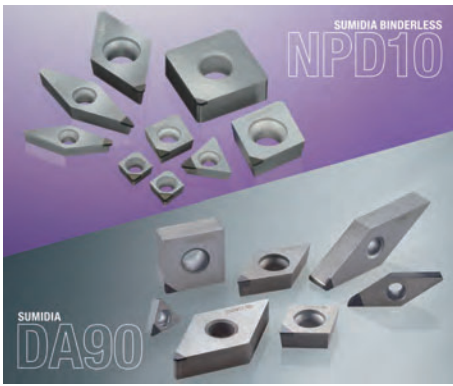
● Indexable Inserts (Cemented Carbide Machining) **M28**



● Tool Holder (Ultra-precision Cutting of Carbide)



SUMIDIA BINDERLESS/SUMIDIA NPD10/DA90



General Features

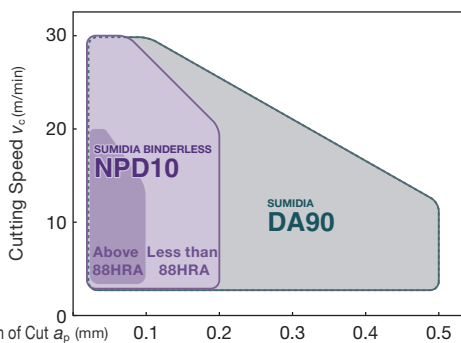
NPD10 is made from high-hardness nano-polycrystalline diamond. This is a pure diamond material, but unlike single-crystal diamonds, it has no anisotropy. It achieves extended tool life and machining accuracy superior to conventional diamond tools when machining hard brittle materials such as cemented carbide.

DA90 is a polycrystalline diamond grade in which coarse diamond particles have been sintered to form a dense structure. The high diamond content, with high wear resistance, makes it ideal for roughing of cemented carbide and hard brittle material. Optimised design and mass production technology have been developed, achieving the same performance as conventional tools with higher cost-performance.

Features

- **Ideal for Finishing of Hard Brittle Materials Including Cemented Carbide (NPD10)**
The outstanding wear resistance of nano-polycrystalline diamond enables high-precision machining of cemented carbides.
- **Superior dimensional accuracy maintained for a long time (NPD10)**
Number of tool changes can be drastically reduced compared to conventional diamond tools, enabling work efficiency to be improved and total costs to be reduced.
- **Ideal for Roughing of Hard Brittle Materials Including Cemented Carbide (DA90)**
Stable tool life in sintered surface machining of cemented carbide and roughing of hard brittle materials thanks to the outstanding wear resistance of nano-polycrystalline diamond
- **Uses SUMIDIA NF Insert (DA90)**
Optimised design and mass production technology have been developed, achieving the same performance as conventional tools with higher cost-performance.

Application Range (Cemented Carbide Machining)



Applications of NPD10 and DA90 (Cemented Carbide Machining)

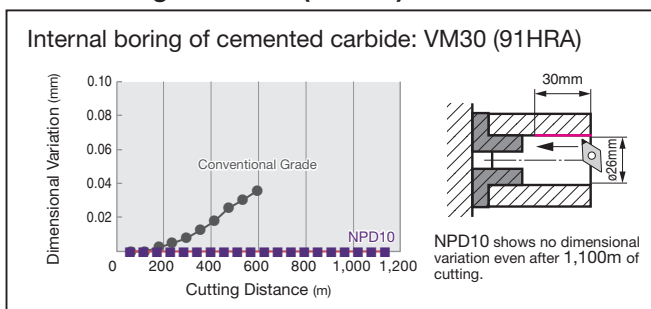
Grade	SUMIDIA BINDERLESS NPD10	SUMIDIA DA90
Dimensional Tolerance	Best	The first recommendation is NPD10
Tool Life (Wear Resistance)	Best $a_p = 0.2\text{mm}$ or below $f = 0.1\text{mm/rev}$ or below recommended	$a_p = 0.2\text{mm}$ or above can also be used
Sintered surface machining of cemented carbide	Impossible	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 v_c (m/min)		Feed Rate f (mm/rev)	Depth of Cut a_p (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	DA90	5 - 20 - 30	0.03 - 0.10 - 0.20	0.03 - 0.20 - 0.50

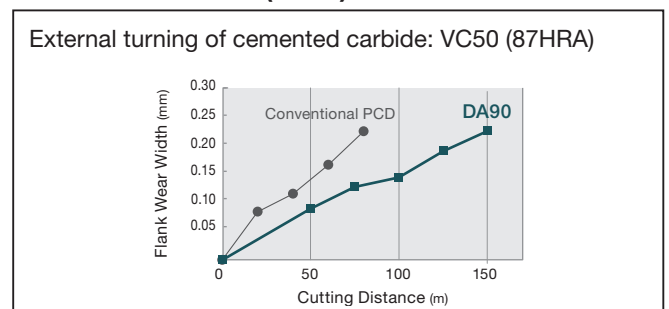
Min. - Optimum - Max. Coolant: Dry (NPD10)/Wet (DA90)

Machining Precision (NPD10)



Work Material : Cemented carbide: VM30 (91HRA)
Tool Cat. No. : DCMW 11T304RH
Cutting Conditions : $v_c = 20\text{m/min}$, $f = 0.05\text{mm/rev}$, $a_p = 0.05\text{mm}$ Dry

Wear Resistance (DA90)



Work Material : Cemented carbide: VC50 (87HRA)
Tool : NF-DCMW 070204
Cutting Conditions : $v_c = 20\text{m/min}$, $f = 0.1\text{mm/rev}$, $a_p = 0.2\text{mm}$ Wet

SUMIDIA BINDERLESS SUMIDIA BINDERLESS SUMICRYSTAL C D S T V W

SUMIDIA DA1000

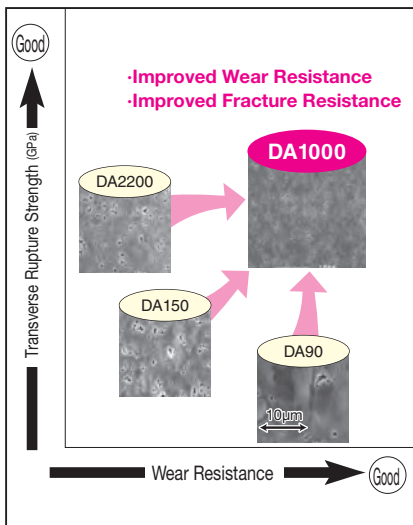


■ Features

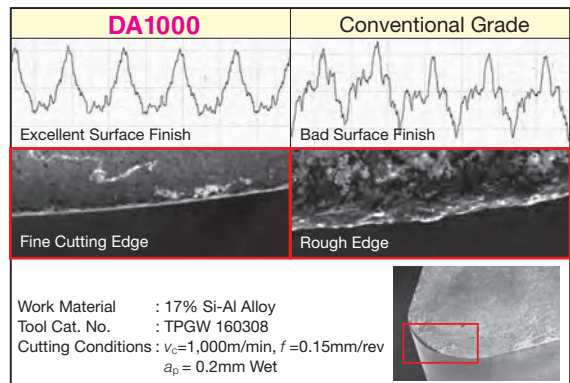
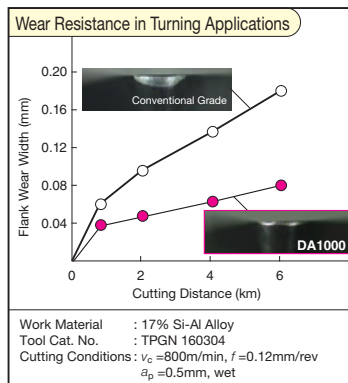
Ultra-high-density sintered ultra-fine grained diamond

- 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



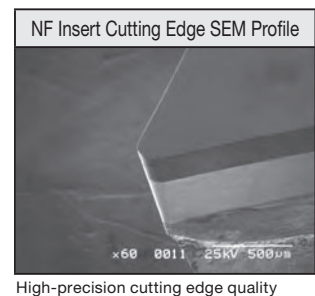
■ Cutting Performance



■ NF Insert

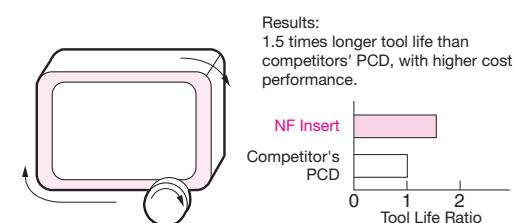
The NF Type SUMIDIA insert uses optimised design and improved mass production techniques that maintain the good basic performance of DA1000 yet offer higher cost efficiency. It makes the most of the SUMIDIA DA1000 grade, with excellent fracture and wear resistance and good work material finished surface roughness.

- 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.



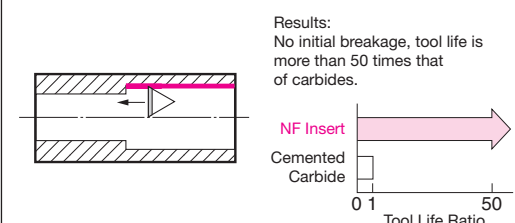
■ Application Examples

● Milling of Aluminum Alloy Oil Pump Cover



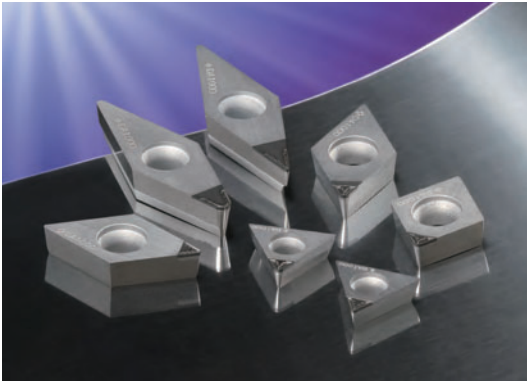
Work Material : ADC12, Tool Cat. No.: NF-TEEN32R
Cutting Conditions : $v_c=3,000\text{m/min}$, $f_z=0.06\text{mm/t}$, $a_p=0.2\text{mm}$ Wet

● Boring of Aluminum Valve Bore



Work Material : ADC12, Tool Cat. No.: NF-TPGN110304P
Cutting Conditions : $v_c=530\text{m/min}$, $f=0.05\text{mm/rev}$, $a_p=0.2\text{mm}$ Wet

LD Type/GD Type

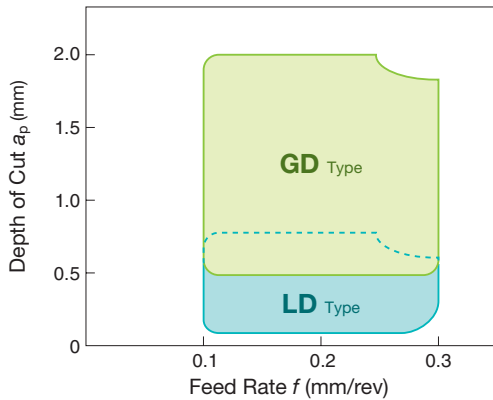


■ Features

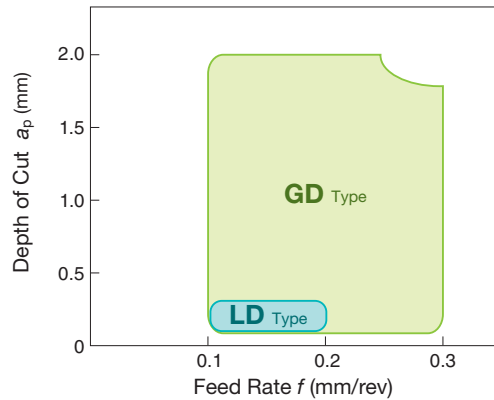
- SUMIDIA insert with chipbreaker
- Provides excellent chip control in medium finishing and finishing of aluminum alloy.
- Solves chip control problems and dramatically improves work efficiency.
- Achieves long, stable tool life by employing high-toughness grade DA1000.

■ Application Range

- Wrought Aluminum Alloy (A6061)

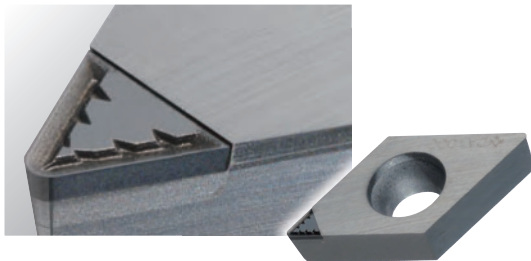


- Cast Aluminum Alloy (ADC12)



LD Type Chipbreaker for Finishing

Provides excellent chip control in finishing



GD Type Chipbreaker for Medium Finishing

Provides excellent chip control in medium finishing

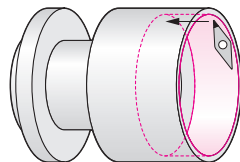


■ Cutting Performance

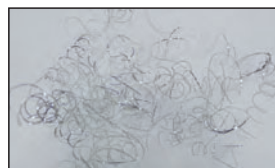
For Wrought Aluminum Alloy Machining

- Machining Details: Internal Boring of Machine Components

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



BREAK MASTER LD Type



Without Chipbreaker

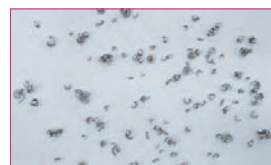
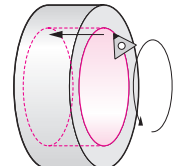
Work Material : A6061, Tool Cat. No.: NF-VCMT110302N-LD (DA1000)
Cutting Conditions : $V_c = 200\text{m/min}$, $f = 0.20\text{mm/rev}$, $a_p = 0.10\text{mm}$ Wet

■ Cutting Performance

For Aluminum Alloy Casting Machining

- Machining Details: Internal Boring of Transmission Components

Finely breaks chips in machining of cast materials



BREAK MASTER GD Type

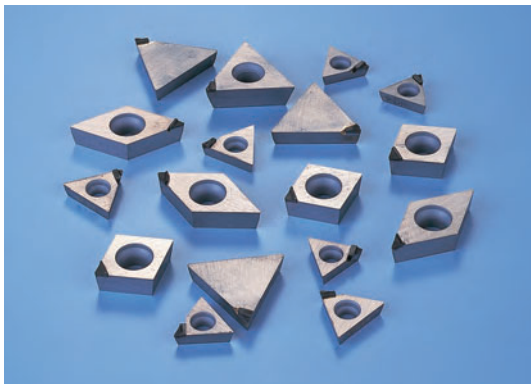


Without Chipbreaker

Work Material : ADC12, Tool Cat. No.: NF-TPMT110304N-GD (DA1000)
Cutting Conditions : $V_c = 400\text{m/min}$, $f = 0.23\text{mm/rev}$, $a_p = 1.20\text{mm}$ Wet

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

DM Type

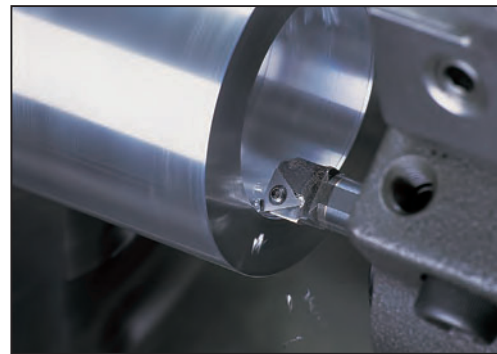
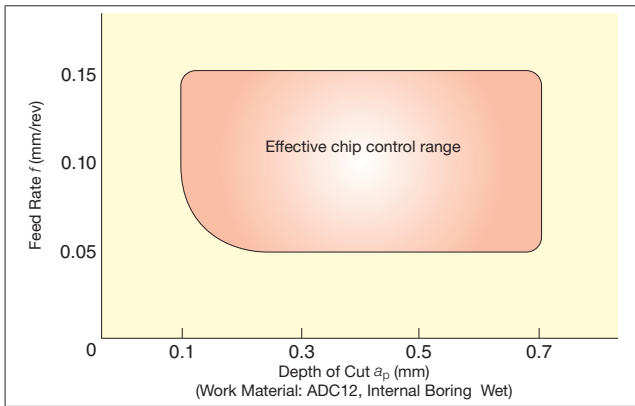


■ Features

- 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



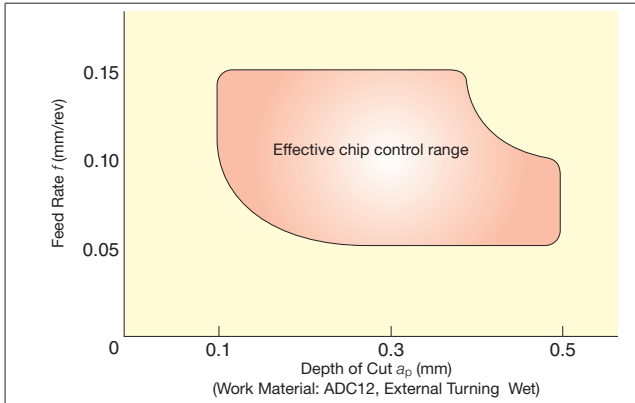
■ Chip Control

● Chips Created by BREAK MASTER DM Type

● Chips with No Chipbreaker



- External Turning & Facing (Insert Shape: 55°/80° Diamond Type)



■ Recommended Cutting Conditions

- Internal Boring (Insert Shape: Triangular Type)

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

- External Profiling (Insert Shape: 55°/80° Diamond Type)

Feed Rate f	Depth of Cut a_p	Coolant
up to 0.15 mm/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 $v_c = 300\text{m/min}$ $f = 0.06\text{mm/rev}$ $a_p = 0.35\text{mm}$ Wet	With the required finished surface roughness of $R_a = 1\mu\text{m}$ 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 Cat. No. Identification Table

Regrindable Type

CNMA 120408 **B**

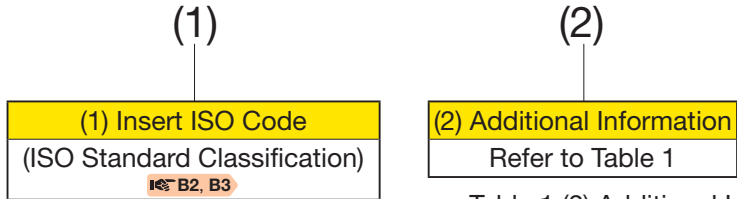


Table 1 (2) Additional Information

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 - CNMA 120408 **P**

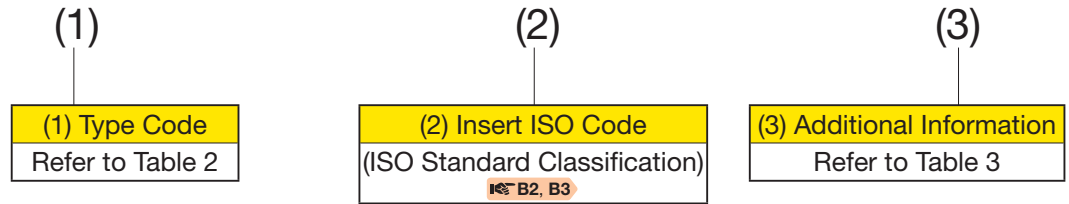


Table 2 (1) Type Code

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	Chipbreaker Type (Neutral)
R-DM	Chipbreaker Type (Right -handed) M8
L-DM	Chipbreaker Type (Left-handed) M8

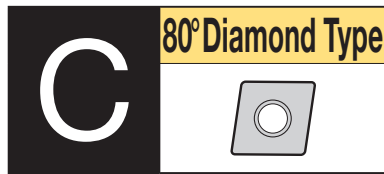
Insert Shape

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

SUMIDIA
M
SUMIDIA
BINDERLESS
SUMICRYSTAL
C
D
S
T
V
W

SUMIDIA Insert

Indexable Insert



Neg.-Pos.

CNMX 1204				
Dimensions (mm)	Inscribed Circle IC	12.70	Hole Dia.	5.16
	Thickness S	4.76		

Applicable External Holders C8 to C10
 Applicable Internal Holders E15, E23 to E25

7° Pos.

CCMW 03X1				
Dimensions (mm)	Inscribed Circle IC	3.5	Hole Dia.	1.9
	Thickness S	1.4		

Applicable Internal Holders E18, E20

CCMW 04X1				
Dimensions (mm)	Inscribed Circle IC	4.3	Hole Dia.	2.3
	Thickness S	1.8		

Applicable Internal Holders E18, E20

CCM 0602				
Dimensions (mm)	Inscribed Circle IC	6.35	Hole Dia.	2.8
	Thickness S	2.38		

Applicable External Holders C11, D13, D17, D22 to D23

Applicable Internal Holders E18 to E20

(Legend) General Cutting 1st Recommendation

Recommended Application	N Non-Ferrous Metal			
	Carbide/Hard Brittle Material			

Dimensions (mm) SUMIDIA

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				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	—	—	—	—
	120412	1.2	2.6	—	—	—	—
 CNMX	CNMX 120402	0.2	5.5	—	—	●	—
	120404	0.4	5.4	●	●	●	▲
	120408	0.8	5.4	●	●	●	▲
	120412	1.2	5.3	●	—	—	—

 NF Insert	NF-CCMW 03X102	0.2	1.1	●	—	—	—
	03X104	0.4	1.1	●	—	—	—

 NF Insert	NF-CCMW 04X102	0.2	1.5	●	—	—	—
	04X104	0.4	1.5	●	—	—	—

 NF Insert	NF-CCMW 060202	0.2	2.4	●	—	—	—
	060204	0.4	2.4	●	—	—	—

 NF Insert	NF-CCMT 060201	0.1	2.8	—	—	●	▲
	060202	0.2	2.8	—	—	●	▲
	060204	0.4	2.8	—	—	●	▲

 BREAK MASTER	NF-CCMT 060202N-LD	0.2	2.9	—	—	●	—
	060204N-LD	0.4	2.9	—	—	●	—

 BREAK MASTER	NF-CCMT 060202N-GD	0.2	2.9	—	—	●	—
	060204N-GD	0.4	2.9	—	—	●	—

 BREAK MASTER	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	CCMT 060201	0.1	3.3	—	—	●	—
	060202	0.2	3.2	—	—	●	—
	060204	0.4	3.1	—	—	●	—

SUMIDIA
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SUMIDIA BINDERLESS
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M10


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

SUMIDIA Insert

Indexable Insert

C

80° Diamond Type



7° Pos.

CCM

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09T3

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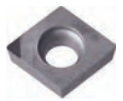
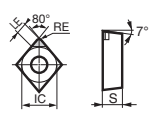
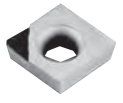
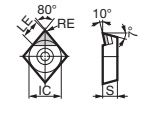

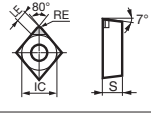

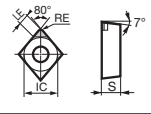
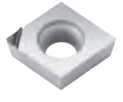
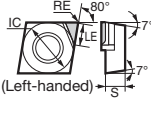
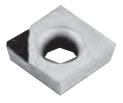
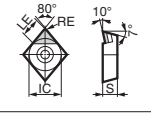
Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	4.4
	Thickness S	3.97		

Applicable External Holders C11, D13, D17, D22 to D23

Applicable Internal Holders E12, E18 to E20

(Legend) General Cutting ● 1st Recommendation

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

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	Dimensions (mm)			
					DA90	DA150	DA1000	DA2200
 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">NF Insert</p>		NF-CCMW 09T302	0.2	2.4	●			
		09T304	0.4	2.4	●			
		09T308	0.8	2.3	●			
 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">NF Insert</p>		NF-CCMT 09T301	0.1	2.8			●	▲
		09T302	0.2	2.8			●	▲
		09T308	0.4	2.8			●	▲
 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">NF Insert</p>		NF-CCMT 09T302N-LD	0.2	2.9			●	
		09T304N-LD	0.4	2.9			●	
		09T308N-LD	0.8	2.8			●	
 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">BREAK MASTER</p>		NF-CCMT 09T302N-GD	0.2	2.9			●	
		09T304N-GD	0.4	2.9			●	
		09T308N-GD	0.8	2.8			●	
 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">BREAK MASTER</p>		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			●	
 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">NF Insert</p>		CCMT 09T301	0.1	3.3			●	
		09T302	0.2	3.2			●	
		09T304	0.4	3.1			●	

11° Pos.

CPMT

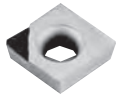
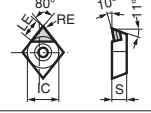
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0802

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

Applicable Internal Holders E21 to E22

 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">NF Insert</p>		CPMT 080202	0.2	4.2			●	▲
		080204	0.4	4.2			●	▲
		080208	0.8	4.1			●	▲

CPMT


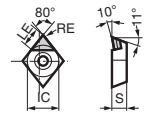
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0903

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

Applicable Internal Holders E12, E21 to E22

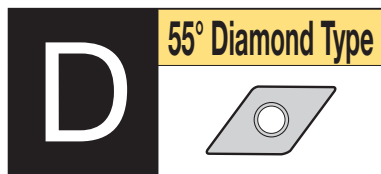
 <p style="font-size: 8px; background-color: #fce4ec; padding: 1px;">NF Insert</p>		NF-CPMT 090302	0.2	2.8			●	▲
		090304	0.4	2.8			●	▲
		090308	0.8	2.7			●	▲

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

SUMIDIA Insert

Indexable Insert



55° Diamond Type

(Legend) General Cutting ● 1st Recommendation

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

Dimensions (mm) SUMIDIA

Neg.

DNMA 1504

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

Applicable External Holders C12 to C14

Applicable Internal Holders E15, E33 to E35

Neg.-Pos.

DNMX 1504

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

Applicable External Holders C12 to C14

Applicable Internal Holders E15, E33 to E35

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

 NF Insert	NF-DNMX 150402	0.2	6.4	—	—	●	▲
	150404	0.4	6.2	—	—	●	▲
	150408	0.8	5.8	—	—	●	▲
	150412	1.2	5.4	—	—	●	▲
 One-Use	NU-DNMX 150402	0.2	3.0	—	—	—	—
	150404	0.4	2.8	—	—	—	—
	150412	1.2	2.1	—	—	—	—
 DNMX	DNMX 150402	0.2	6.4	—	—	●	—
	150404	0.4	6.2	—	—	●	▲
	150408	0.8	5.8	—	—	●	▲
	150412	1.2	5.4	—	—	●	▲

7° Pos.

DCM 0702

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

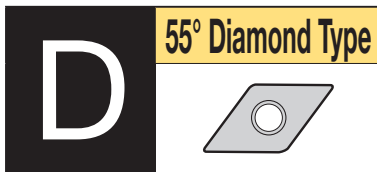
Applicable External Holders C17, D14, D18 to D19, D24 to D25

Applicable Internal Holders E16, E28 to E32

 NF Insert	NF-DCMW 070202	0.2	2.6	●	—	—	—
	070204	0.4	2.4	●	—	—	—
 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	NU-DCMT 070202R-DM	0.2	3.0	—	●	—	—
	070202L-DM	0.2	3.0	—	●	—	—
	070204R-DM	0.4	3.0	—	●	—	—
	070204L-DM	0.4	3.0	—	●	—	—
 DCMT	DCMT 070201	0.1	4.3	—	—	●	—
	070202	0.2	4.2	—	—	●	—
	070204	0.4	4.0	—	—	●	—

SUMIDIA Insert

Indexable Insert



7° Pos.

DCM		11T3	
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	4.4
	Thickness S		

Applicable External Holders: C17, D14, D18 to D19, D24 to D25

Applicable Internal Holders: E13, E28 to E32

(Legend) General Cutting ● 1st Recommendation

Recommended Application	N Non-Ferrous Metal			
	DA90	DA150	DA1000	DA2200
Carbide/Hard Brittle Material	●			

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
					DA90	DA150	DA1000	DA2200
 NF Insert		NF-DCMW 11T302	0.2	2.6	●	—	—	—
		11T304	0.4	2.4	●	—	—	—
		11T308	0.8	2.0	●	—	—	—
 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		NU-DCMT 11T302R-DM	0.2	3.0	—	●	—	—
		11T302L-DM	0.2	3.0	—	●	—	—
 BREAK MASTER		NU-DCMT 11T304R-DM	0.4	3.3	—	●	—	—
		11T304L-DM	0.4	3.3	—	●	—	—
		DCMT 11T301	0.1	4.3	—	●	—	—
		11T302	0.2	4.2	—	●	—	—
		11T304	0.4	4.0	—	●	—	—

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

SUMIDIA Insert

Indexable Insert

S **Square Type**

Neg.

SNMA 1204

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

Applicable External Holders C19 to C24

Applicable Internal Holders E51 to E53

7° Pos.

SCMT 0702

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

Applicable External Holders D26

11° Pos.

SPGN 0903

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

Applicable Internal Holders E49

Applicable Cartridge: CE Type

SPGN 1203

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

Applicable External Holders C25 to C26

Applicable Cartridge: CE Type

(Legend) General Cutting 1st Recommendation

Recommended Application	N Non-Ferrous Metal			
	Carbide/Hard Brittle Material			

Dimensions (mm)

SUMIDIA

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	DA90	DA150	DA1000	DA2200
		NF-SNMA 120408	0.8	2.4		—	—	—
		120412	1.2	2.4		—	—	—

		NF-SCMT 070201	0.1	3.0	—	—		—
		070202	0.2	3.0	—	—		—
		070204	0.4	3.0	—	—		—
		SCMT 070201	0.1	3.0	—		—	—
		070202	0.2	3.0	—		—	—
		070204	0.4	3.0	—		—	—

		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-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	—	—	—	—

SUMIDIA

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SUMIDIA
SUMIDIA
BINDERLESS

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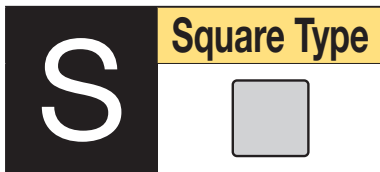
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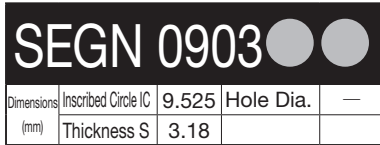
SUMIDIA Insert

Indexable Insert



Square Type

20° Pos.



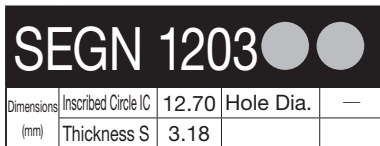
Dimensions (mm)	Inscribed Circle IC	9.525	Hole Dia.	—
	Thickness S	3.18		

Applicable Cartridge: CE Type

(Legend) General Cutting ● 1st Recommendation

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

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
					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				



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

Applicable Cartridge: CE Type

 	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				

SUMIDIA

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SUMIDIA
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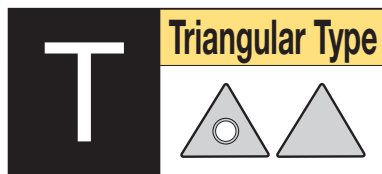
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SUMIDIA Insert

Indexable Insert



SUMIDIA

Neg.-Pos.

TNMX 1604

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

Applicable External Holders C27 to C33, D16, D20

Applicable Internal Holders E15, E61 to E63

M

SUMIDIA
SUMIDIA
BINDERLESS

SUMICRYSTAL

C

5° Pos.

TBGW 0601

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

Applicable Internal Holders E56, E58

D

S

T

TBGN 0601

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

Applicable Internal Holders E76

V

W

7° Pos.

TCMT 0902

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

Applicable External Holders D27

TCMT 1102

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

Applicable External Holders D27

(Legend) General Cutting 1st Recommendation

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

Dimensions (mm)

SUMIDIA

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				DA90	DA150	DA1000	DA2200
 NF Insert	NF-TNMX 160402 160404 160408	0.2	3.7	—	—	●	▲
		0.4	3.6	—	—	●	▲
		0.8	3.3	—	—	●	▲
 One-Use	NU-TNMX 160402 160404 160408	0.2	3.0	—	—		
		0.4	2.9	—	—		
		0.8	2.6	—	—		
 TNMX	TNMX 160402 160404 160408 160412	0.2	3.7	—	—	●	
		0.4	3.6	—	—	●	▲
		0.8	3.3	—	—	●	▲
		1.2	3.0	—	—		

 NF Insert	NF-TBGW 060102 060104	0.2	2.3	—	—	●	▲
		0.4	2.2	—	—	●	▲
 TBGW	TBGW 060102 060104	0.2	2.3	—	●		
		0.4	2.2	—	●		

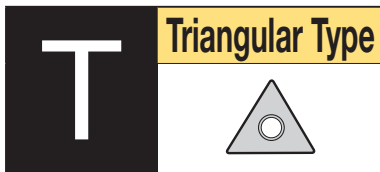
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		0.4	2.0	—	—	●	▲
 TBGN	TBGN 060102B 060104B 060108B	0.2	6.5	—	●	●	
		0.4	6.2	—	●	●	
		0.8	5.7	—	●	●	

 NF Insert	NF-TCMT 090202 090204	0.2	2.9	—	—	●	▲
		0.4	2.8	—	—	●	▲
 TCMT	TCMT 090201 090202 090204	0.1	2.8	—	—		
		0.2	2.7	—	●		
		0.4	2.6	—	●		

 NF Insert	NF-TCMT 110201 110202 110204	0.1	3.0	—	—	●	▲
		0.2	2.9	—	—	●	▲
		0.4	2.8	—	—	●	▲
 TCMT	TCMT 110201 110202 110204	0.1	2.8	—	—		
		0.2	2.7	—	●		
		0.4	2.6	—	●		

SUMIDIA Insert

Indexable Insert



11° Pos.

TPGW 0802				
Dimensions (mm)	Inscribed Circle IC	4.76	Hole Dia.	2.4
	Thickness S	2.38		

Applicable Internal Holders E56 to E59

TPM 0802				
Dimensions (mm)	Inscribed Circle IC	4.76	Hole Dia.	2.4
	Thickness S	2.38		

Applicable Internal Holders E56 to E59

TPGW 0902				
Dimensions (mm)	Inscribed Circle IC	5.56	Hole Dia.	2.8
	Thickness S	2.38		

Applicable Internal Holders E56

TPMT 0902				
Dimensions (mm)	Inscribed Circle IC	5.56	Hole Dia.	2.8
	Thickness S	2.38		

Applicable Internal Holders E56

(Legend) General Cutting ● 1st Recommendation

Recommended Application	SUMIDIA			
	DA90	DA150	DA1000	DA2200
N Non-Ferrous Metal			●	
Carbide/Hard Brittle Material	●			

Shape		Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
					DA90	DA150	DA1000	DA2200
NF Insert		NF-TPGW 080201	0.1	3.1			●	▲
		080202	0.2	3.0			●	▲
		080204	0.4	2.9			●	▲
NF Insert		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	●			
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		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		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			●			

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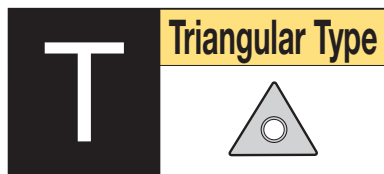
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▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability).

SUMIDIA Insert

Indexable Insert



Triangular Type

11° Pos.

TPGW 1102

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

Applicable Holder: Special Holder

TPMT 1102

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

Applicable Holder: Special Holder

TPGW 1103

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

Applicable Internal Holders E14, E56 to E59

TPM 1103

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

Applicable Internal Holders E14, E56 to E59

(Legend) General Cutting 1st Recommendation

Recommended Application	N Non-Ferrous Metal			
	Carbide/Hard Brittle Material			

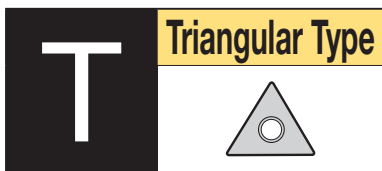
Dimensions (mm)

SUMIDIA

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				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	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	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	—	●	—	—	
 NF Insert	NF-TPGW 110301	0.1	3.1	—	—	●	▲
	110302	0.2	3.0	—	—	●	▲
	110304	0.4	2.9	—	—	●	▲
	110308	0.8	2.7	—	—	●	▲
 TPGW 110300	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	●	—	—	—
 NF Insert	NF-TPMT 110301	0.1	3.1	—	—	●	▲
	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	—	●	—	—	
 TPM 110300	TPM 110300	0.05	3.7	—	—	—	▲
	110302	0.2	3.6	—	—	—	▲
	110304	0.4	3.5	—	—	—	▲
	110308	0.8	3.2	—	—	—	▲

SUMIDIA Insert

Indexable Insert



11° Pos.

TPGW 1603			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	4.4
Thickness S	3.18		

Applicable Internal Holders E56

TPGW 1604			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	4.4
Thickness S	4.76		

Applicable Internal Holders E14, E56 to E58

TPM 1604			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	4.4
Thickness S	4.76		

Applicable Internal Holders E14, E56 to E58

(Legend) General Cutting ● 1st Recommendation

Recommended Application	SUMIDIA			
	DA90	DA150	DA1000	DA2200
N Non-Ferrous Metal			●	
Carbide/Hard Brittle Material	●			

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				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			●	▲
 TPGW 160402	160404	0.2	3.7		●		
	160408	0.4	3.5		●		
	160412	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	●			
 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			●	

SUMIDIA

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SUMIDIA BINDERLESS

SUMICRYSTAL

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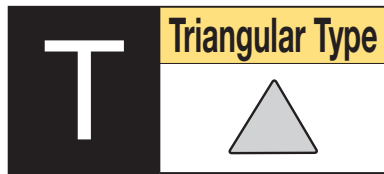
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▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability).

SUMIDIA Insert

Indexable Insert



Triangular Type

11° Pos.

TPGN 0902

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

Applicable Cartridge: CP Type

(Legend) General Cutting ● 1st Recommendation

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

Dimensions (mm)

SUMIDIA

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				DA90	DA150	DA1000	DA2200
	NF-TPGN 090202	0.2	3.1	—	—	●	▲
	090204	0.4	3.0	—	—	●	▲
	090208	0.8	2.9	—	—	●	▲
	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 Internal Holders E60

	NF-TPGN 110302	0.2	3.0	—	—	●	▲
	110304	0.4	2.9	—	—	●	▲
	110308	0.8	2.7	—	—	●	▲
	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 Internal Holders E60

	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 C34 to C35

Applicable Internal Holders E60

	NF-TPGN 160302	0.2	3.0	—	—	●	▲
	160304	0.4	2.9	—	—	●	▲
	160308	0.8	2.7	—	—	●	▲
	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 C34 to C35

Applicable Internal Holders E60

	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	—	●	—	—

SUMIDIA

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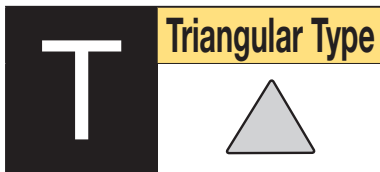
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▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability).

SUMIDIA Insert

Indexable Insert



Triangular Type

20° Pos.

TEGN 1102			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	—
Thickness S	2.38		

Applicable Cartridge: CE Type

(Legend) General Cutting ● 1st Recommendation

Recommended Application	N Non-Ferrous Metal			
	DA90	DA150	DA1000	DA2200
Carbide/Hard Brittle Material	●			

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

TEGN 1103			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	—
Thickness S	3.18		

Applicable Cartridge: CE Type

<p>NF Insert</p>	NF-TEGN 110302 110304 110308	0.2	3.1	—	—	●	▲
		0.4	2.9	—	—	●	▲
		0.8	2.7	—	—	●	▲
<p>NF Insert</p>	NF-TEGN 110304P 110308P	0.4	10.4	—	—	●	▲
		0.8	9.8	—	—	●	▲
<p>TEGN</p>	TEGN 110302 110304 110308	0.2	3.7	●	—	—	—
		0.4	3.6	●	—	—	—
		0.8	3.3	—	—	—	—

Part number suffix P: Full-length Cutting Edge Type

TEGN 1603			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	—
Thickness S	3.18		

Applicable Cartridge: CE Type

<p>NF Insert</p>	NF-TEGN 160302 160304	0.2	3.0	—	—	●	—
		0.4	2.9	—	—	●	—
<p>NF Insert</p>	NF-TEGN 160304P	0.4	15.9	—	—	●	▲
		0.8	3.3	—	—	—	—
<p>TEGN</p>	TEGN 160302 160304 160308	0.2	3.7	●	—	—	—
		0.4	3.6	●	●	▲	—
		0.8	3.3	—	—	—	—

Part number suffix P: Full-length Cutting Edge Type

TEGN 2204			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	—
Thickness S	4.76		

Applicable Cartridge: CE Type

<p>TEGN</p>	TEGN 220404 220408	0.4	3.6	●	—	—	—
		0.8	3.3	—	—	—	—


SUMIDIA Insert

Indexable Insert

(Legend) General Cutting ● 1st Recommendation

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

Dimensions (mm) SUMIDIA

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				DA90	DA150	DA1000	DA2200
 NF Insert	NF-VNMA160408 160412	0.8	1.9	●	—	—	—
		1.2	1.7	●	—	—	—

35° Diamond Type

V


Neg.

VNMA 1604

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


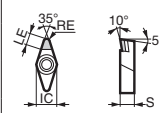
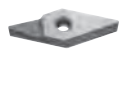
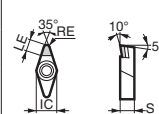
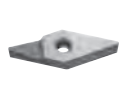
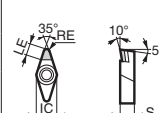
Applicable External Holders C36 to C37

Neg.-Pos.

VNMX 1604

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

Applicable External Holders C36 to C37

 NF Insert	 NF-VNMX 160402 160404 160408 160412	0.2	6.9	—	—	●	▲
		0.4	6.4	—	—	●	▲
		0.8	5.6	—	—	●	▲
		1.2	4.7	—	—	●	▲
 One-Use	 NU-VNMX 160402 160404 160408 160412	0.2	3.6	—	—	—	▲
		0.4	3.1	—	—	—	▲
		0.8	2.3	—	—	—	▲
		1.2	2.3	—	—	—	▲
 NF Insert	 VNMX 160402 160404 160408 160412	0.2	6.9	—	●	●	—
		0.4	6.4	—	●	●	▲
		0.8	5.6	—	●	●	▲
		1.2	4.7	—	●	●	▲

7° Pos.

VCMW 0802

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

Applicable Internal Holders E38, E41, E44, E47


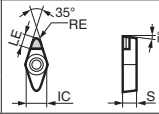

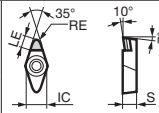

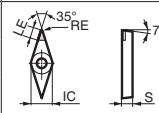

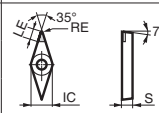
 NF Insert	 NF-VCMW 080202 080204	0.2	3.2	●	—	—	—
		0.4	2.8	●	—	—	—

VCM 1103

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

Applicable External Holders C38 to C39, D15, D20, D28

Applicable Internal Holders E41, E44, E47


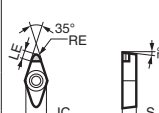

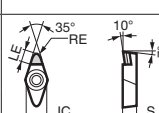
 NF Insert	 NF-VCMW 110302 110304	0.2	3.2	●	—	—	—
		0.4	2.8	●	—	—	—
 NF Insert	 NF-VCMT 110301 110302 110304	0.1	3.5	—	—	●	▲
		0.2	3.4	—	—	●	▲
		0.4	3.0	—	—	●	▲
 BREAK MASTER	 NF-VCMT 110302N-LD 110304N-LD	0.2	3.8	—	—	●	—
		0.4	3.4	—	—	●	—
 BREAK MASTER	 NF-VCMT 110302N-GD 110304N-GD	0.2	3.8	—	—	●	—
		0.4	3.4	—	—	●	—

VCM 1604

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

Applicable External Holders C38 to C39

Applicable Internal Holders E41, E44

 NF Insert	 NF-VCMW 160402 160404 160408 160412	0.2	3.7	●	—	—	—
		0.4	3.3	●	—	—	—
		0.8	2.4	●	—	—	—
		1.2	2.1	●	—	—	—
 NF Insert	 NF-VCMT 160404 160408 160412	0.4	6.5	—	—	●	▲
		0.8	5.6	—	—	●	▲
		1.2	4.6	—	—	●	▲

SUMIDIA

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SUMIDIA Insert

Indexable Insert



7° Pos.

VCMT 1604			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	4.4
Thickness S	4.76		

Applicable External Holders C38 to C39

Applicable Internal Holders E41, E44

VCMT 2205			
Dimensions (mm)	Inscribed Circle IC	Hole Dia.	5.5
Thickness S	5.56		

Applicable External Holders C43

(Legend) General Cutting 1st Recommendation

Recommended Application	N Non-Ferrous Metal			
Carbide/Hard Brittle Material				

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				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 220520	2.0	5.0				
	220530	3.0	5.0				

SUMIDIA

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

SUMIDIA Insert

Indexable Insert



5° Pos.

WBMT 0601			
Dimensions (mm)	Inscribed Circle IC	3.97	Hole Dia. 2.2
	Thickness S	1.59	

Applicable Internal Holders E54

(Legend) General Cutting ● 1st Recommendation

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

Dimensions (mm) SUMIDIA

Shape	Cat. No.	Corner Radius RE	Cutting Edge Length LE	SUMIDIA			
				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	060101L	0.1	1.8	—	—		▲
	060102L	0.2	1.8	—	—		▲
	060104L	0.4	1.7	—	—		▲

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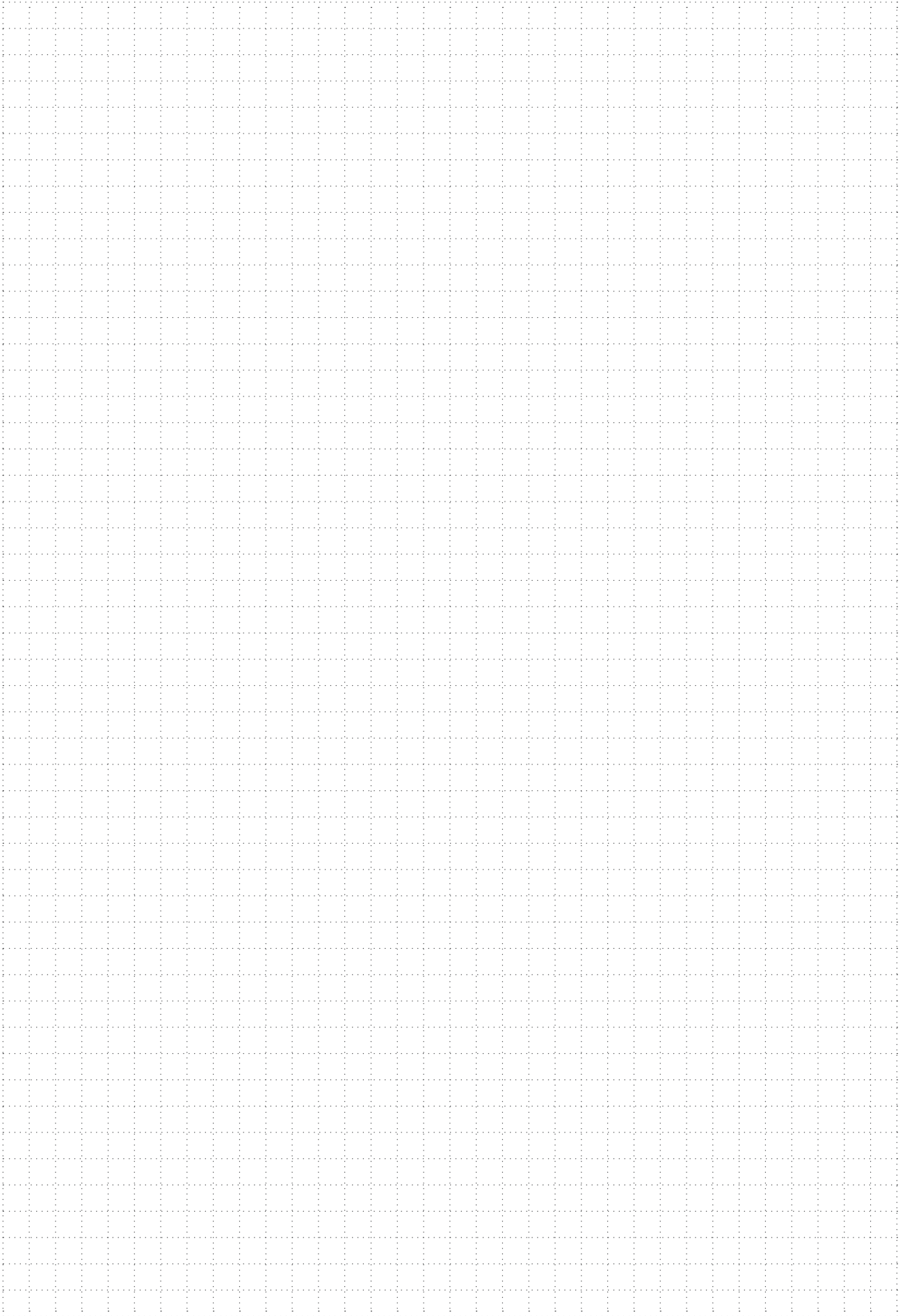
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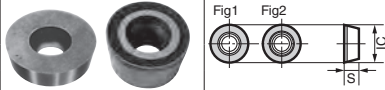


SUMIDIA Insert

Indexable Insert



For Turning

Round Insert

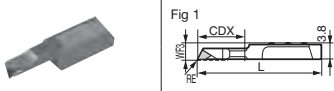
Shape	Cat. No.	SUMIDIA				Inscribed Circle IC	Thickness S	Cutting Edge Length LE	Corner Radius RE	Hole Dia.	Fig	Applicable Holder
		DA90	DA150	DA1000	DA2200							
	RPGW 0803M0			●	▲	8.0	3.18	—	—	3.3	1	Al. Wheel Turning Holder SEC-RP Profiling Holder (RP02 Type (Made-to-order item))
	RPGT 0803M0-WF	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

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

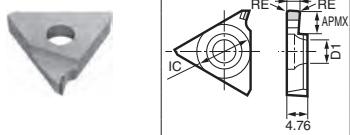
Dogbone Insert

Shape	Cat. No.	SUMIDIA				Overall Length L	Thickness S	Corner Radius RE	Fig	Applicable Holder
		DA90	DA150	DA1000	DA2200					
	MDE 3R				●	26	8.5	3.0	1	Al. Wheel Turning Holder SEC-GD Profiling Holder (GDE Type) → C44 to C45
	4R				●	30	8.5	4.0	1	
	MDE 3R-AW				●	26	8.5	3.0	1	
	4R-AW				●	30	8.5	4.0	1	

Very Small Dia. Boring Inserts

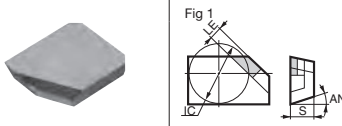
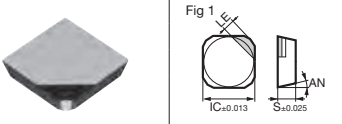
Shape	Cat. No.	SUMIDIA				Min. Bore Dia. DMIN	WF3	Corner Radius RE	L	CDX	Fig	Applicable Holder
		DA2200										
	KBMX R0311-10	●				3.0	4.1	0.1	28.5	11.0	1	Very Small Dia. Boring Bar (CKB Type) → M30
	R0411-10	●				4.0	4.3	0.1	28.5	11.0	1	
	R0511-10	●					5.0	4.5	0.1	28.5	11.0	

Grooving Insert

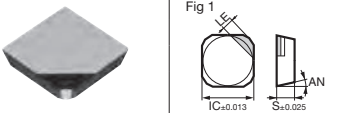
Shape	Cat. No.	DA2200		Inscribed Circle IC	Width of Cut CW	Corner Radius RE	Maximum Groove Depth APMX	Hole Dia. D1	Fig	Applicable Holder
		R	L							
	TGA R/L4125	●		12.70	1.25	0.1	2.0	5.5	1	SEC-Grooving Tools (GWC Type, GWCS Type, GWCI Type) → F4 to F5
	R/L4150	●		12.70	1.50	0.1	3.5	5.5	1	
	R/L4200	●		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 Type

Shape	Cat. No.	SUMIDIA				Inscribed Circle IC	Thickness S	Cutting Edge Length LE	Relief Angle AN	Fig	Applicable Cutter/Endmill
		DA150	DA1000	DA2200	SC10						
	APW 4R		●	▲	—	12.70	3.18	2.0	15	1	APG Type → H46
	5R				—	15.875	4.76	2.0	15	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 Type / SEC-Multi Use Endmill FPE Type

	NF-SDKN 42M	—	●	▲	—	12.70	3.18	3.0	15	1	FPG Type → H38 FPE Type → H39
	SDKN 42M	●			—	12.70	3.18	3.0	15	1	
	SDKN 53M				—	15.88	4.76	3.0	15	1	

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SUMIDIA Insert

Indexable Insert

For Milling

For SUMIDIA Cutter FAM Type/SAM Type

Shape	Cat. No.	SUMIDIA					Dimensions (mm)					
		DA150	DA1000	DA2200	SC10*	SCV10*	Inscribed Circle IC	Thickness S	Cutting Edge Length LE	Relief Angle AN	Fig	Applicable Cutter/Endmill
	FAB R L	●		●	—	—	—	7.9	(5.8)	15	1	FAM Type →M50
	SAB R L	●		●	—	—	—	7.9	(5.7)	15	2	SAM Type →M50 to M51

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

	Fig 1 	NF-TEEN 22R 32R 43R	—	●	▲	—	—	6.35	3.18	4.9	20	1	CHG Type →H138 CHE Type →H139 to H141
		TEEN 22R 32R 43R	●		—	—	—	6.35	3.18	4.9			
			●		—	—	—	9.525	3.18	4.9			
			●		—	—	—	12.70	4.76	4.8			

For High-efficiency Cutter for Aluminum Alloys ALNEX ANX Type

	Fig 1 Fig 2 Fig 3 Fig 4 Fig 5 	ANB 1600R-L 1600R-G 1600R-H	—	●	—	—	—	—	6.0	1	ANX Type →M32 to M39	
		ANB 1600R-GX	—	●	—	—	—	—	9.0			2
		ANB 1604R	—	●	—	—	—	—	6.0			3
		ANB 1600R-W	—	●	—	—	—	—	—	4		
		ANB 1600R-WS	—	—	—	○	—	—	—	5		

For High-efficiency Cutter for Aluminum Alloys HF Type

	Fig 1 Fig 2 Fig 3 	NF-LDEN 12T3ZDFR-L 12T3ZDFR-G 12T3ZDFR-H	—	●	—	—	—	—	6.0	1	HF Type →M40 to M45	
		NF-LDEN 12T3ZDFR-GX	—	●	—	—	—	—	9.0			2
		NF-LDEN 12T3ZDFR-W	—	●	—	—	—	—	—			3

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

	Fig 1 Fig 2 Fig 3 	NF-SNEW 1204ADFR 120404ADFR-H	—	●	▲	—	12.70	4.76	4.7	15	1	RF Type →M46 to M47
		NF-SNEW 1204ADFR-W	—	●	▲	—	12.70	4.76	2.3	15	2	
		SNEW 1204ADFR-WS	—	—	—	●	—	12.70	4.76	1.0	20	

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

	Fig 1 Fig 2 Fig 3 	RFB	—	●	—	—	—	—	6.5	—	1	RF Type →M46 to M47
		RFBW	—	●	—	—	—	—	4.5	—	2	

For Small Diameter Cutter for Aluminum Alloys SRF Type

	Fig 1 Fig 2 Fig 3 	NF-SNEW 09T3ADTR	—	●	▲	—	9.525	3.96	6.0	15	1	SRF Type →M48 to M49
		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 Type

	Fig 1 	NF-SECW13T3AGTN-N	—	●	▲	—	13.40	3.97	2.1	20	1	WGC Type →H24 to H27
		NF-XEEW13T3AGFR-W	—	●	▲	—	13.40	3.97	2.5	20	1	WGC Type →H24 to H27

*SC10 is SUMICRYSTAL and SCV10 is CVD single-crystal diamond

○ mark: Stock or planned stock item (please confirm stock availability) ▲: To be replaced by new item (please confirm stock availability)

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SUMIDIA/SUMIDIA BINDERLESS Inserts Indexable Insert

■ SUMIDIA BINDERLESS NPD10 Neg.

(Legend) Continuous Cutting ● 1st Recommendation

Shape	Cat. No.	NPD10	Dimensions (mm)				
			CBN 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

■ SUMIDIA DA90 Neg. NF

(Legend) Continuous Cutting ● 1st Recommendation

Shape	Cat. No.	DA90	Dimensions (mm)				
			CBN 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

Pos.

(Legend) Continuous Cutting ● 1st Recommendation

Shape	Relief Angle	Cat. No.	NPD10	Dimensions (mm)				
				CBN 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
	7°	CCMW 04X102RH	●	1.7	4.3	1.8	2.3	0.2
		04X104RH	●	1.7	4.3	1.8	2.3	0.4
	7°	CCMW 060202RH	●	1.7	6.35	2.38	2.8	0.2
		060204RH	●	1.7	6.35	2.38	2.8	0.4
	7°	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
		DCMW 070202RH	●	2.1	6.35	2.38	2.8	0.2
	7°	DCMW 070204RH	●	2.0	6.35	2.38	2.8	0.4
		DCMW 11T302RH	●	2.1	9.525	3.97	4.4	0.2
	7°	DCMW 11T304RH	●	1.9	9.525	3.97	4.4	0.4
		DCMW 11T308RH	●	1.6	9.525	3.97	4.4	0.8
		TPMW 080202RH	●	1.2	4.76	2.38	2.3	0.2
	11°	TPMW 080204RH	●	1.0	4.76	2.38	2.3	0.4
		TPMW 110302RH	●	1.5	6.35	3.18	3.4	0.2
	11°	TPMW 110304RH	●	1.3	6.35	3.18	3.4	0.4
		TPMW 110308RH	●	1.0	6.35	3.18	3.4	0.8
		TPMW 160402RH	●	2.2	9.525	4.76	4.4	0.2
	7°	TPMW 160404RH	●	2.0	9.525	4.76	4.4	0.4
		TPMW 160408RH	●	1.6	9.525	4.76	4.4	0.8
		TPMW 160412RH	●	1.5	9.525	4.76	4.4	1.2
	7°	VCMW 080201RH	●	2.2	4.76	2.38	2.3	0.1
		VCMW 080202RH	●	1.9	4.76	2.38	2.3	0.2
		VCMW 080204RH	●	1.5	4.76	2.38	2.3	0.4
	7°	VCMW 110302RH	●	2.1	6.35	3.18	2.8	0.2
		VCMW 110304RH	●	1.7	6.35	3.18	2.8	0.4
	7°	VCMW 160402RH	●	2.1	9.525	4.76	4.4	0.2
		VCMW 160404RH	●	1.7	9.525	4.76	4.4	0.4
		VCMW 160408RH	●	1.8	9.525	4.76	4.4	0.8
		VCMW 160412RH	●	1.5	9.525	4.76	4.4	1.2

The R portion of the cutting edge is cylindrical shaped.

Pos. NF

(Legend) Continuous Cutting ● 1st Recommendation

Shape	Relief Angle	Cat. No.	DA90	Dimensions (mm)				
				CBN 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
		NF-CCMW 03X104	●	1.1	3.5	1.4	1.9	0.4
	7°	NF-CCMW 04X102	●	1.5	4.3	1.8	2.3	0.2
		NF-CCMW 04X104	●	1.5	4.3	1.8	2.3	0.4
	7°	NF-CCMW 060202	●	2.4	6.35	2.38	2.8	0.2
		NF-CCMW 060204	●	2.4	6.35	2.38	2.8	0.4
	7°	NF-CCMW 09T302	●	2.4	9.525	3.97	4.4	0.2
		NF-CCMW 09T304	●	2.4	9.525	3.97	4.4	0.4
		NF-CCMW 09T308	●	2.3	9.525	3.97	4.4	0.8
		NF-DCMW 070202	●	2.6	6.35	2.38	2.8	0.2
	7°	NF-DCMW 070204	●	2.4	6.35	2.38	2.8	0.4
		NF-DCMW 11T302	●	2.6	9.525	3.97	4.4	0.2
	7°	NF-DCMW 11T304	●	2.4	9.525	3.97	4.4	0.4
		NF-DCMW 11T308	●	2.0	9.525	3.97	4.4	0.8
		NF-TPMW 080202	●	2.5	4.76	2.38	2.3	0.2
	11°	NF-TPMW 080204	●	2.4	4.76	2.38	2.3	0.4
		NF-TPMW 110302	●	2.5	6.35	3.18	3.4	0.2
	11°	NF-TPMW 110304	●	2.4	6.35	3.18	3.4	0.4
		NF-TPMW 110308	●	2.1	6.35	3.18	3.4	0.8
		NF-TPMW 160402	●	2.5	9.525	4.76	4.4	0.2
	7°	NF-TPMW 160404	●	2.4	9.525	4.76	4.4	0.4
		NF-TPMW 160408	●	2.1	9.525	4.76	4.4	0.8
		NF-TPMW 160412	●	2.1	9.525	4.76	4.4	1.2
	7°	NF-VCMW 080202	●	3.2	4.76	2.38	2.3	0.2
		NF-VCMW 080204	●	2.8	4.76	2.38	2.3	0.4
	7°	NF-VCMW 110302	●	3.2	6.35	3.18	2.8	0.2
		NF-VCMW 110304	●	2.8	6.35	3.18	2.8	0.4
	7°	NF-VCMW 160402	●	3.7	9.525	4.76	4.4	0.2
		NF-VCMW 160404	●	3.3	9.525	4.76	4.4	0.4
		NF-VCMW 160408	●	2.4	9.525	4.76	4.4	0.8
		NF-VCMW 160412	●	2.1	9.525	4.76	4.4	1.2

The R portion of the cutting edge is cylindrical shaped.

SUMIDIA BINDERLESS

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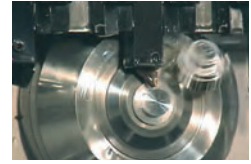
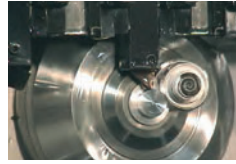
W

SGW Type



■ Features

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



■ Application Examples

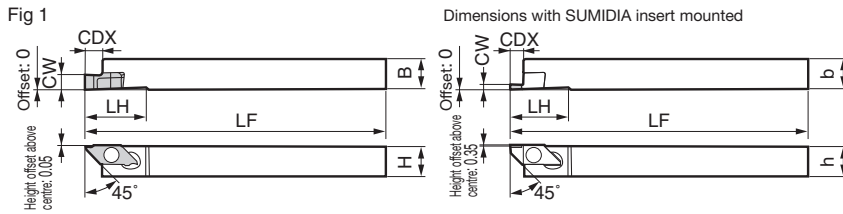
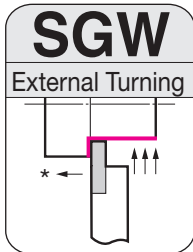
LD Type + DA1000

Conventional Tool

Work Material: Valve (A6061) Tool Cat. No.: KGV R2004-LD (DA1000)
Cutting Conditions: $v_c = 250\text{m/min}$, $f = 0.10\text{mm/rev}$, $a_p = 0.5\text{mm}$ Wet

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

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



*Use the SUMIDIA insert for traverse cutting.

Holder

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

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)

Cat. No.	DA1000	Width of Cut CW	Overall Length L	Overall Length LF	Maximum Groove Depth CDX	Head Length LH	Effective Length	Fig	Fig 1
KGV R2004-LD	●	2.0	19.7	118.7	5.7	23.2	4.0	1	
KGV R2504-LD	●	2.5	19.7	118.7	5.7	23.2	4.0	1	
KGV R2506-LD	●	2.5	21.2	120.2	7.2	24.7	5.5	1	

Insert (Carbide) (Coated)

Cat. No.	AC1030U	AC530U	Width of Cut CW	Overall Length L	Overall Length LF	Maximum Groove Depth CDX	Head Length LH	Effective Length	Fig	Fig 1
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	

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

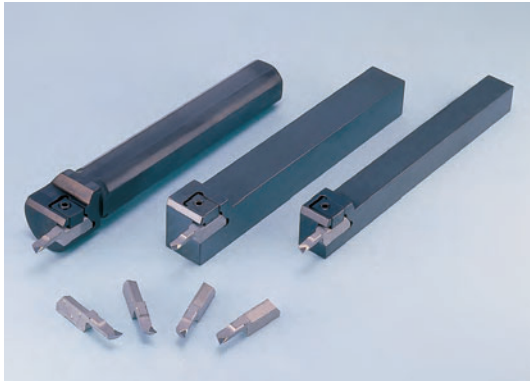
Recommended Cutting Conditions

Work Material	P Steel	M Stainless Steel	N Non-Ferrous Metal	N Non-Ferrous Metal	
	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.

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

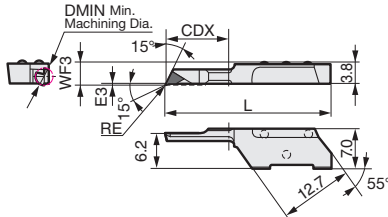
SUMIDIA
M
SUMIDIA
BINDERLESS
SUMICRYSTAL
C
D
S
T
V
W



■ Features

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

■ Insert

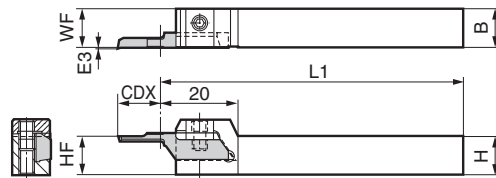


(SUMIDIA)

Dimensions (mm)

Cat. No.	DA2200	Min. Machining 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

Parts

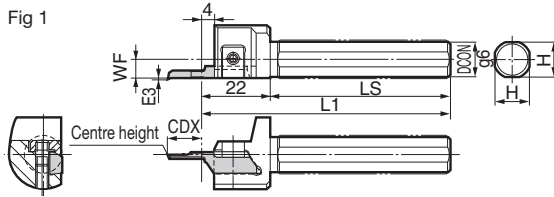
Dimensions (mm)	Fig	Clamp Plate	Double Screw	Wrench
10, 12, 16, 20, 25	1	CKBW16	WB4-8	LH020

Holders

Cat. No.	Stock	Height H	Width B	Overall Length L1	Cutting Edge Distance WF	Cutting Edge Height HF	Fig
CKB R1010-16	●	10	10	100	10	10	1
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

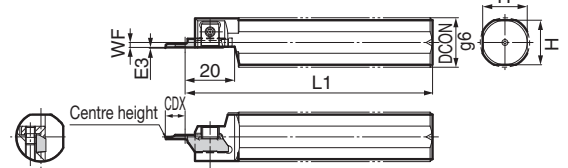
*Inserts are not embedded into tool holders.

■ Round Shank



For E3 and CDX, refer to the insert section

Fig. 2 (Small Offset Type)



Parts

Dimensions (mm)	Fig	Clamp Plate	Double Screw	Wrench
9, 11, 15, 17, 18, 19.05, 20, 22, 23, 25.4	2	CKBW16	WB4-8	LH020 (For Hex Socket)

Holders

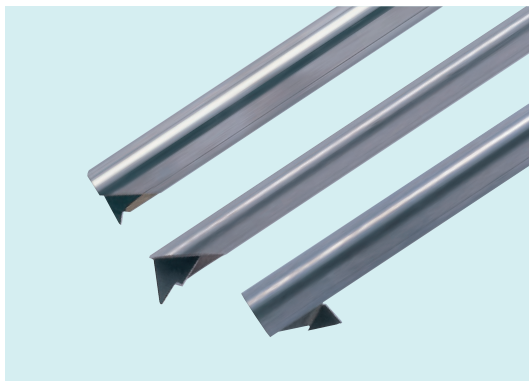
Cat. No.	Stock	Diameter DCON	Height H	Overall Length L1	Length LS	Cutting Edge Distance WF	Fig
S10F-CKB R-16	●	10	9	80	58	5	1
S12F-CKB R-16	●	12	11	80	58	6	1
S16H-CKB R-16	●	16	15	100	78	8	1
S19K-CKB R-16	●	19.05	17	125	103	8	1
S20K-CKB R-16	●	20	18	125	103	10	1
S1905H-CKB RS-16	●	19.05	17	100	—	2	2
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 embedded into tool holders.

■ Recommended Cutting Conditions

Work Material	Spindle Speed	Depth of Cut a_p	Feed Rate f	Coolant
N Aluminum Alloy	Above 2,000 min ⁻¹	0.1mm or below	Below 0.1mm/rev.	Wet

DABB Type

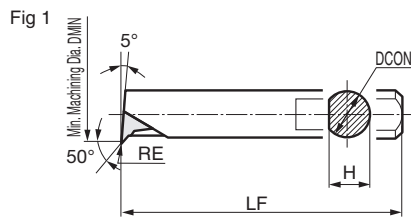
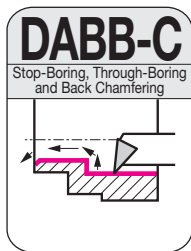


■ Features

- Small Diameter Boring Bars for Aluminum Alloy
Three types are in stock, enabling a range of machining from general boring to necking and back turning. $\phi 3.0$ mm minimum machining diameter
- Utilises High Strength PCD Grade DA2200 for Cutting Edge

For general boring with min. machining diameter $\phi 10$ to $\phi 22$ mm range, use the BNB Type small diameter boring bar + SUMIDIA Insert (See page L126 for details)

PCD

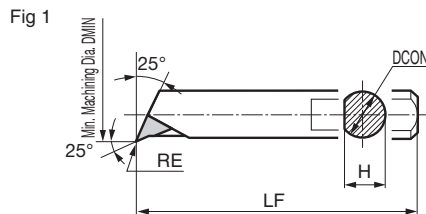
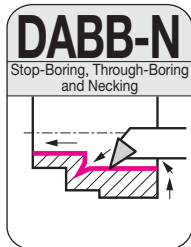


Holder (SUMIDIA)

Dimensions (mm)

Cat. No.	DA2200	Min. Machining Dia. DMIN	Diameter DCON	Height H	Overall Length LF	Corner Radius RE	Applicable 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

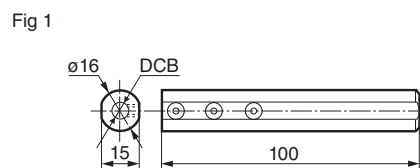
PCD



Holder (SUMIDIA)

Dimensions (mm)

Cat. No.	DA2200	Min. Machining Dia. DMIN	Diameter DCON	Height H	Overall Length LF	Corner Radius RE	Applicable 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



Sleeve

Dimensions (mm)

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

HBX Type sleeve can also be used.

■ Recommended Cutting Conditions

Work Material	Spindle Speed	Depth of Cut a_p	Feed Rate f	Coolant
N Aluminum Alloy	Above 2,000 min ⁻¹	0.1mm or below	Below 0.1mm/rev.	Wet

SUMIDIA
 M
 SUMIDIA BINDERLESS
 SUMICRYSTAL
 C
 D
 S
 T
 V
 W

ALNEX ANX Type

Expansion



■ Features

- **Drastically Reduced Runout Adjustment Time**
Simple screw-fastening structure enables fine adjustments to be made easily
- **Through-Blade Coolant**
Directs coolant supply to the cutting edge and effectively breaks chips
- **Lightweight Aluminum Alloy Body**
Utilizes aluminum alloy to achieve a total weight of less than 1.3kg for a ø125mm cutter with 22 teeth

■ 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
	ANXA 16000RS	Aluminum Alloy								6	10	14	8	12	18	10	14	22	12	20	28
	ANXS 16000R Inch	Steel							6	8	12	6	10	14	8	12	18	10	14	22	
	ANXS 16000RS	Steel				4	6	4	6	9	6	8	12	6	10	14	8	12	18	10	14
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												

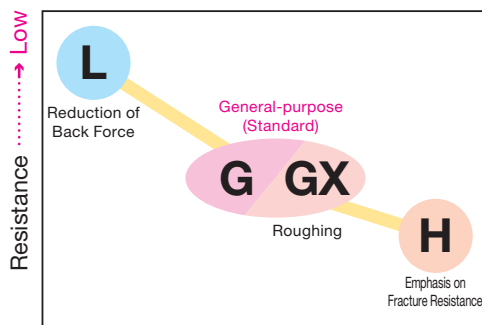
Number in ● shows the number of teeth (expanded items are shown in red with white borders) Inch Inch Bore

Modular Type **M39**

■ Blade Selection Guide

Work Material	N							
Applications	Finishing/ Light Cutting	General-purpose	Roughing		Corner Radius	Corner Radius	Finishing	Mirror Finish/ Burrless Finish
Features	Low Resistance	Standard	Long Edge	High Strength	Corner Radius 0.4	Corner Radius 0.8	Wiper	Wiper
Type	L	G	GX	H	—	—	W	WS
Cutting Edge Shape								
Edge Length (*)	6.0mm	6.0mm	9.0mm	6.0mm	6.0mm	6.0mm	2.0mm	—

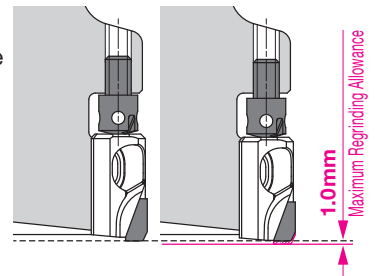
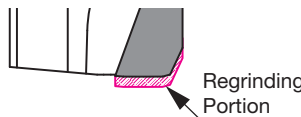
■ Blade Selection Reference



*Edge Length
GX Type 9.0mm

● 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 cannot be reground.)



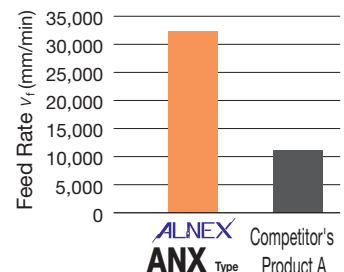
■ High-speed/High-efficiency Cutting

Realizes ultra-high-efficiency machining with $v_f = 30,000\text{mm/min}$



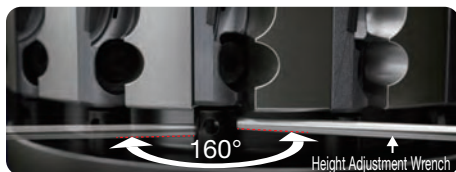
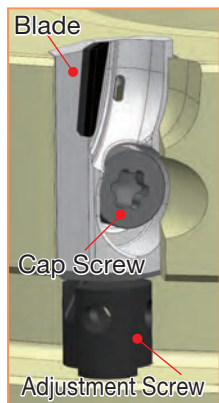
Cutter Diameter ø100mm Comparison

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



■ Drastically Reduced Runout Adjustment Time

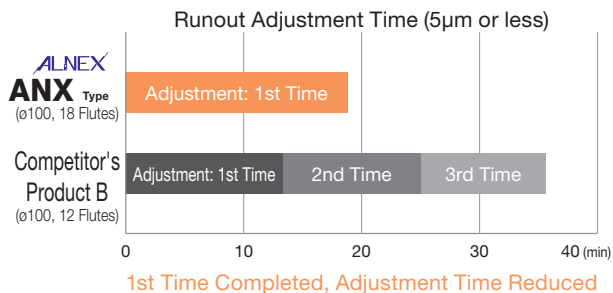
- Simple screw-fastening structure
- Enables fine adjustments to be made easily
- High-rigidity body (reduces deformation due to tightening)



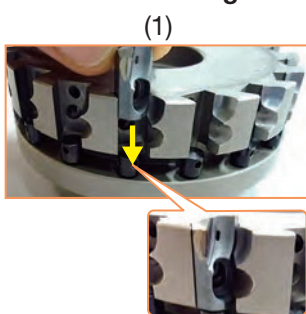
Adjustment is easy thanks to the large movable range of the height adjustment wrench.



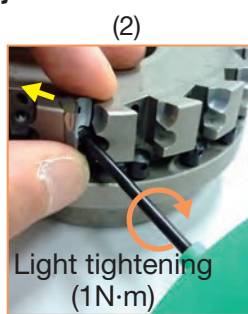
*We recommend keeping cutting edge height variation during runout adjustment to within 5µm.



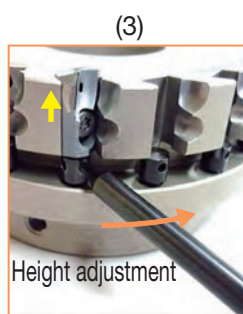
■ Blade Mounting/Runout Adjustment



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



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



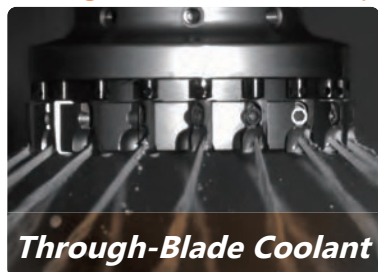
(3) Adjust the blade to the required height by using the dedicated height adjustment wrench to turn the height adjustment screw.



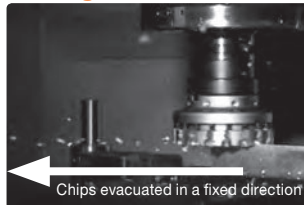
(4) Perform final tightening (2N·m) of the cap screw.

■ Chip Control

Through-Blade Coolant Chip Breaking



Through-Blade Coolant



Controls the chip's scatter direction.



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



ALNEX ANX Type



Competitor's Product C

Work Material: ADC12, Cutting Conditions: $V_c = 2,500\text{m/min}$, $f_z = 0.05\text{mm/t}$, $a_p = 0.5\text{mm Wet}$

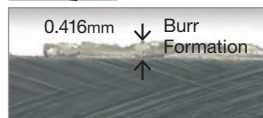
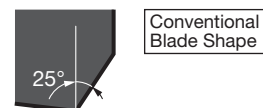
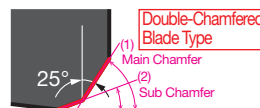
■ Burr Control

Reduces burrs by using a double-chamfered cutting edge.



Drastically reduces burrs by preventing plastic deformation that causes burrs.

Work Material: A6061 Sheet Metal
Cutting Conditions: $V_c = 3,142\text{m/min}$, $f_z = 0.10\text{mm/t}$, $a_p = 0.5\text{mm Dry}$



New CVD Single Crystal Diamond Wiper Blade

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

ANXA 16000R(S) Type

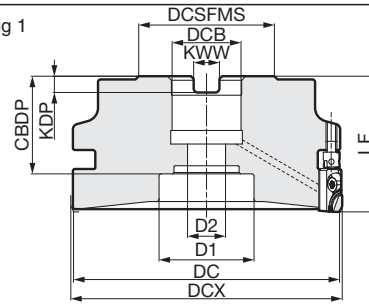


Expansion

Rake Angle	Radial	+5°
	Axial	+5°



Fig 1



Body (Aluminum Alloy)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Boss Dia. DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CDBP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
ANXA 16080RS06	●	78	80	50	50	27	12.4	7	34	35	14	6	0.5	1
16080RS10	●	78	80	50	50	27	12.4	7	34	35	14	10	0.5	1
16080RS14	●	78	80	50	50	27	12.4	7	34	35	14	14	0.5	1
16100RS08	●	98	100	50	50	27	12.4	7	34	35	14	8	0.8	1
16100RS12	●	98	100	50	50	27	12.4	7	34	35	14	12	0.8	1
16100RS18	●	98	100	50	50	27	12.4	7	34	35	14	18	0.9	1
16125RS10	●	123	125	50	50	27	12.4	7	34	35	14	10	1.2	1
16125RS14	●	123	125	50	50	27	12.4	7	34	35	14	14	1.2	1
16125RS22	●	123	125	50	50	27	12.4	7	34	35	14	22	1.3	1
16160RS12	●	158	160	80	63	40	16.4	9	35	52	29	12	2.6	1
16160RS20	●	158	160	80	63	40	16.4	9	35	52	29	20	2.6	1
16160RS28	●	158	160	80	63	40	16.4	9	35	52	29	28	2.6	1
ANXA 16080R06	●	78	80	50	50	25.4	9.5	6	34	35	14	6	0.5	1
16080R10	●	78	80	50	50	25.4	9.5	6	34	35	14	10	0.5	1
16080R14	●	78	80	50	50	25.4	9.5	6	34	35	14	14	0.5	1
16100R08	●	98	100	50	50	25.4	9.5	6	34	35	14	8	0.8	1
16100R12	●	98	100	50	50	25.4	9.5	6	34	35	14	12	0.9	1
16100R18	●	98	100	50	50	25.4	9.5	6	34	35	14	18	0.9	1
16125R10	●	123	125	50	50	25.4	9.5	6	34	35	14	10	1.2	1
16125R14	●	123	125	50	50	25.4	9.5	6	34	35	14	14	1.2	1
16125R22	●	123	125	50	50	25.4	9.5	6	34	35	14	22	1.3	1
16160R12	●	158	160	80	63	38.1	15.9	10	42.5	55	30	12	2.3	1
16160R20	●	158	160	80	63	38.1	15.9	10	42.5	55	30	20	2.4	1
16160R28	●	158	160	80	63	38.1	15.9	10	42.5	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 Aluminum Alloy Body Blade Size Cutter Dia. Feed Direction Metric Body Number of Teeth

SUMIDIA

M

SUMIDIA
SUMIDIA
BINDERLESS

SUMICRYSTAL

C

D

S

T

V

W

Expansion

Blade

Dimensions (mm)

Grade Classification		SUMIDIA	CVD Single-crystal Diamond					
Process	High-speed/Light	N	N					
	General-purpose	N						
	Roughing	N						
Cat. No.	DA1000	SCV10	Cutting Edge Length	Corner Radius RE	Wiper Flat Shape	Applications	Fig	
ANB 1600R-L	●	—	6.0	—	Linear	Low Resistance	1	
1600R-G	●	—	6.0	—	Arc-Shaped	General-purpose	1	
1600R-H	●	—	6.0	—	Arc-Shaped	Strong Edge	1	
1600R-GX	●	—	9.0	—	Arc-Shaped	Long Edge	2	
1604R	●	—	6.0	0.4	Linear	Corner Radius	3	
1608R	●	—	6.0	0.8	Linear	Corner Radius	3	
1600R-W	●	—	2.0	—	Arc-Shaped	Wiper	4	
1600R-WS	—	○	—	—	Arc-Shaped	Wiper	5	

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 guidelines. 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 v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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.

Maximum Allowable Spindle Speed

Cat. No.	n max(min ⁻¹)
ANXA 1608RS06	20,000
1608RS10	20,000
1608RS14	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 1608R06	20,000
1608R10	20,000
1608R14	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

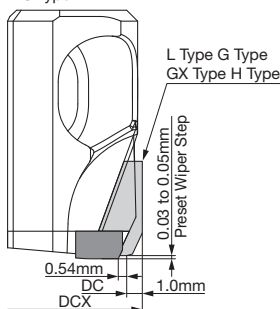
Parts

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

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

SCV10 Wiper Blade Step Amount

WS Type



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

When using the WS Type (SCV10 wiper blade), in order to maintain balance, be sure to use a cutter with an even number of cutting edges and place the WS Type blades at opposite positions.

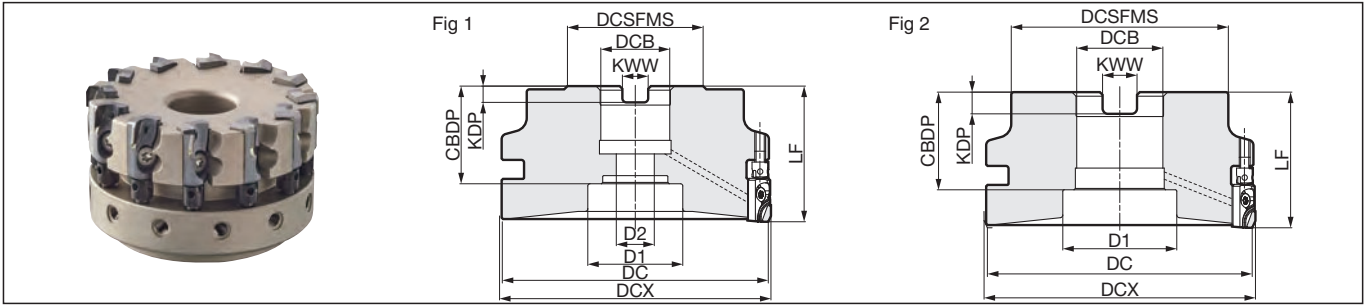
ANXS 16000R(S) Type



Expansion

Rake Angle	Radial Axial	+5°
Angle		+5°

3mm 90°



Body (Steel)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Boss Dia. DCSFMS	Overall Length LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CDBP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
ANXS 16040RS04	●	38	40	38.5	40	16	8.4	5.6	26	14	9	4	0.3	1
16040RS06	●	38	40	38.5	40	16	8.4	5.6	26	14	9	6	0.3	1
16050RS04	●	48	50	48.5	40	22	10.4	6.3	26	18	11	4	0.4	1
16050RS06	●	48	50	48.5	40	22	10.4	6.3	26	18	11	6	0.4	1
16050RS09	●	48	50	48.5	40	22	10.4	6.3	26	18	11	9	0.5	1
16063RS06	●	61	63	50	40	22	10.4	6.3	26	18	11	6	0.7	1
16063RS08	●	61	63	50	40	22	10.4	6.3	26	18	11	8	0.7	1
16063RS12	●	61	63	50	40	22	10.4	6.3	26	18	11	12	0.7	1
16080RS06	●	78	80	50	50	27	12.4	7	34	35	14	6	1.2	1
16080RS10	●	78	80	50	50	27	12.4	7	34	35	14	10	1.2	1
16080RS14	●	78	80	50	50	27	12.4	7	34	35	14	14	1.2	1
16100RS08	●	98	100	80	50	32	14.4	8	32	46	—	8	1.9	2
16100RS12	●	98	100	80	50	32	14.4	8	32	46	—	12	2.0	2
16100RS18	●	98	100	80	50	32	14.4	8	32	46	—	18	2.0	2
16125RS10	●	123	125	80	63	40	16.4	9	35	52	—	10	3.8	2
16125RS14	●	123	125	80	63	40	16.4	9	35	52	—	14	3.9	2
16125RS22	●	123	125	80	63	40	16.4	9	35	52	—	22	3.9	2
ANXS 16063R06	●	61	63	50	50	25.4	9.5	6	31	20	14	6	0.9	1
16063R08	●	61	63	50	50	25.4	9.5	6	31	20	14	8	0.9	1
16063R12	●	61	63	50	50	25.4	9.5	6	31	20	14	12	0.9	1
16080R06	●	78	80	50	50	25.4	9.5	6	34	35	14	6	1.2	1
16080R10	●	78	80	50	50	25.4	9.5	6	34	35	14	10	1.2	1
16080R14	●	78	80	50	50	25.4	9.5	6	34	35	14	14	1.2	1
16100R08	●	98	100	80	50	31.75	12.7	8	36	42	—	8	1.9	2
16100R12	●	98	100	80	50	31.75	12.7	8	36	42	—	12	2.0	2
16100R18	●	98	100	80	50	31.75	12.7	8	36	42	—	18	2.0	2
16125R10	●	123	125	80	63	38.1	15.9	10	42.5	52	—	10	3.9	2
16125R14	●	123	125	80	63	38.1	15.9	10	42.5	52	—	14	3.9	2
16125R22	●	123	125	80	63	38.1	15.9	10	42.5	52	—	22	3.9	2

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 Steel Body Blade Size Cutter Dia. Feed Metric Number of Teeth Direction Body of Teeth

SUMIDIA

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SUMIDIA BINDERLESS

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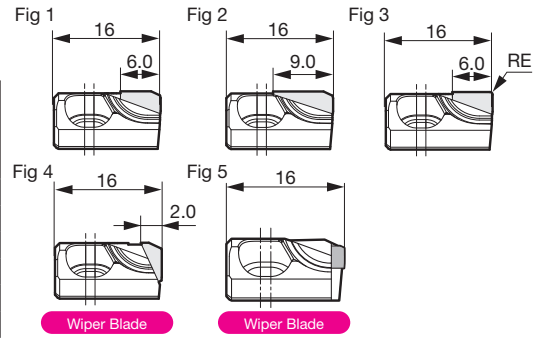
W

Expansion

Blade

Dimensions (mm)

Grade Classification		SUMIDIA	CVD Single-crystal Diamond					
Process	High-speed/Light	N	N					
	General-purpose	N						
	Roughing	N						
Cat. No.	DA1000	SCV10	Cutting Edge Length	Corner Radius RE	Wiper Flat Shape	Applications	Fig	
ANB 1600R-L	●	—	6.0	—	Linear	Low Resistance	1	
1600R-G	●	—	6.0	—	Arc-Shaped	General-purpose	1	
1600R-H	●	—	6.0	—	Arc-Shaped	Strong Edge	1	
1600R-GX	●	—	9.0	—	Arc-Shaped	Long Edge	2	
1604R	●	—	6.0	0.4	Linear	Corner Radius	3	
1608R	●	—	6.0	0.8	Linear	Corner Radius	3	
1600R-W	●	—	2.0	—	Arc-Shaped	Wiper	4	
1600R-WS	—	○	—	—	Arc-Shaped	Wiper	5	



Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 guidelines. 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 v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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.

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

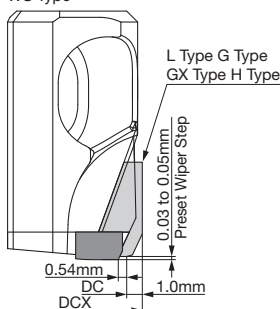
Parts

Applicable Cutter	Cap Screw		Wrench	Adjustment Screw	Adjustment Wrench	Centre Bolt	
ANXS 16040RS00						BXH0825-D13	15
ANXS 16050RS00						BXH1030-D16	25
ANXS 16063RS00	BXA0310IP	2.0	TRXW10IP	HFJ	ANT	BXH1235-D33	50
ANXS 16080RS00						BXH1635-D40	100
ANXS 16100RS00						BXH2036-D50	200
ANXS 16125RS00						BXH1235-D18	40
ANXS 16063R00	BXA0310IP	2.0	TRXW10IP	HFJ	ANT	BXH1235-D33	50
ANXS 16080R00						BXH1635-D40	100
ANXS 16100R00						BXH2036-D50	200
ANXS 16125R00						BXH2036-D50	200

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

SCV10 Wiper Blade Step Amount

WS Type



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

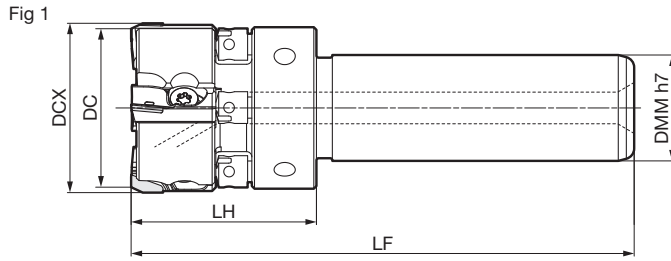
When using the WS Type (SCV10 wiper blade), in order to maintain balance, be sure to use a cutter with an even number of cutting edges and place the WS Type blades at opposite positions.

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ANXS 16000E Type



Expansion	Rake Angle	Radial Axial	-2° to 0° +5°	3mm	90°



Body (Steel)

Dimensions (mm)

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

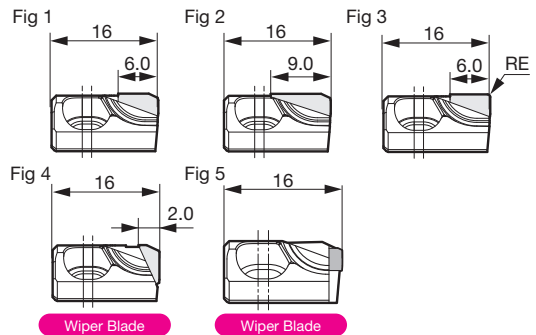
Parts

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 Type and High-efficiency Cutter HF Type.

Blade

Grade Classification	SUMIDIA		CVD Single-crystal Diamond	Cutting Edge Length	Corner Radius RE	Wiper Flat Shape	Applications	Fig
	High-speed/Light	General-purpose						
Process	N	N	N					
Cat. No.	DA1000	SCV10						
ANB 1600R-L	●	—	6.0	—	Linear	Low Resistance	1	
1600R-G	●	—	6.0	—	Arc-Shaped	General-purpose	1	
1600R-H	●	—	6.0	—	Arc-Shaped	Strong Edge	1	
1600R-GX	●	—	9.0	—	Arc-Shaped	Long Edge	2	
1604R	●	—	6.0	0.4	Linear	Corner Radius	3	
1608R	●	—	6.0	0.8	Linear	Corner Radius	3	
1600R-W	●	—	2.0	—	Arc-Shaped	Wiper	4	
1600R-WS	—	○	—	—	Arc-Shaped	Wiper	5	



Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 guidelines. 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 v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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.

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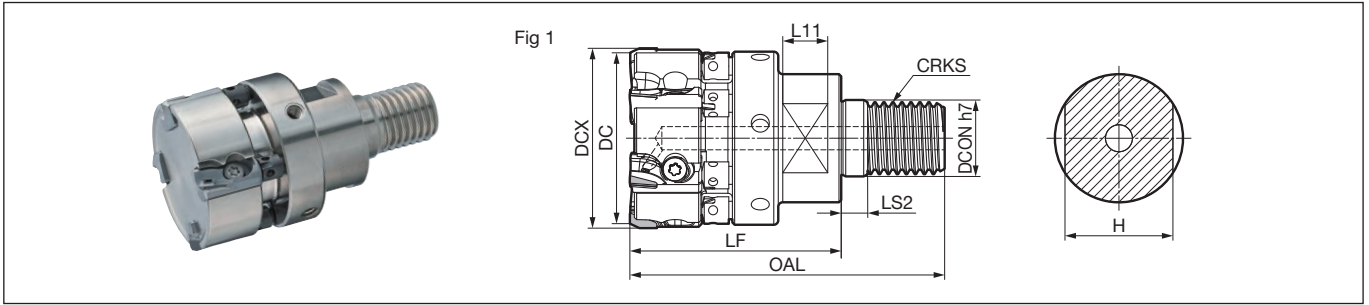
W

ANXS 16000M Type



New

Rake Angle	Radial Axial	-2° to 0° +5°	3mm	90°



Body (Steel)

													Dimensions (mm)	
Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Mounting Dia. DCON	Screw CRKS	Overall Length OAL	Effective Length LF	Length LF2	Chamfer L11	Width H	Number of Teeth	Weight (kg)	Fig	
Metric	ANXS 16025M12Z02	●	23	25	12.5	M12	61	40	5	10	19	2	0.1	1
	16030M16Z03	●	28	30	17.0	M16	70	47	5	10	24	3	0.2	1
	16030M16Z04	●	28	30	17.0	M16	70	47	5	10	24	4	0.2	1
	16032M16Z03	●	30	32	17.0	M16	70	47	5	10	24	3	0.3	1
	16032M16Z04	●	30	32	17.0	M16	70	47	5	10	24	4	0.3	1
	16040M16Z04	●	38	40	17.0	M16	70	47	5	10	24	4	0.4	1
	16040M16Z06	●	38	40	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.

Blade

Grade Classification		SUMIDIA	CVD Single-crystal Diamond						Dimensions (mm)				
Process	High-speed/Light	N	N										
	General-purpose	N											
	Roughing	N											
Cat. No.	DA1000	SCV10	Cutting Edge Length	Corner Radius RE	Wiper Flat Shape	Applications	Fig	Fig 1	Fig 2	Fig 3	Fig 4	Fig 5	
ANB 1600R-L	●	—	6.0	—	Linear	Low Resistance	1	16	16	16	16	16	
1600R-G	●	—	6.0	—	Arc-Shaped	General-purpose	1	16	16	16	16	16	
1600R-H	●	—	6.0	—	Arc-Shaped	Strong Edge	1	16	16	16	16	16	
1600R-GX	●	—	9.0	—	Arc-Shaped	Long Edge	2	16	16	16	16	16	
1604R	●	—	6.0	0.4	Linear	Corner Radius	3	16	16	16	16	16	
1608R	●	—	6.0	0.8	Linear	Corner Radius	3	16	16	16	16	16	
1600R-W	●	—	2.0	—	Arc-Shaped	Wiper	4	16	16	16	16	16	
1600R-WS	—	○	—	—	Arc-Shaped	Wiper	5	16	16	16	16	16	

Parts

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

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

Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 above 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 v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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.

Identification Code

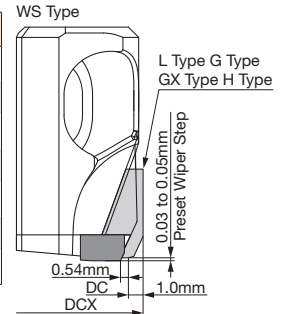
ANX S 16 032 M16 Z03

Series Steel Body Blade Size Cutter 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

SCV10 Wiper Blade Step Amount



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

When using the WS Type (SCV10 wiper blade), in order to maintain balance, be sure to use a cutter with an even number of cutting edges and place the WS Type blades at opposite positions.

HF Type

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General Features

The HF Type high-efficiency aluminum alloy cutter employs a unique blade design to achieve machining without burrs.

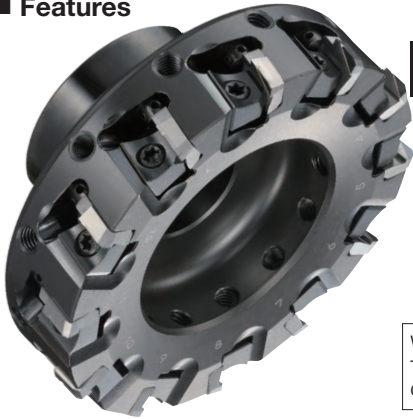
HFFH Type with coolant holes is now available as a BBT30 (BIG-PLUS™) arbor integrated version.

Work Material

- Aluminum and aluminum alloys
- Other non-ferrous metals

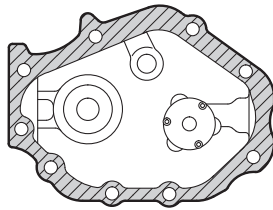
(Not suited for cast iron or steel.)

Features

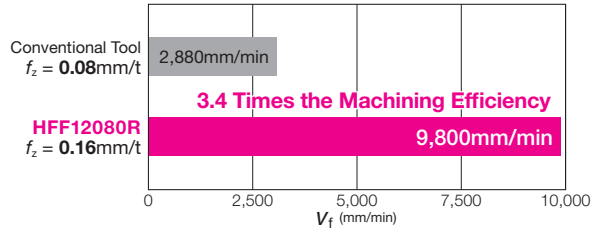


- Achieves high-efficiency milling with v_f of over 20,000mm/min thanks to its multi-blade design (3 edges per inch)

High-feed, High-efficiency Milling by Multi-edge Design

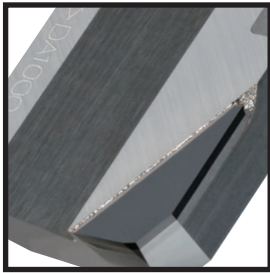


Workpiece: Aluminum Case (Frame Milling)
Tool: HFF12080R-25.4 (ø80 10-teeth), Conventional Tool (ø80 6-teeth)



Maximum Allowable Spindle Speed and Feed Rate

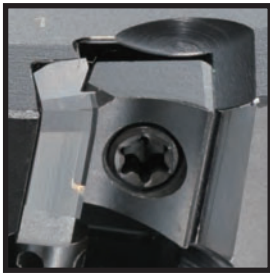
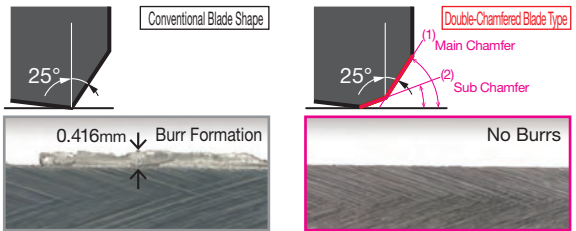
Cutter Dia. (mm)	n_{max} (min ⁻¹)	v_c (m/min)	f_z (mm/t)	Maximum Number of Teeth (pcs.)	v_f (mm/min)
ø80	11,000	2,763	up to 0.2	10	up to 22,000
ø100	9,500	2,983	up to 0.2	12	up to 22,800
ø125	7,500	2,944	up to 0.2	15	up to 22,500



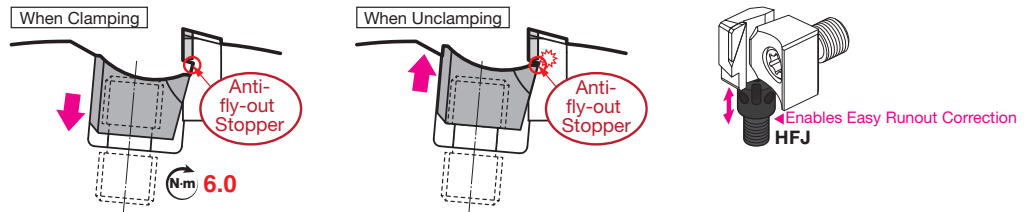
- Reduces burrs by using a double-chamfered blade type

Drastically reduces burrs by preventing plastic deformation that causes burrs.

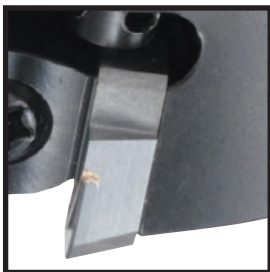
Work Material: A6061 Sheet Metal
Cutting Conditions: $v_c = 3,142$ m/min, $f_z = 0.10$ mm/t, $a_p = 0.5$ mm Dry



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



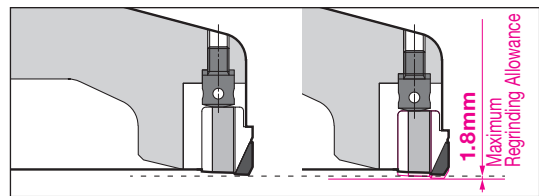
Ensure that the maximum allowable spindle speed (n_{max}) specified for each cutter diameter is not exceeded. (See the table at upper right)



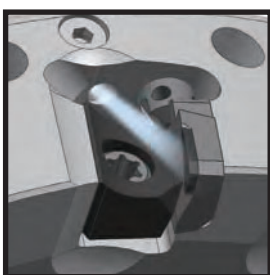
- Reduces running costs by drastically increasing blade regrinding allowance (to 1.8mm)

Assuming 0.2mm of regrinding each time, an edge can be used up to 10 times.

(Given conditions of normal wear with $a_p = 1.4$ 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)

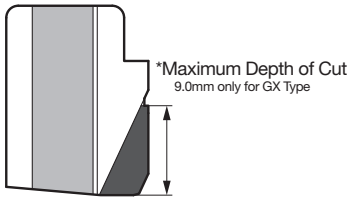
The internal coolant effectively prevents chips from becoming clogged or biting into the work material and achieves longer tool life. (Use an internal coolant compatible arbor)

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

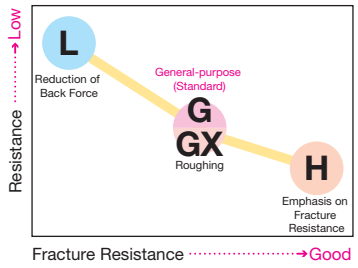
HF Type

Blade Selection Guide

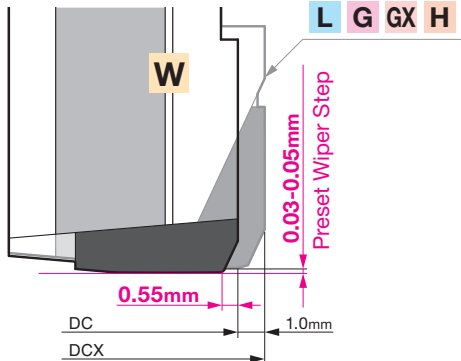
Work Material	N				
Applications	Reduction of Back Force	General-purpose	Roughing	Emphasis on Fracture Resistance	Finishing
Features	Low Resistance	Standard	Long Edge	High Strength	Wiper
Type	L Type	G Type	GX Type	H Type	W Type
Cutting Edge Shape					
Edge Length (*)	6.0mm	6.0mm	9.0mm	6.0mm	2.0mm



Blade Selection Reference

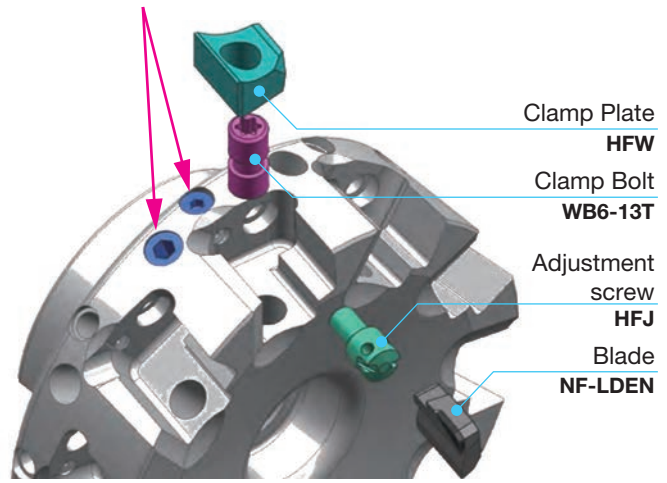


Wiper Blade Step Amount



Structure of HF Type

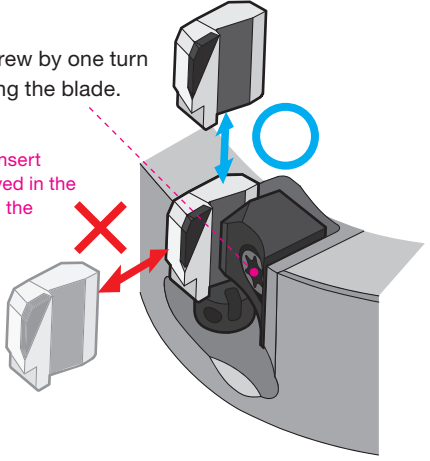
The axial set screw and balance adjustment screw hole have an embedded special part that prevents the insertion of screwdrivers or hex wrenches.



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.

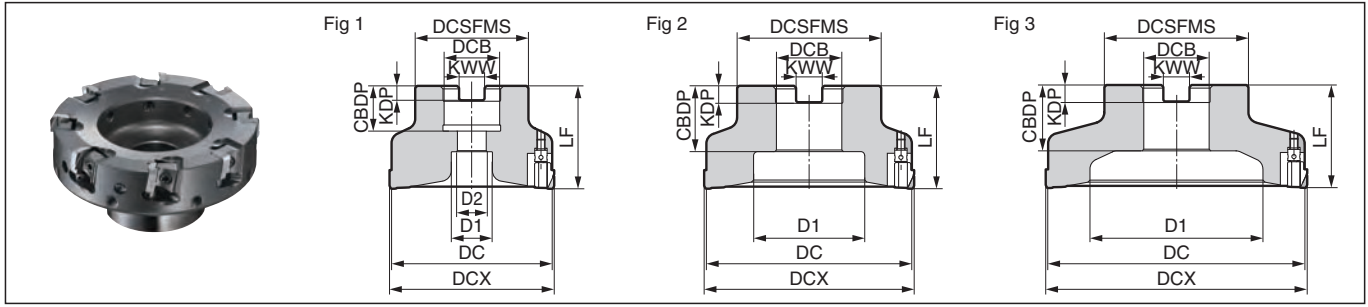


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HFM 12000RS/R Type



Rake Angle	Radial	4°
	Axial	10°



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 CDBP	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	N
	General-purpose	N
	Roughing	N

Cat. No.	DA1000	Cutting Edge Length	Wiper Flat Shape	Applications	Fig
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Resistance	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

Parts

(Sold Separately)

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

Identification Code

HF M 12 080 R S - 22

Series Fine Pitch Blade Cutter Feed Metric Hole
Size Dia. Direction Body Dia.

Recommended Cutting Conditions

Si content of 12.6% or less

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

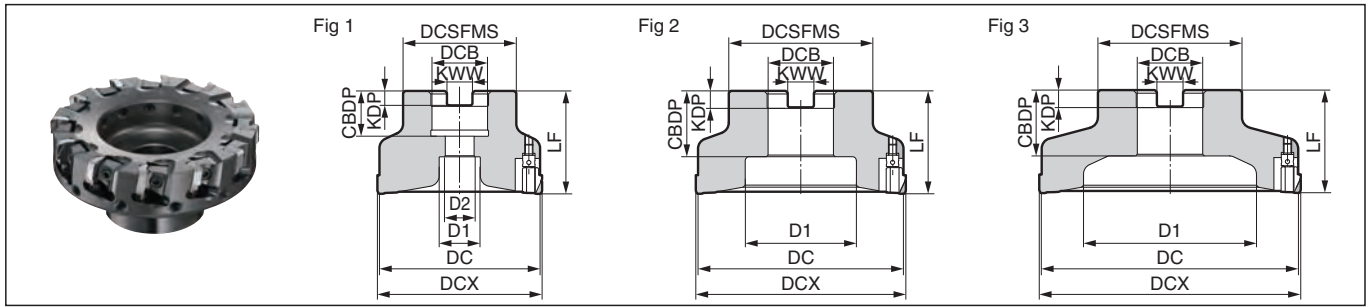
Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

HFF 12000RS/R Type



Rake Angle	Radial	4°
	Axial	10°

3mm 90°



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 CDBP	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	N
	General-purpose	N
	Roughing	N

Cat. No.	DA1000	Cutting Edge Length	Wiper Flat Shape	Applications	Fig
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Resistance	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

Parts

(Sold Separately)

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

Identification Code

HF F 12 080 R S - 22

Series Extra Blade Cutter Feed Metric Hole
 Fine Pitch Size Dia. Direction Body Dia.

Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 guidelines. 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%

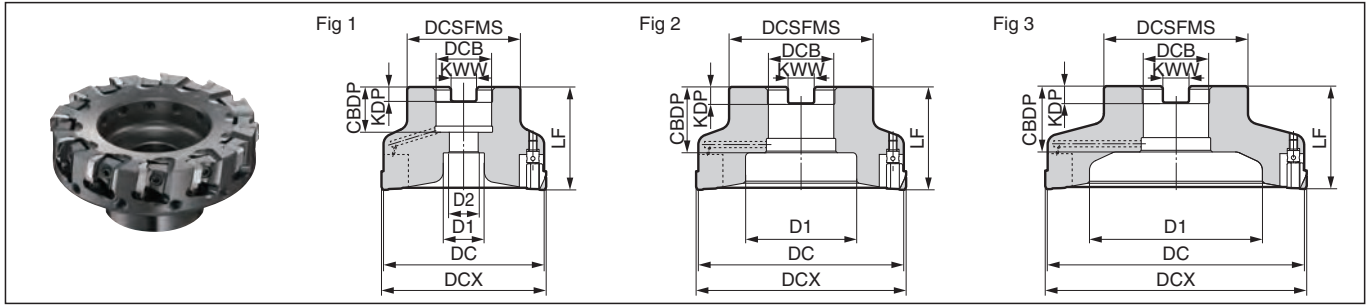
ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Blade Grade
N	Aluminum Alloy	400-600-800	0.05-0.13-0.20	DA1000

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.

HFFH 12000RS/R Type



Rake Angle	Radial	4°
	Axial	10°



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 CBBDP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
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
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
High-speed/Light	N
General-purpose	N
Roughing	N

Cat. No.	DA1000	Cutting Edge Length	Wiper Flat Shape	Applications	Fig
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Resistance	1
12T3ZDFR-G	●	6.0	Arc-Shaped	General-purpose	1
12T3ZDFR-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

Parts

(Sold Separately)

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

Identification Code

HF F H 12 080 R S - 22

Series Extra Fine Pitch With Oil Hole Blade Size Cutter Dia. Feed Direction Metric Body Hole Dia.

Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 guidelines. 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%

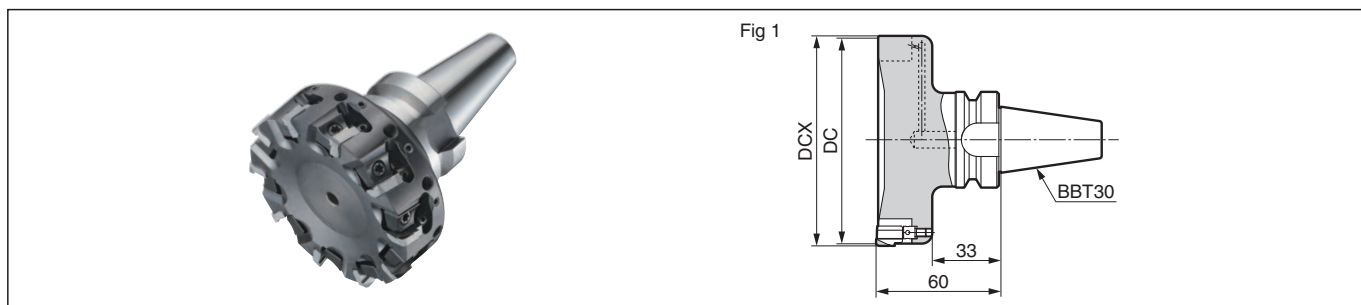
ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Blade Grade
N	Aluminum Alloy	400-600-800	0.05-0.13-0.20	DA1000

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.

HFFH 12000R-BBT30 Type



Rake Angle	Radial	4°
	Axial	10°



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

Dimensions (mm)

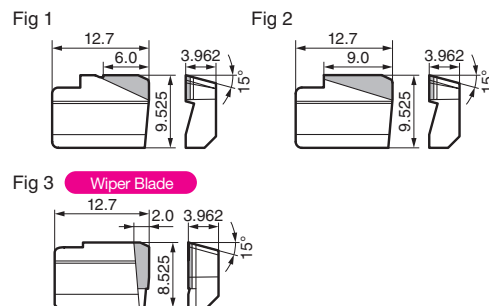
Inch	Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Number of Teeth	Weight (kg)	Fig
	HFFH 12080R-BBT30	●	80	82	10	1.6	1
	12100R-BBT30	●	100	102	12	2.4	1
	12125R-BBT30	●	125	127	15	2.9	1

Blades are sold separately.

Blade

Dimensions (mm)

Grade Classification		SUMIDIA				
Process	High-speed/Light	N				
	General-purpose	N				
	Roughing	N				
Cat. No.	DA1000	Cutting Edge Length	Wiper Flat Shape	Applications	Fig	
NF-LDEN 12T3ZDFR-L	●	6.0	Linear	Low Resistance	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	



Parts

(Sold Separately)

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

Identification Code

HF F H 12 080 R - BBT30

Series Extra With Blade Cutter Dia. Feed Supported
 Fine Pitch Oil Size Direction Arbor
 Hole

Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 guidelines. 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 v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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.

RF Type



General Features

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

Work Material

- Aluminum and aluminum alloys
- Other Non-ferrous Metals

(Not suited for cast iron or steel.)

Features

- 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 10 μ m runout even before setting

Finished Surface Roughness

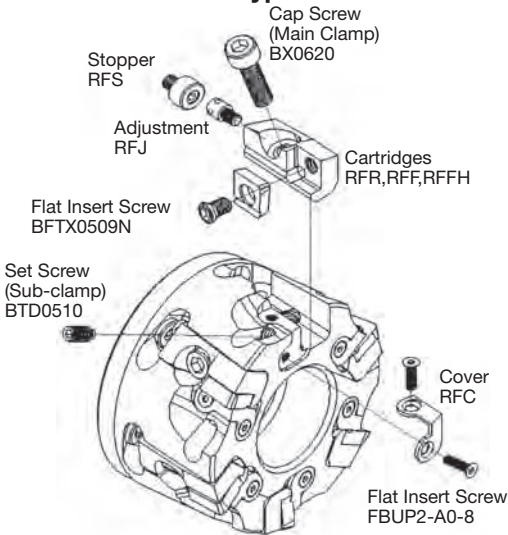
<ul style="list-style-type: none"> Process: Finish Milling Machine: Vertical Machining Centre Arbor: HSK63A Work Material: Si 10 to 12% Al Alloy Cutter: RF4100R 6-teeth (1 Wiper) Grade: SUMIDIA (DA1000) 	<ul style="list-style-type: none"> $v_c = 4,990$ m/min $n = 15,900$ min⁻¹ $v_f = 11,400$ mm/min $f_z = 0.12$ mm/t $a_p = 0.5$ mm, Wiper $a_p = 0.03$ mm Dry
--	--

Rz (Highest Peak): 0.69 μ m Ra: 0.092 μ m

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

Structure of RF Type



Recommended Cutting Conditions

Si content of 12% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Insert Grade
N	Aluminum Alloy	2,000-3,500-5,000	0.05-0.13-0.20	DA1000 DA2200
		1,000-1,750-2,500	0.05-0.13-0.20	H1

Note The cutting conditions are guidelines. 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 v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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

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.
- Ensure proper balance by fixing the SUMIDIA inserts of the blades on opposite sides of the cutter.

SUMIDIA

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SUMIDIA
SUMIDIA
BINDERLESS

SUMICRYSTAL

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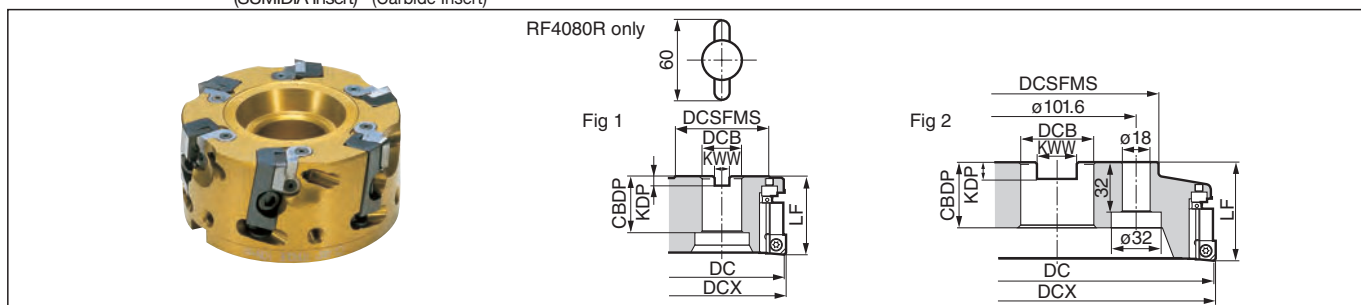
V

W

RF 4000R Type



Rake Angle	Radial	4°	3mm 90°	10mm 87°
	Axial	10°		
			(SUMIDIA Insert)	(Carbide Insert)



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 CDBP	Number of Teeth	Weight (kg)	Fig	
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 collar bolt to mount the cutter to the arbor.

Insert/Cartridge

Grade Classification		Cemented Carbide	DLC	SUMIDIA	SUMICRYSTAL	Refer to page M62 for details of SUMICRYSTAL.						
Process	High-speed/Light	N	N	N	N	*When using large depth of cut ($a_p = 3\text{mm}$ or longer) with RF4080R, use the RFFH cartridge. (RFF is possible for normal cutting.)						
	General-purpose	N	N	N	N							
	Roughing	N	N	N	N							
Cat. No.	H	DL1000	DA1000	DA2200	SC10	Fig	Cartridge Cat. No.	Cartridges in Stock	Fig	Cartridges Fig 1 (RFR) Fig 2 (RFF)		
SDET 1204ZDFR	●	●	—	—	—	3	RFR	●	1	Fig 3 Fig 4 Fig 5		
NF-SNEW 1204ADFR	—	—	●	▲	—	4	RFF	●	2	Fig 6 Fig 7		
120404ADFR-H	—	—	●	—	—	5	RFF (Others) *RFFH(RF4080R)	●	2	Wiper Insert Wiper Insert		
1204ADFR-W	—	—	●	▲	—	6	RFF	●	2			
SNEW 1204ADFR-WS	—	—	—	—	●	7	RFF	●	2			

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 	Sub-clamp 	Cover Mounting 							
RFC	RFS	BX0620	10.0	BTD 0510	3.0	FBUP2-A0-8	RFJ	BFTX 0509N	5.0	TH050 TH025 RFT	TTX20

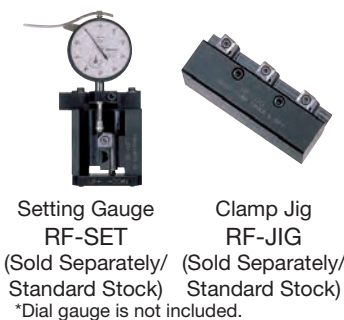
Blades/Dummy Blades

Product Name	Cat. No.	SUMIDIA
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

Cartridge design allows inserts to be attached outside the machine with high precision.



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)
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	—



SRF Type



General Features

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

Features

- 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 $n = 20,000\text{min}^{-1}$
(Please operate within the maximum allowable spindle speed of the machine and holder used)
- Simple Runout Adjustment Mechanism:
Simple insert direct mounting design
for runout precision with easy fine adjustment

Recommended Cutting Conditions

Si content of 12% or less

ISO	Work Material	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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 cutting conditions are guidelines. 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 v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (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.

SUMIDIA

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SUMIDIA
SUMIDIA
BINDERLESS

SUMICRYSTAL

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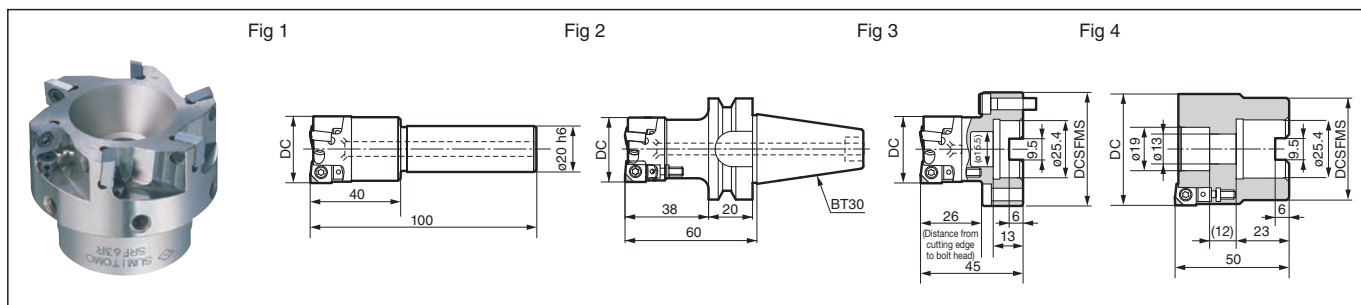
V

W

SRF Type



Rake Angle	Radial	-2° to 4°
	Axial	6°



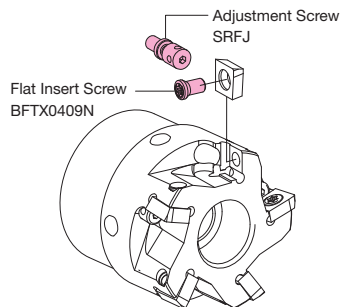
Body

Cat. No.		Stock	Di. 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.

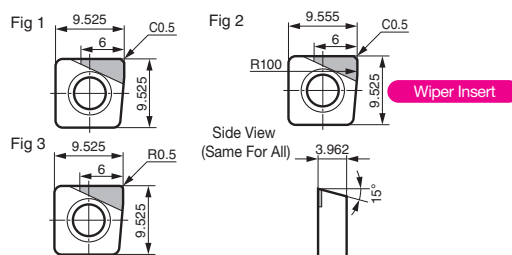


For mounting ø50 and ø63 mm cutter bodies to the arbor, use a JIS B1176 hex socket bolt (M12 x 30 to 35mm).



Insert

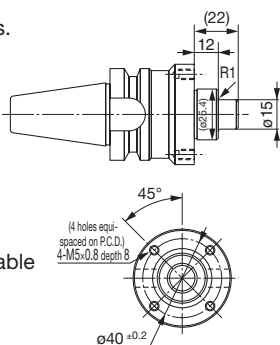
Grade Classification		SUMIDIA		Cat. No.	DA1000	DA2200	Cutting Edge Shape	Fig
Process	High-speed/Light	N	N					
	General-purpose	N	N					
	Roughing	N	N					



- 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 x 20 mm for securing the body.

Parts

Flat Insert Screw	Adjustment Screw	Wrench
BFTX0409N	SRFJ	TH015 TTX15W

Recommended Cutting Conditions M48

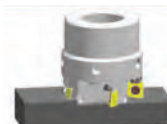
Maximum Depth of Cut (SRF50R, 5-teeth)

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.

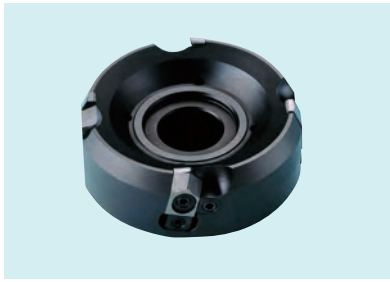
Depth of Cut a_p (mm)	Feed Rate	Feed Rate v_f (mm/min)		
		2,500	4,000	5,000
		Feed Rate Per Tooth f_z (mm/t)		
		0.05	0.08	0.10
0.5		○	○	○
1.0		○	○	○
1.5		○	○	○
2.0		○	○	○
2.5		○	○	○
3.0		○	○	○
3.5		○	○	—
4.0		○	—	—
4.5		○	—	—
5.0		○	—	—

Cutting Conditions

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

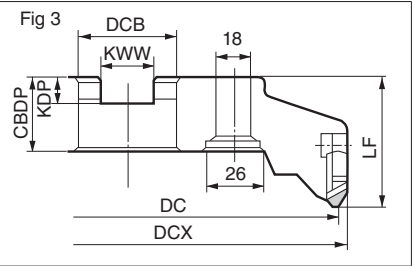
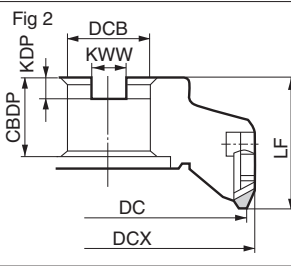
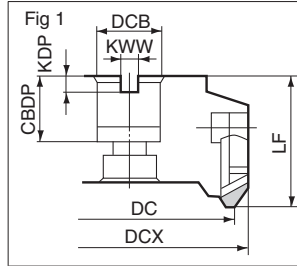
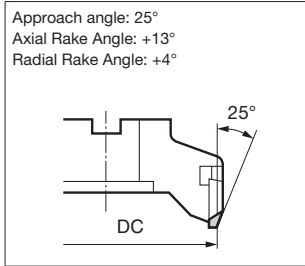


Rake Angle	Radial	+4°	+6°	5.8mm 65°	5.7mm 90°
Angle	Axial	+13°	+10°		
		(FAM type)	(SAM type)	FAM	SAM



■ Features

- Special cutting edge shape makes it suitable for mirror finishing of aluminum alloys and non-ferrous metals.
- Uniquely designed clamping system enables fine adjustment for high runout precision.
- Rigid body and blade firmly mounted with a double clamp allow use for roughing as well.

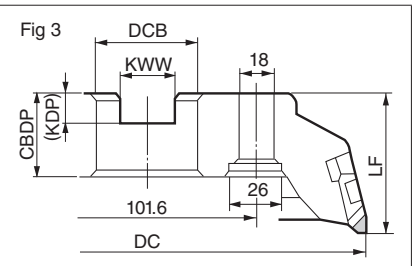
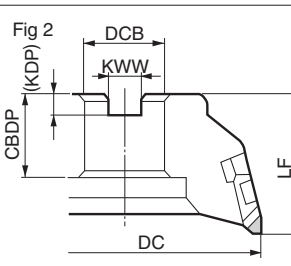
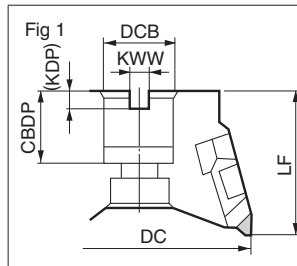
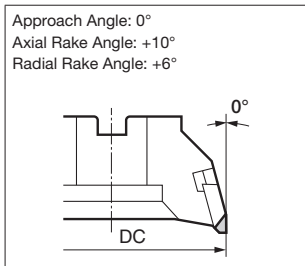


Body (FAM Type)

Dimensions (mm)

Cat. No.	Stock		Dia. DC	Max. Dia. DCX	Height LF	Bore Dia. DCB	Mounting Depth CBBDP	Keyway Width KWW	Keyway Depth KDP	Number of Teeth	Weight (kg)	Fig
	R	L										
FAM080 R/L	●		80	92	50	25.4	25	9.5	6	4	2.1	1
FAM100 R/L	●		100	112	50	31.75	32	12.7	8	4	2.9	2
125 R/L	●		125	137	63	38.1	38	15.9	10	5	3.8	2
160 R/L	●		160	171	63	50.8	38	19.1	11	6	6.6	2
FAM200 R/L	●		200	210	63	47.625	38	25.4	14	8	9.9	3
250 R/L			250	260	63	47.625	40	25.4	14	10	16.0	3
315 R/L			315	325	63	47.625	40	25.4	14	12	25.1	3

Inserts are sold separately.



Body (SAM Type)

Dimensions (mm)

Cat. No.	Stock		Dia. DC	Height LF	Bore Dia. DCB	Mounting Depth CBBDP	Keyway Width KWW	Keyway Depth KDP	Number of Teeth	Weight (kg)	Fig
	R	L									
SAM080 R/L	●		80	50	25.4	25	9.5	6	4	1.6	1
SAM100 R/L	●		100	50	31.75	32	12.7	8	4	2.3	2
125 R/L			125	63	38.1	38	15.9	10	5	3.7	2
160 R/L			160	63	50.8	38	19.1	11	6	5.9	2
SAM200 R/L			200	63	47.625	38	25.4	14	8	8.5	3
250 R/L			250	63	47.625	40	25.4	14	10	114.3	3
315 R/L			315	63	47.625	40	25.4	14	12	30.3	3

Inserts are sold separately.

● Refer to M51 for blades, parts and recommended cutting conditions.

It is possible to design the FAM/SAM Type cutters in 2 teeth/inch or multi-teeth configurations.

SUMIDIA Cutter SAM-E Type



Rake Angle	Radial Axial	0° to 2° +10°	5.7mm 90°



Features

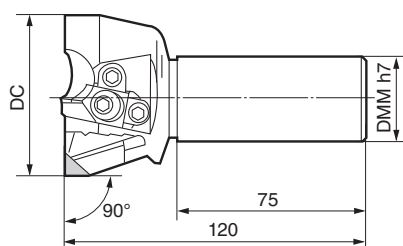
SUMIDIA Cutter Range Expansion

- **Excellent Sharpness and Durability:**
New blade shape with strong cutting edge and excellent sharpness.
- **High Runout Precision:**
Fine pitch screw allows fine adjustment.
- **High-Rigidity Body Design:**
Shallow blade grooves improve blade seating rigidity.

Body (SAM-E Type)

Dimensions (mm)

Cat. No.	Stock		Dia. DC	Shank Dia. DMM	Number of Teeth	Axial Rake	Radial Rake
	R	L					
SAM050E R/L	●		50	32	3	10°	0°
063E R/L	●		63	32	3	10°	1°
080E R/L	●		80	32	4	10°	2°



Inserts are sold separately.

Blade (SUMIDIA)

Cat. No.	DA150		DA2200		Fig	Applicable Cutter
	R	L	R	L		
FAB R/L	●		●		1	FAM Type
SAB R/L	●		●		2	SAM Type

Parts

						Applicable Cutter
Tightening Bolt	Holding Piece	Adjustment Wedge	Double Screw	Double Screw	Wrench	
FADR	FAWR	FAAR*	WB7-15T	WB7F-15T	TT25	FAM Type SAM Type

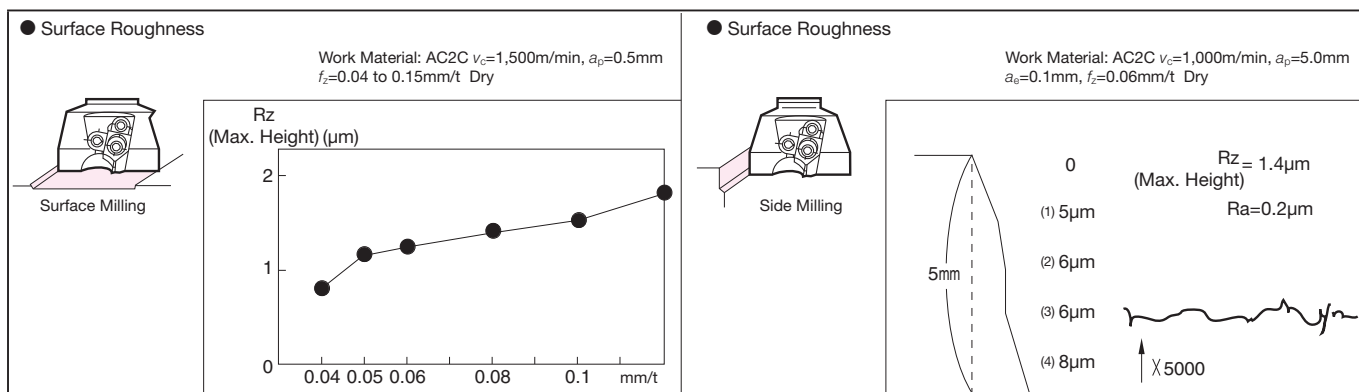
* The adjustment wedge for SAM050E R/L and SAM063E R/L is SAAR.

Recommended Cutting Conditions

ISO	Work Materials	Machining Details	Cutting Speed v_c (m/min)		Feed Rate f_z (mm/t)		Insert Grade
			Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	Min. - Optimum - Max.	
N	Aluminum Alloy (AC)	Roughing	400-1,700-3000	0.05-0.13-0.20	DA150 DA2200		
	Aluminum Alloy (ADC)	Finishing	400-1,700-3000	0.04-0.10-0.15	DA150 DA2200		
	Aluminum Alloy (A390)	Finishing	300-450-600	0.04-0.10-0.15	DA150 DA2200		

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.

Cutting Performance



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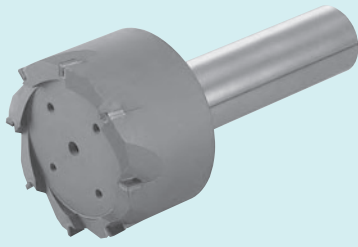
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DFE Type



■ Features

- Supports small machines. Small cutter with shank.
- 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

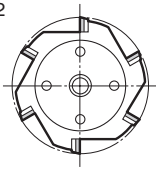
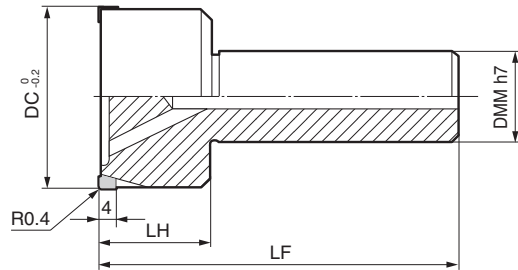
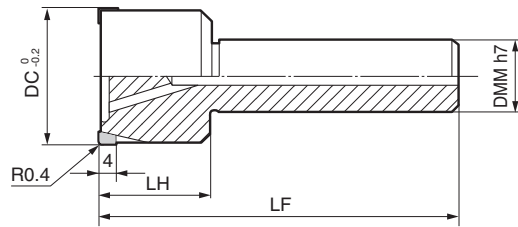
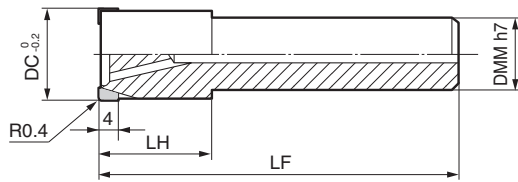
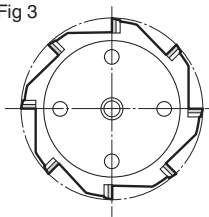


Fig 3



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 v_c (m/min)	Feed Rate f_z (mm/t)	Insert Grade
		N	Aluminum Alloy	Min. - Optimum - Max. 200-800-2,000	Min. - Optimum - Max. 0.02-0.05-0.10

■ Application Examples

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

SUMIDIA

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SUMIDIA BINDERLESS Endmill Series



General Features

SUMIDIA BINDERLESS is polycrystalline diamond that directly binds nano-order diamond particles with high strength without using any binders.

Harder than single-crystal diamond, it has no cleavability, enabling machining of hard brittle material 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 the 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 the excellent wear resistance of the diamond material.

SUMIDIA BINDERLESS Radius Endmills

NPDRS Type

Radius *r*

For Surface Milling and Rounded Base Milling

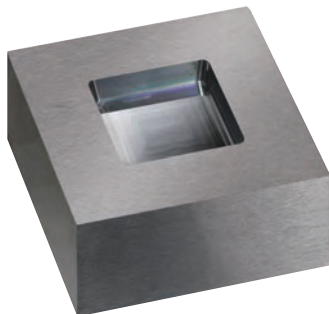
SUMIDIA BINDERLESS Ballnose Endmills

NPDBS Type / **NPDB** Type

Ballnose *R*

For Spherical Milling

● Pocketing



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

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



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

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NPDRS Type

Cemented Carbide Hard Brittle Material

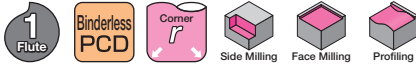
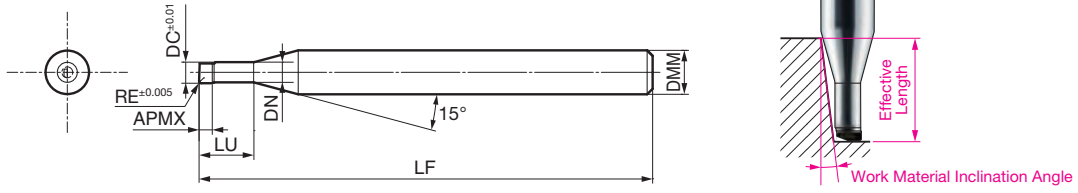


Fig 1



Body Dimensions (mm)

Cat. No.	Stock	Dia. DC	Radius RE	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Effective Length for Work Material Inclination Angle					Wiper Flat	Fig
									0.5°	1°	1.5°	2°	3°		
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

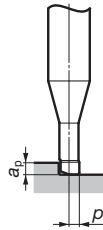
Identification Code

NPDR S 1 020 R002 - 006

Cat. No. For Number Dia. Corner Radius Neck Length
Standard of Teeth Finishing

Recommended Cutting Conditions

1. Use a precision machine for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as equipment performance and other conditions may vary.
5. Values shown in the table of conditions are guidelines. Adjust the actual cutting conditions to the desired machined surface quality.



Work Material		Cemented Carbide			
DC (mm)	LU (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	ap (mm)	pr (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

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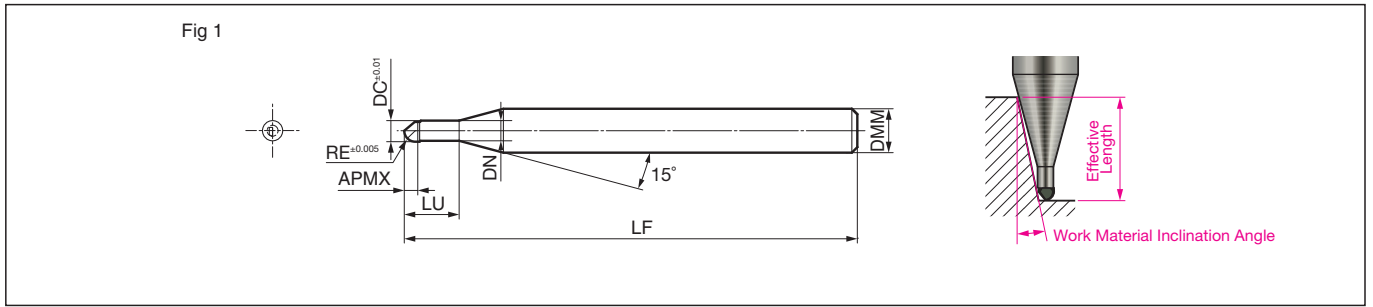
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NPDBS Type

Cemented Carbide Hard Brittle Material



Body (for Standard Finishing)

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Effective Length for Work Material Inclination Angle					Fig
									0.5°	1°	1.5°	2°	3°	
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

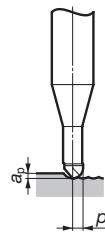
Identification Code

NPDB (S) 1 030 - 010

Cat. No. For Standard Number Ballnose Neck
Finishing of Teeth of Teeth Radius Length

Recommended Cutting Conditions

1. Use a precision machine for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant.
Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as equipment performance and other conditions may vary.
5. Values shown in the table of conditions are guidelines. Adjust the actual cutting conditions to the desired machined surface quality.



Flat Surface Finishing

Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	p _f (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 in the case. *Also applicable for long neck types, depending on the size. For details, please contact us.

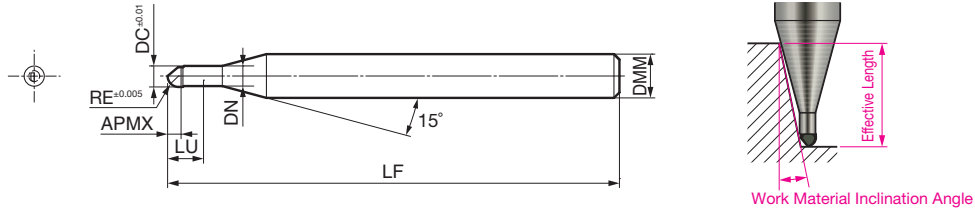
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NPDB Type

Cemented Carbide Hard Brittle Material



Fig 1



Body (for Precision Finishing)

Dimensions (mm)

Cat. No.	Stock	Radius RE	Dia. DC	Cutting Edge Length APMX	Neck Length LU	Overall Length LF	Head Dia. DN	Shank Dia. DMM	Effective Length for Work Material Inclination Angle					Fig
									0.5°	1°	1.5°	2°	3°	
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

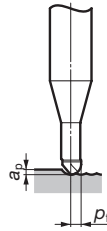
Identification Code

NPDB 1 030 - 010

Cat. No. Number of Teeth Ballnose Radius Neck Length

Recommended Cutting Conditions

1. Use a precision machine for stable cutting.
2. Non-water soluble cutting oil is recommended. Supply as a mist or external coolant. Take fire prevention precautions to avoid fire hazards caused by sparks igniting during machining or tool breakage.
3. Shorten overhang as much as possible.
4. Adjust cutting conditions as necessary as equipment performance and other conditions may vary.
5. Values shown in the table of conditions are guidelines. Adjust the actual cutting conditions to the desired machined surface quality.



Flat Surface Finishing

Work Material		Cemented Carbide			
RE (mm)	LU (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p (mm)	ρ _f (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 in the case. *Also applicable for long neck types, depending on the size. For details, please contact us.

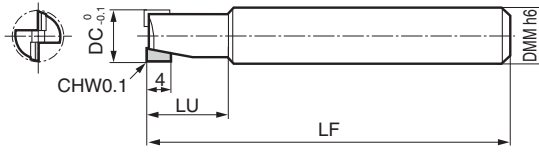
SUMIDIA Endmills

DFE Type

Aluminum Alloy Copper Alloy Graphite



Fig 1



Body

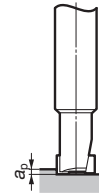
Dimensions (mm)

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	
	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
DC(mm)		
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	a_p	0.4DC



Fig 1

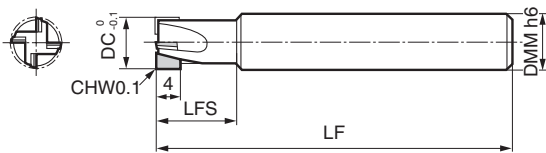
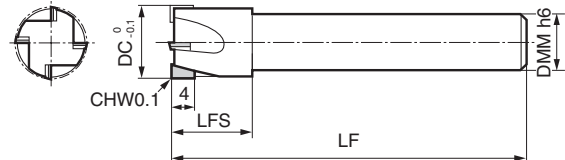


Fig 2



Body

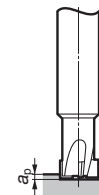
Dimensions (mm)

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.



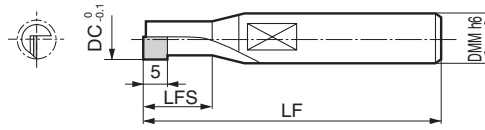
Face Milling (4 Flutes)

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

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Fig 1



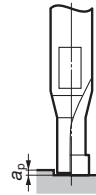
Body Dimensions (mm)

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

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



Face Milling (1 Flute)

Cutting Conditions	Work Material	
	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	a_p 0.4DC	

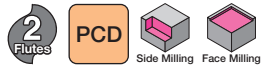
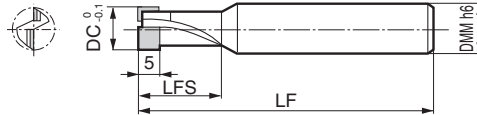


Fig 1



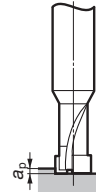
Body (2 Flutes) Dimensions (mm)

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

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



Face Milling (2 Flutes)

Cutting Conditions	Work Material	
	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	a_p 0.4DC	

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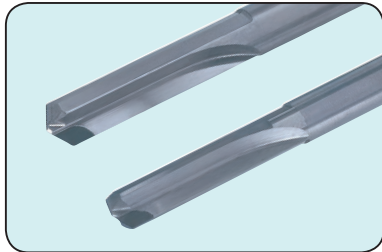
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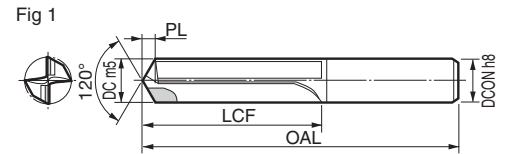
From General to High Precision Drilling of Aluminum Alloys

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

DAL Type

*Refer to N38 for the tolerance of m5, h8 Dimensions (mm)

Grade Classification		SUMIDIA				
Process	High-speed/Light	N				
	General-purpose					
	Roughing					
Cat. No.	DA2200	Dia. (Shank Dia.) DC(DCON)	Flute Length LCF	Overall Length OAL	Tip PL	Fig
DAL 0500H to 0600H		$\phi 5 \leq DC \leq \phi 6$	31.6	81.6	1.6	1
0601H to 0700H		$\phi 6 < DC \leq \phi 7$	36.9	91.9	1.9	1
0701H to 0800H		$\phi 7 < DC \leq \phi 8$	37.2	92.2	2.2	1
0801H to 0900H		$\phi 8 < DC \leq \phi 9$	42.5	102.5	2.5	1
0901H to 1000H		$\phi 9 < DC \leq \phi 10$	42.8	102.8	2.8	1
1001H to 1100H		$\phi 10 < DC \leq \phi 11$	53.1	113.1	3.1	1
1101H to 1200H		$\phi 11 < DC \leq \phi 12$	53.4	113.4	3.4	1

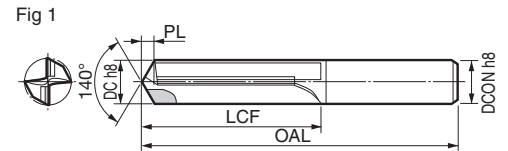


Ordering numbers should be handled according to this example: $\phi 6.05\text{mm}$ drill \rightarrow DAL0605H.

DDL Type

*Refer to N38 for the tolerance of h8 Dimensions (mm)

Grade Classification		SUMIDIA				
Process	High-speed/Light	N				
	General-purpose					
	Roughing					
Cat. No.	DA2200	Dia. (Shank Dia.) DC(DCON)	Flute Length LCF	Overall Length OAL	Tip PL	Fig
DDL 050V to 060V		$\phi 5 \leq DC \leq \phi 6$	31.5	81.0	1.0	1
061V to 070V		$\phi 6 < DC \leq \phi 7$	36.2	91.2	1.2	1
071V to 080V		$\phi 7 < DC \leq \phi 8$	36.4	91.4	1.4	1
081V to 090V		$\phi 8 < DC \leq \phi 9$	41.6	101.6	1.6	1
091V to 100V		$\phi 9 < DC \leq \phi 10$	41.7	101.7	1.7	1
101V to 110V		$\phi 10 < DC \leq \phi 11$	51.9	111.9	1.9	1
111V to 120V		$\phi 11 < DC \leq \phi 12$	52.1	112.1	2.1	1



Ordering numbers should be handled according to this example: $\phi 10.5\text{mm}$ drill \rightarrow DDL105V.

Recommended Cutting Conditions (v_c : Cutting Speed (m/min), f : Feed Rate (mm/rev))

Diameter DC (mm)	Cutting Conditions	DAL Type	DDL Type	Depth of Cut	Oil
$\phi 8.0$	v_c	80 - 100 - 150	150 - 200 - 250	L/D=Below 3	Emulsion Type
	f	0.05 - 0.1 - 0.15	0.1 - 0.15 - 0.25		
$\phi 12.0$	v_c	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 type for high-precision machining, select a high rigidity machine and high precision holder.
- Supply coolant generously at the entrance of the hole.

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