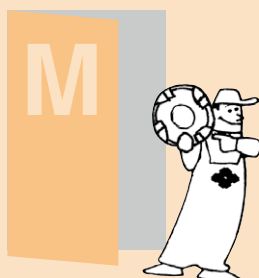


SUMIDIA/SUMIDIA Binderless SUMICRYSTAL M1 to M46

M



Grades	SUMIDIA Series	M2
	SUMIDIA DA1000	M3
Insert	 SUMIDIA BreakMaster LD Type / GD Type	M4
	SUMIDIA BreakMaster DM Type	M5
	SUMIDIA NF Type Inserts	M6
	SUMIDIA Insert Identification	M7
	SUMIDIA Indexable Inserts Stock List	M8
Tools	SUMIDIA Mini Boring Tools CKB Type	M24
	SUMIDIA Small Hole Boring Bar DABB Type	M25
Cutters, Endmills	High-Efficiency Aluminum Cutter HF12000 Type	M26
	Aluminium Body Cutter RF4000 Type	M30
	SUMIDIA Cutter For Aluminium SRF Type	M32
	SUMIDIA Cutter FAM Type / SAM Type	M34
	SUMIDIA Endmill SAM-E Type	M35
	SUMIDIA Mini-Cutter DFE Type	M36
	SUMIDIA Endmill DFE Type	M37
Drills	SUMIDIA Endmill DAE Type	M37
	SUMIDIA Drill DAL Type	M38
	SUMIDIA Drill DDL Type	M38

M SUMIDIA Binderless

Nano-Polycrystalline Diamond Tool SUMIDIA Binderless M40
MOLD FINISH MASTER SUMIDIA Binderless Ball-nose Endmills NPDB Type M41

M SUMICRYSTAL

SUMICRYSTAL M43
SUMICRYSTAL UP M45
SUMICRYSTAL PD / PDX M46

Stock Indications and Symbols

- mark: Standard stocked item
- mark: To be replaced by a new item featured on the same page
- ▲ mark: To be replaced by new item
(Please confirm stock availability)

- * mark: Semi-standard stock (Please confirm stock availability)
- mark: Stock or planned stock (Please confirm stock availability)
- No mark: Made-to-order item
- mark: We cannot produce

M
SUMIDIA
SUMIDIA
Binderless

SUMIDIA
SUMIDIA
Binderless
SUMICRYSTAL

M1



General Features

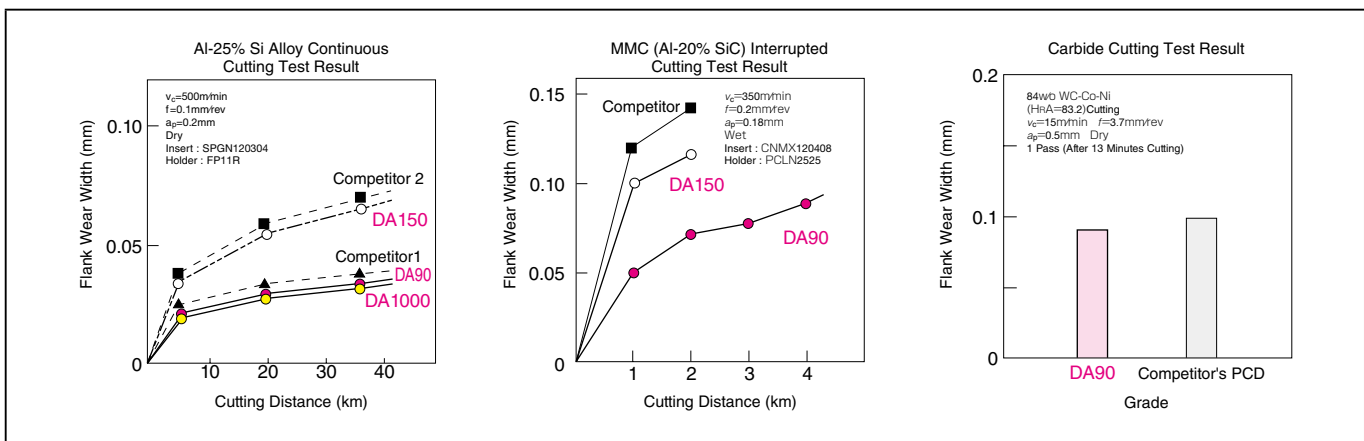
SUMIDIA is a unique series of sintered polycrystalline diamond grades, namely, DA90, DA150, DA2200 and DA1000.

The lineup covers a wide range of applications. DA90, DA150 and DA2200 use optimal combinations of diamond grain size and binder to produce their own individual characteristics, while DA1000 provides excellent strength, wear resistance and sharpness.

Series / Characteristics / Application

Grades	Characteristics	Application	Average Size of Diamond Grains (μm)	Hardness HV (GPa)	TRS (GPa)
DA1000	High density sintered material made of ultrafine diamond particles that demonstrates optimum wear and fracture resistance, and excellent edge sharpness.	- High-Silicon Aluminium Alloy Cutting - Rough, Interrupted and Finishing of Al-alloy - Wood or Wooden Board Cutting - Non-Ferrous Metal finishing (Aluminium, Copper Alloy)	Up to 0.5	110 to 120	≈ 2.6
DA2200	Sintered material made of ultra-fine diamond particles that demonstrates optimum wear and fracture resistance, and excellent edge sharpness.	- Rough, Interrupted and Finishing of Al-alloy - Wood or Wooden Board Cutting	0.5	90 to 100	≈ 2.45
DA150	Micro-grained sintered diamond grade with strong diamond-to-diamond bonding. It is suitable for the machining of non-ferrous metals and other very hard materials.	- Non-Ferrous Metal finishing (Aluminium, Copper Alloy) - Carbide or Semi-Sintered Carbide & Ceramic Roughing - FRP, Hard Rubber & Carbon Cutting - Wooden or Inorganic Material Board Cutting	5	100 to 120	≈ 1.95
DA90	Contains coarser diamond grains than other grades. Therefore, it has good wear resistance suitable for the machining of carbides and high silicon aluminium.	- High-Silicon Aluminium Alloy Cutting - Sintered Carbide Cutting - Carbide Cutting - Green or Semi-Sintered Carbide & Ceramic Roughing - Sintered Ceramic Cutting - Stone or Rock Cutting	Up to 50	100 to 120	≈ 1.10

Performance



Recommended Cutting Conditions

Work Material	Cutting Speed v_c (m/min)	Feed Rate f (mm/rev)	Depth of Cut a_p (mm)
Aluminium 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	Up to 4,000	Up to 0.4	—
Carbide	10 to 30	Up to 0.2	Up to 0.5
Carbon	100 to 600	1	Up to 2

SUMIDIA Grinding Method

Functions	Remarks
Grinding Machine	— A rigid, special-purpose grinding machine that is capable of wet grinding operations.
Grinding Wheel	Abrasive Grain Diamond
	Grain Size Rough Grinding: 400 mesh Finish Grinding: 800 to 1,500 mesh
	Bond Special Purpose Metal Bond for Diamond Sintered Tool or Vetrified
	Concentration 100 to 125
Grinding Conditions	Dressing Use a WA stick of about 400mesh
	Peripheral Speed 800 to 1,000 m/min
	Table Rocking 30 to 60 cycle/min
Others	Grinding Liquid Coolant Water Soluble Grinding Coolant (Solution Type)
	(1) The rake surface 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 require a sharp cutting edge.
	(4) Surfaces that were cut by EDM should have more than 0.05mm ground off.

SUMIDIA DA1000



■ Characteristics

High-density sintered ultra-fine diamond particles

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

■ Application Range

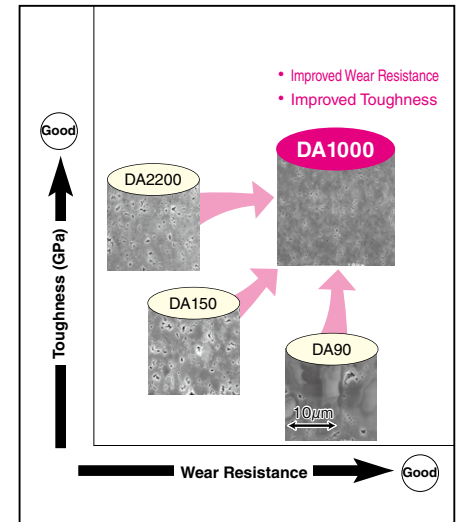
● Aluminum Alloy

Machinability	Work Material	Turning		Milling	Example Parts
		Roughing	Finishing		
(Good) ↑ ↕ ↓ (Diff)	Sintered Aluminum	DA1000 DA2200 DA150			Piston Liner
	Die Cast Aluminum (ADC12)				Transmission Case, Oil Pan Cylinder Block, Aluminum Wheel, HDD
	Low Silicon (AC2B-T6, AC4C-T6)				Cylinder Head
	High Silicon (T6)				Cylinder Block

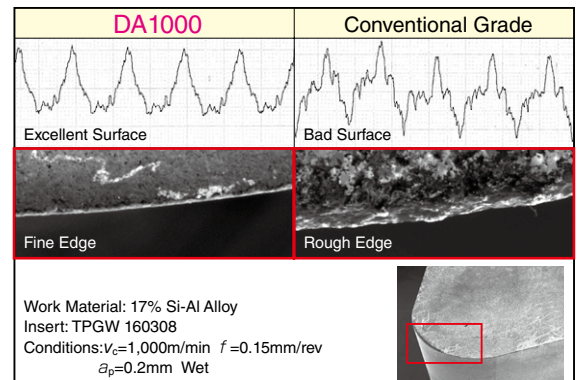
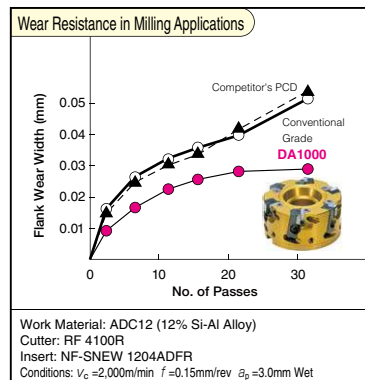
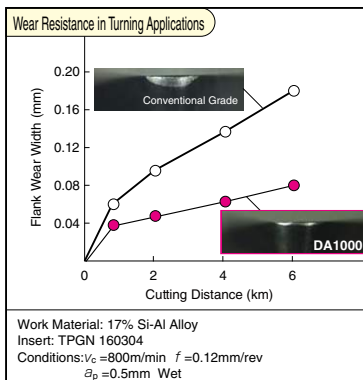
● Non-aluminium Alloy

Machinability	Work Material	Turning		Milling	Example Parts
		Roughing	Finishing		
(Good) ↑ ↕ ↓ (Diff)	Non-ferrous Sintered Alloy	DA1000 DA2200			Bush
	Gunmetal Carbon				Connecting Rod
	Carbide	DA90 DA150			Roll
	Fe Combined				Cylinder Block, Bearing Cap

■ Position of DA1000



■ Cutting Performance



Process	Cutting Conditions	Results
Bush Boring Cutting Distance 73m/Workpiece	Work Material: Copper Alloy $V_c = 300\text{m/min}$, $f = 0.07\text{mm/rev}$ $a_p = 0.08\text{mm}$, Wet NF-TPGN160308 Surface Roughness: 3.2S	DA1000: ~2,500 workpieces Conventional: ~500 workpieces
Oil Pump Cover Milling Cutting Distance 62m/Workpiece	Work Material: ADC12 $V_c = 1,400\text{m/min}$, $f = 0.3\text{mm/rev}$ $a_p = 0.2\text{mm}$, Wet NF-CNGX120408 Tool Life Criteria: Burring	DA1000: ~3,500 workpieces Conventional: ~1,000 workpieces
Cylinder Block Milling	Work Material: ADC12 $V_c = 2,800\text{m/min}$, $f = 0.14\text{mm/rev}$ $a_p = 2\text{mm}$, Wet NF-SNEW1204ADFR Tool Life Criteria: Burring	DA1000: ~4,500 workpieces Conventional: ~3,000 workpieces

M

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Binderless

SUMICRYSTAL

BREAK MASTER LD/GD Type

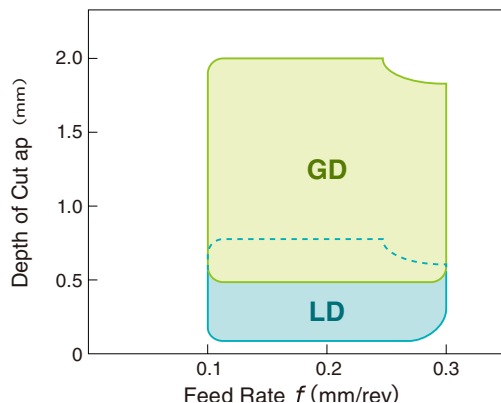


Characteristic

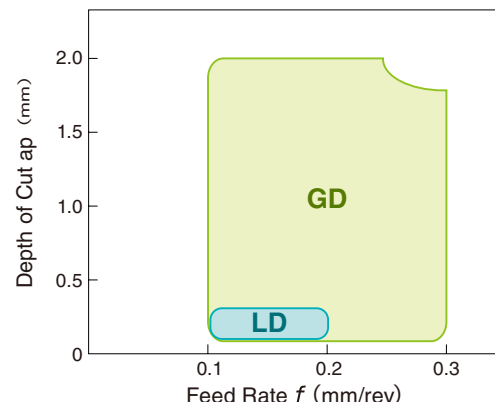
- Provides excellent chip control in medium finishing and finishing of aluminum alloy.
- Solves chip control problems and dramatically improves work efficiency.
- Achieves stable long tool life by employing high toughness grade DA1000.

Application Range

- Aluminum Alloys (A6061)

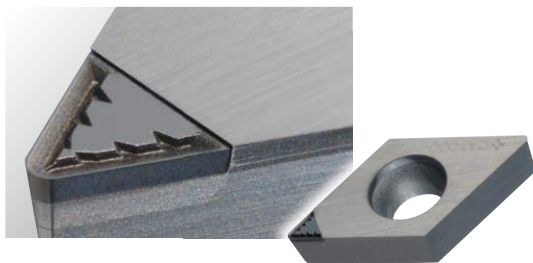


- Aluminum Alloy Castings (ADC12)



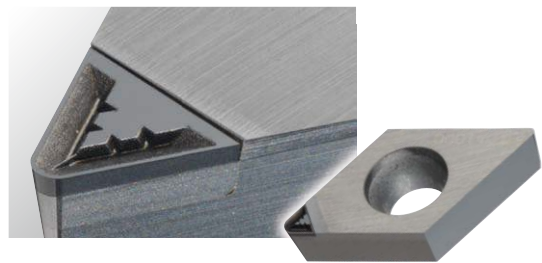
LD Type Chipbreaker for Finishing

Provides excellent chip control in finishing



GD Type Chipbreaker for Medium Finishing

Provides excellent chip control in medium finishing

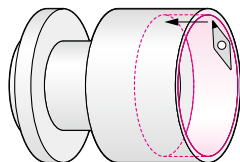


Comparison Test

For Expanded Aluminum Alloy Machining

- Process : Boring of Machine Component

Provides good chip control in small-depth cutting of expanded material



Break Master LD Type



Without Chipbreaker Inserts

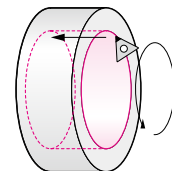
Work Material : A6061 Insert : NF-VCMT110302N-LD (DA1000)
Cutting Conditions : $v_c=200\text{m/min}$ $f=0.20\text{mm/rev}$ $a_p=0.10\text{mm}$ Wet

Comparison Test

For Aluminum Alloy Casting Machining

- Process : Boring of Transmission Component

Finely breaks chips in machining of casting material



Break Master GD Type

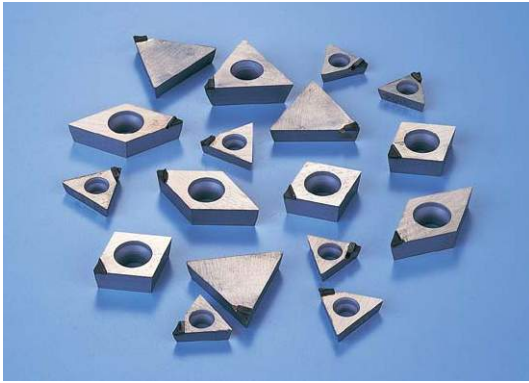


Without Chipbreaker Inserts

Work Material: ADC12 Insert : 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 inversely affect chip control performance.

Break Master DM Type



■ Characteristics

● Economy One-Use Insert

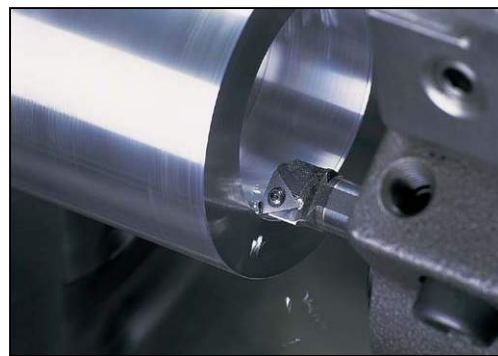
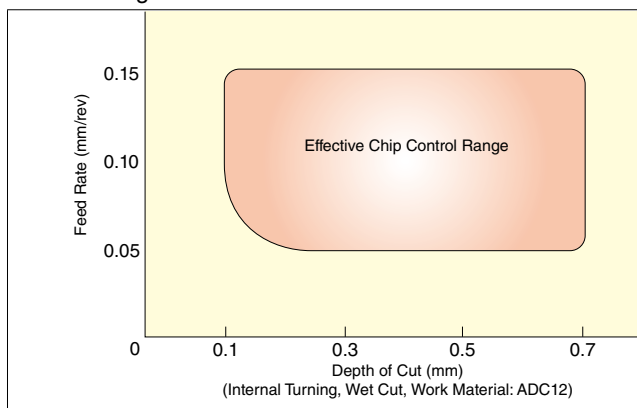
- Similar to SUMIBORON One-Use type inserts

● With Built-in Chipbreaker for Effective Chip Removal

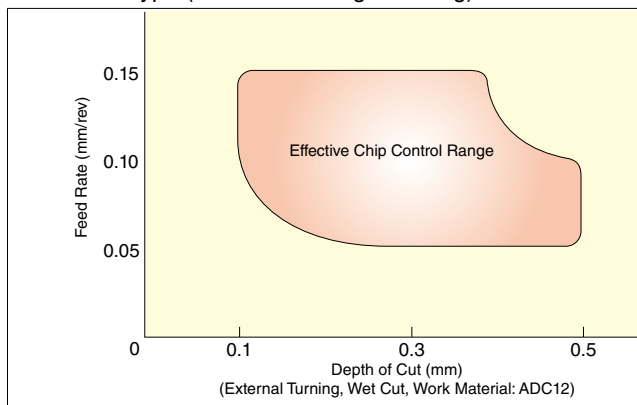
- Solving chip control problems and improving efficiency with DM-type chipbreaker.

■ Application Range

● For Boring



● DC&CC Type (External Turning & Facing)



■ Chip Control

● Break Master



● No Chipbreaker



■ Application Examples

Process	Cutting Conditions	Conditions
Operation: Internal Boring	Work Material: AC2A-T6 $V_c \approx 300$ m/min $f \approx 0.06$ mm/rev $a_p \approx 0.35$ mm Wet	Surface finish of the bore hole was less than $Ra=1\mu\text{m}$. Chips formed were of a uniform curl of about 2mm in length. There were almost no chips left inside the bore hole.

■ Recommended Cutting Conditions

● Boring (Triangular Insert)

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

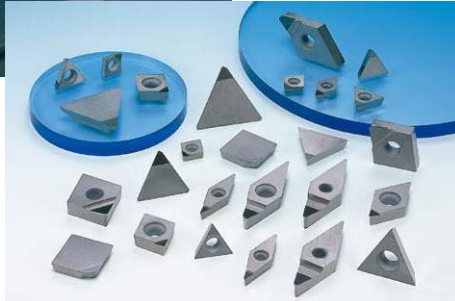
● External Copying (55°/80° Diamond Shaped Inserts)

Feed Rate f	Depth of Cut a_p	Coolant
Up to 0.15 mm/rev	Up to 0.5 mm	Wet

● For facing process, D.O.C. should be less than 0.4mm.

■ Series

Process	Boring	External Turning & 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	—



■ Characteristics

● Total Cost Effectiveness with High Performance and Lower Price

- Long, stable tool life and good fracture resistance with high toughness grade DA1000.
- Optimum design utilizing improved mass production techniques provides a relatively lower cost.
- Regrindable type results in huge total cost reduction.

● Wide Application Range

- Wide range of stocked items for small hole boring, OD turning to milling processes.
- Nega-posi type inserts that are applicable on standard lever-lock and pin-lock type holders.

■ Performance

SUMIDIA NF type inserts use improved mass production techniques which maintain good performance yet offer higher cost efficiency. Coupled with SUMIDIA DA1000 grade, the strong cutting edges of NF type inserts give excellent surfaces finishes.

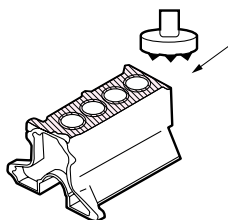
● SEM Image of NF-Type Edge



(NF-type is precision ground just like conventional inserts.)

■ Application Examples

● Milling of Aluminum Cylinder Block

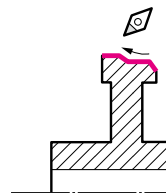


Results:
Burs are not formed due to the edge sharpness of DA1000. 1.5 times longer tool life than competitor's products.



Work Material: ADC12 Insert: 15° Positive Milling Insert
Cutting Conditions: $v_c=1,000\text{m/min}$, $f_z=0.025\text{mm/t}$, $a_p=1.2\text{mm}$, Wet

● OD Turning of Aluminum Alloy Electronics Part

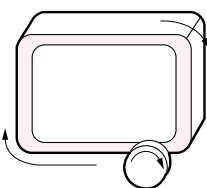


Results:
6 times tool life with comparatively little chipping.

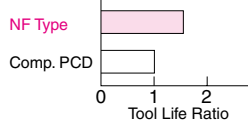


Work Material: ADC12 Insert: NF-VCMT110301
Cutting Conditions: $v_c=800\text{m/min}$, $f=0.1\text{mm/rev}$, $a_p=0.02\text{mm}$, Wet

● Milling of Aluminum Oil Pump Cover

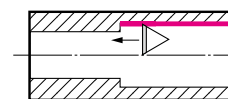


Results:
1.5 times longer tool life than competitor's with higher cost effectiveness.

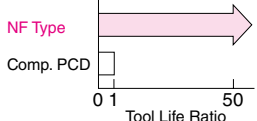


Work Material: ADC12 Insert: NF-TEEN32R
Cutting Conditions: $v_c=3,000\text{m/min}$, $f_z=0.06\text{mm/t}$, $a_p=0.2\text{mm}$, Wet

● Boring of Aluminum Valve Bore



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



Work Material: ADC12 Insert: NF-TPGN110304P
Cutting Conditions: $v_c=530\text{m/min}$, $f=0.05\text{mm/rev}$, $a_p=0.2\text{mm}$, Wet

Regrindable Type

CNMA 120408

B

(1) Insert ISO Code
(ISO Standard Classification)
B2/B3

(2) Supplementary Symbols
Chart 1

Chart 1 (2) Supplementary Symbols

Symbol	Description
R	Right Hand
L	Left Hand
B	All-PCD Rake Surface Type
-WF	Edge With Special Land For Aluminum Wheel Glossy Finishing

One-corner Type

NF

- CNMA 120408

P

(1) Type Code
Chart 2

(2) Insert ISO Code
(ISO Standard Classification)
B2/B3

(3) Supplementary Symbols
Chart 3

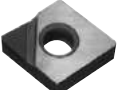
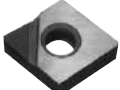
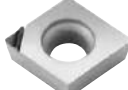
Chart 2 (1) Type Code

Symbol	Description
NF	NF Type
NU	One-use Insert

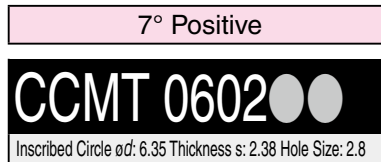
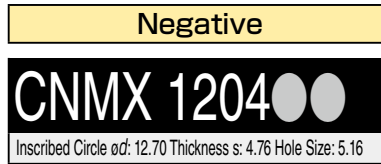
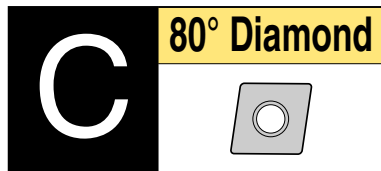
Chart 3 (4) Supplementary Symbols

Symbol	Description
L	Left Hand
P	Full-length Cutting Edge Type
N-LD	Chipbreaker Type
N-GD	
R-DM	Chipbreaker Type (Right Hand)
L-DM	Chipbreaker Type (Left Hand)

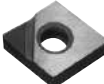
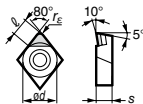
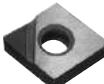
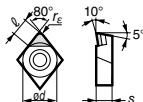
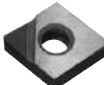
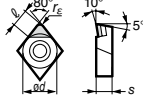
Insert Shape Photos

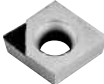
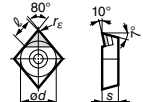
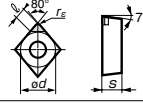
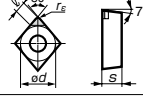
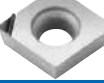
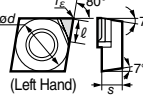
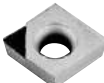
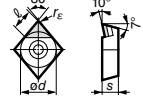
All-PCD Rake Surface Type	Edge With Special Land For Aluminum Wheel Glossy Finishing	NF Type	One-use Insert	Full-length Cutting Edge Type	Chipbreaker Type
					

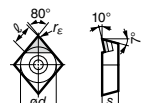
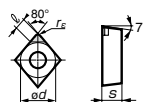
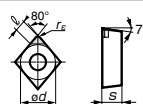
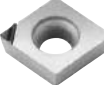
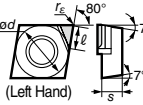
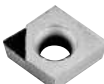
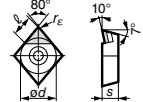
SUMIDIA Inserts



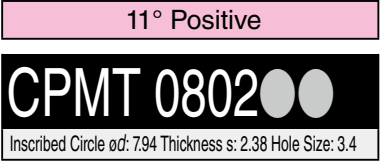
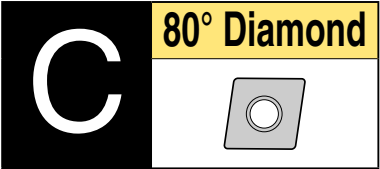
(Legend) General Cutting ●: Recommended

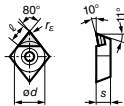
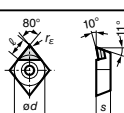
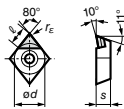
			N Non-Ferrous Metal		SUMIDIA				Page for Applicable Holder
			Dimensions (mm)						
Appearance	Shape	Cat. No.	Nose Radius(r_n)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200	
 NF Type		NF-CNMX 120402 120404 120408 120412	0.2 0.4 0.8 1.2	5.7 5.7 5.6 5.4	— — — —	— — — —	● ● ● ●	▲ ▲ ▲ ▲	External Holders C7 C8 Boring Bars E45 E46 E47
 One-use		NU-CNMX 120402 120404 120408 120412	0.2 0.4 0.8 1.2	2.8 2.8 2.7 2.6	— — — —	— — — —	— — — —	▲ ▲ ▲ ▲	
 CNMX		CNMX 120402 120404 120408 120412	0.2 0.4 0.8 1.2	5.7 5.7 5.6 5.6	— — ● ●	— — ● ●	● ● ● ●	▲ ▲ ▲ ▲	

 NF Type		NF-CCMT 060201 060202 060204	0.1 0.2 0.4	2.8 2.8 2.8	— — —	— — —	● ● ●	▲ ▲ ▲	External Holders C29 D13 D17 D24 Boring Bars E36 E37
 Break Master		NF-CCMT 060202N-LD 060204N-LD	0.2 0.4	2.9 2.9	— —	— —	● ●	— —	
 Break Master		NF-CCMT 060202N-GD 060204N-GD	0.2 0.4	2.9 2.9	— —	— —	● ●	— —	
 Break Master		NU-CCMT 060202R-DM 060202L-DM 060204R-DM 060204L-DM	0.2 0.2 0.4 0.4	2.5 2.5 2.5 2.5	— — — —	● ● ● ●	— — — —	— — — —	
 CCMT		CCMT 060201 060202 060204	0.1 0.2 0.4	3.3 3.2 3.1	— — —	— — —	● ● ●	▲ ▲ ▲	

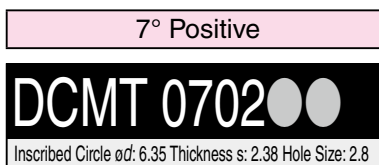
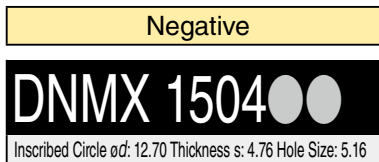
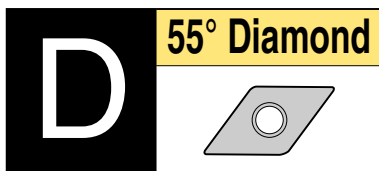
 NF Type		NF-CCMT 09T301 09T302 09T304 09T308	0.1 0.2 0.4 0.8	2.8 2.8 2.8 2.7	— — — —	— — — —	● ● ● ●	▲ ▲ ▲ ▲	External Holders C29 D13 D17 D24 Boring Bars E36 E37
 Break Master		NF-CCMT 09T302N-LD 09T304N-LD 09T308N-LD	0.2 0.4 0.8	2.9 2.9 2.8	— — —	— — —	● ● ●	— — —	
 Break Master		NF-CCMT 09T302N-GD 09T304N-GD 09T308N-GD	0.2 0.4 0.8	2.9 2.9 2.8	— — —	— — —	● ● ●	— — —	
 Break Master		NU-CCMT 09T302R-DM 09T302L-DM 09T304R-DM 09T304L-DM	0.2 0.2 0.4 0.4	2.5 2.5 2.5 2.5	— — — —	● ● ● ●	— — — —	— — — —	
 CCMT		CCMT 09T301 09T302 09T304	0.1 0.2 0.4	3.3 3.2 3.1	— — —	— — —	● ● ●	▲ ▲ ▲	

SUMIDIA Inserts

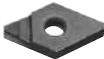
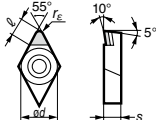
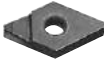
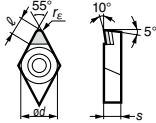
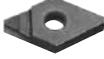
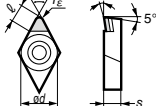


		(Legend)		General Cutting		● : Recommended	
				N Non-Ferrous Metal		●	
						SUMIDIA	
				Dimensions (mm)			
				Nose Radius (r _N)		Cutting Edge (ℓ)	
						DA90	
						DA150	
						DA1000	
						DA2200	
						Page for Applicable Holder	
Appearance		Shape		Cat. No.		Boring Bars	
				CPMT 080202 080204 080208		● ● ● ▲ ▲ ▲ E42 E43	
				NF-CPMT 090302 090304 090308		— — ● — — ● — — ● ▲ ▲ ▲ E42 E43	
				CPMT 090302 090304 090308		— — — — — — — — — ▲ ▲ ▲ E42 E43	

SUMIDIA Inserts



(Legend) General Cutting ● : Recommended

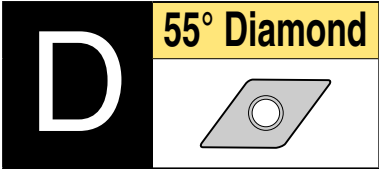
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			Recommended Direction							
			Dimensions (mm)							
Appearance	Shape	Cat. No.	Nose Radius (r _e)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200		
 NF Type		NF-DNMX 150402 150404 150408 150412	0.2	6.4	—	—	●	▲		
			0.4	6.2	—	—	●	▲		
			0.8	5.8	—	—	●	▲		
			1.2	5.4	—	—	●	▲		
								External Holders		
 One-use		NU-DNMX 150402 150404 150408 150412	0.2	3.0	—	—	—	▲		
			0.4	2.8	—	—	—	▲		
			0.8	2.5	—	—	—	▲		
			1.2	2.1	—	—	—	▲		
								Boring Bars		
		DNMX 150402 150404 150408 150412	0.2	6.4	—	—	●	—		
			0.4	6.2	—	●	●	▲		
			0.8	5.8	—	●	●	▲		
			1.2	5.4	—	●	●	▲		
								E65 E66 E67		

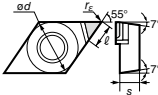
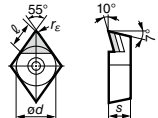
 NF Type		NF-DCMT 070201 070202 070204	0.1	3.0	—	—	●	▲	External Holders C29 D14 D16 D19 Boring Bars E49 E50 E51
			0.2	3.0	—	—	●	▲	
			0.4	2.8	—	—	●	▲	
			0.2	3.1	—	—	●	—	
 Break Master		NF-DCMT 070202N-LD 070204N-LD	0.4	2.9	—	—	●	—	
			0.2	3.1	—	—	●	—	
 Break Master		NF-DCMT 070202N-GD 070204N-GD	0.4	2.9	—	—	●	—	
			0.2	3.1	—	—	●	—	
 Break Master		NU-DCMT 070202R-DM 070202L-DM 070204R-DM 070204L-DM	0.2	3.0	—	●	—	—	
			0.2	3.0	—	●	—	—	
			0.4	3.0	—	●	—	—	
			0.4	3.0	—	●	—	—	
		DCMT 070201 070202 070204	0.1	4.3	—	●	—	▲	
			0.2	4.2	—	●	—	▲	
			0.4	4.0	—	●	—	▲	
			0.4	4.0	—	●	—	▲	

 NF Type		NF-DCMT 11T301 11T302 11T304 11T308	0.1	3.0	—	—	●	▲	External Holders C29 D14 D16 D19 Boring Bars E49 E50 E51
			0.2	3.0	—	—	●	▲	
			0.4	2.8	—	—	●	▲	
			0.8	2.4	—	—	●	▲	
 Break Master		NF-DCMT 11T302N-LD 11T304N-LD 11T308N-LD	0.2	3.1	—	—	●	—	
			0.4	2.9	—	—	●	—	
			0.8	2.5	—	—	●	—	
			0.2	3.1	—	—	●	—	
 Break Master		NF-DCMT 11T302N-GD 11T304N-GD 11T308N-GD	0.4	2.9	—	—	●	—	
			0.8	2.5	—	—	●	—	
			0.4	2.9	—	—	●	—	
			0.8	2.5	—	—	●	—	

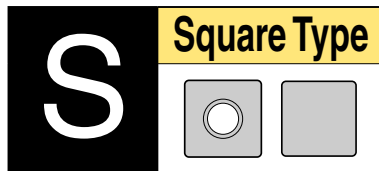
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SUMIDIA Inserts



		(Legend)		General Cutting				● : Recommended	
				Recommended Application		N Non-Ferrous Metal			
						SUMIDIA			
				Dimensions (mm)					
				Nose Radius (r _ε)	Cutting Edge (ℓ)				
						DA90	DA150	DA1000	DA2200
Appearance	Shape	Cat. No.							
 Break Master	 (Left Hand)	NU-DCMT 11T302R-DM 11T302L-DM 11T304R-DM 11T304L-DM			0.2 0.2 0.4 0.4	3.0 3.0 3.3 3.3	— ● ● —	● ● — —	— — — —
		DCMT 11T301 11T302 11T304			0.1 0.2 0.4	4.3 4.2 4.0	— ● ●	● ● —	▲ ▲ ▲
					External Holders				
					C29				
					D14				
					D16				
					D19				
					Boring Bars				
					E49				
					E50				
					E51				

SUMIDIA Inserts



(Legend) General Cutting ● : Recommended

Recommended Application	N Non-Ferrous Metal			●	
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SUMIDIA

Dimensions (mm)

Nose Radius (r _E)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200
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Page for Applicable Holder (Ex.)

7° Positive

SCMT 0702 ● ●

Inscribed Circle ød: 7.94 Thickness s: 2.38 Hole Size: 3.4

Appearance	Shape	Cat. No.	Nose Radius (r _E)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200	External Holders
		NF-SCMT 070201 070202 070204	0.1 0.2 0.4	3.0 3.0 3.0	— — —	— — —	● ● ●		External Holders D28
		SCMT 070201 070202 070204	0.1 0.2 0.4	3.0 3.0 3.0		● ● ●			External Holders D28

SCMT 09T3 ● ●

Inscribed Circle ød: 9.525 Thickness s: 3.97 Hole Size: 4.4

		SCMT 09T301 09T302 09T304	0.1 0.2 0.4	3.0 3.0 3.0		▲ ▲ ▲			External Holders D28 Boring Bars E72
--	--	--	-------------------	-------------------	--	-------------	--	--	---

11° Positive

SPGW 0903 ● ●

Inscribed Circle ød: 9.525 Thickness s: 3.18 Hole Size: 3.4

		SPGW 090302 090304 090308	0.2 0.4 0.8	4.8 4.8 4.8		▲ ▲ ▲			Boring Bars E71
--	--	--	-------------------	-------------------	--	-------------	--	--	---------------------------

SPGN 0903 ● ●

Inscribed Circle ød: 9.525 Thickness s: 3.18 Hole Size: -

		NF-SPGN 090304 090308	0.4 0.8	4.8 4.8	— —	— —	● ●	▲ ▲	Boring Bars E73
		SPGN 090302 090304 090308	0.2 0.4 0.8	4.8 4.8 4.8		● ▲			

SPGN 1203 ● ●

Inscribed Circle ød: 12.70 Thickness s: 3.18 Hole Size: -

		NF-SPGN 120304 120308	0.4 0.8	4.8 4.8	— —	— —	● ●	▲ ▲	External Holders C31
		SPGN 120304 120308 120312	0.4 0.8 1.2	4.8 4.8 4.8		● ▲			

M

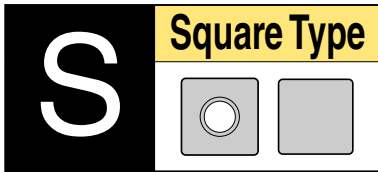
SUMIDIA

SUMIDIA

SUMIDIA
Binderless

SUMICRYSTAL

SUMIDIA Inserts



(Legend) General Cutting ● : Recommended

Recommended Application	N Non-Ferrous Metal			●	
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SUMIDIA

Dimensions (mm)

Nose Radius (r _E)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200
0.2	4.8		▲		
0.4	4.8				
0.8	4.8				

Page for Applicable Holder (Ex.)

20° Positive

SEGN 0702 ● ●

Inscribed Circle ød: 7.94 Thickness s: 2.38 Hole Size: -

Appearance	Shape	Cat. No.	Nose Radius (r _E)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200	Page for Applicable Holder (Ex.)
		SEGN 070202 070204 070208	0.2 0.4 0.8	4.8 4.8 4.8		▲			(Cartridge) (CE Type)

SEGN 0903 ● ●

Inscribed Circle ød: 9.525 Thickness s: 3.18 Hole Size: -

		NF-SEG N 090302	0.2	4.8	—	—	●		(Cartridge) (CE Type)
NF Type									
		SEGN 090302 090304 090308	0.2 0.4 0.8	4.8 4.8 4.8		●			

SEGN 1203 ● ●

Inscribed Circle ød: 12.70 Thickness s: 3.18 Hole Size: -

		NF-SEG N 120302	0.2	4.8	—	—	●		(Cartridge) (CE Type)
NF Type									
		SEGN 120302 120304 120308	0.2 0.4 0.8	4.8 4.8 4.8		●			

M

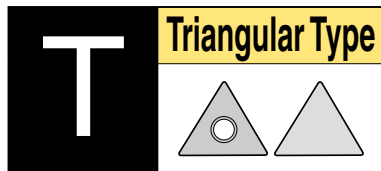
SUMIDIA

SUMIDIA

SUMIDIA
Binderless

SUMICRYSTAL

SUMIDIA Inserts



Triangular Type

Negative

TNMX 1604

Inscribed Circle ϕd : 9.525 Thickness s: 4.76 Hole Size: 3.81

5° Positive

TBGW 0601

Inscribed Circle ϕd : 3.97 Thickness s: 1.59 Hole Size: 2.2

TBGN 0601

Inscribed Circle ϕd : 3.97 Thickness s: 1.59 Hole Size: -

7° Positive

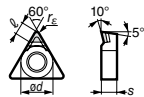
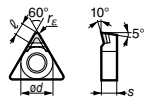
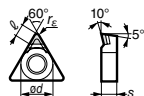
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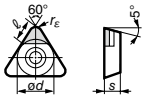
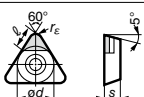
Inscribed Circle ϕd : 5.56 Thickness s: 2.38 Hole Size: 2.5

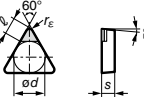
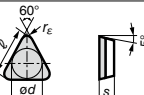
TCMT 1102

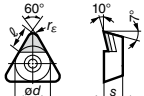
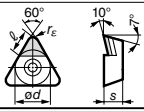
Inscribed Circle ϕd : 6.35 Thickness s: 2.38 Hole Size: 2.8

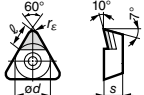
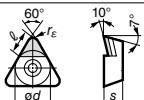
(Legend) General Cutting ● : Recommended

			N Non-Ferrous Metal		SUMIDIA				Page for Applicable Holder
			Dimensions (mm)		DA90	DA150	DA1000	DA2200	
Appearance	Shape	Cat. No.	Nose Radius (r _N)	Cutting Edge (ℓ)					
 NF Type		NF-TNMX 160402 160404 160408	0.2 0.4 0.8	3.7 3.6 3.3	— — —	— — —	● ● ●	▲ ▲ ▲	External Holders C19 to C25 D15 D18 Boring Bars E33 E34 E35
 One-use		NU-TNMX 160402 160404 160408	0.2 0.4 0.8	3.0 2.9 2.6	— — —	— — —	— — —	▲ ▲ ▲	
		TNMX 160402 160404 160408 160412	0.2 0.4 0.8 1.2	3.7 3.6 3.3 3.0	— — — —	— — — —	● ● ● —	▲ ▲ ▲ —	

 NF Type		NF-TBGW 060102 060104	0.2 0.4	2.3 2.2	— —	— —	● ●	▲ ▲	Boring Bars E24 E25
		TBGW 060102 060104	0.2 0.4	2.3 2.2	— —	— —	● ●	— —	

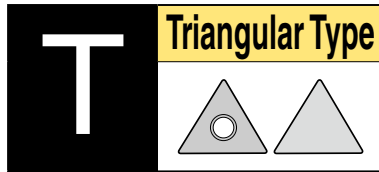
 NF Type		NF-TBGN 060102 060104	0.2 0.4	2.1 2.0	— —	— —	● ●	▲ ▲	Boring Bars E20
		TBGN 060102B 060104B 060108B	0.2 0.4 0.8	6.5 6.2 5.7	— — —	— — —	● ● —	— — —	

 NF Type		NF-TCMT 090202 090204	0.2 0.4	2.9 2.8	— —	— —	● ●	▲ ▲	External Holders D29
		TCMT 090201 090202 090204	0.1 0.2 0.4	2.8 2.7 2.6	— — —	— — —	● ● ●	▲ ▲ ▲	

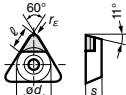
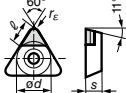
 NF Type		NF-TCMT 110201 110202 110204	0.1 0.2 0.4	3.0 2.9 2.8	— — —	— — —	● ● ●	▲ ▲ ▲	External Holders D29
		TCMT 110201 110202 110204	0.1 0.2 0.4	2.8 2.7 2.6	— — —	— — —	● ● ●	▲ ▲ ▲	

▲ mark: To be replaced by new item (Please confirm stock availability)

SUMIDIA Inserts



(Legend) General Cutting ● : Recommended

			N Non-Ferrous Metal					
					SUMIDIA			
			Dimensions (mm)					
Appearance	Shape	Cat. No.	Nose Radius (r _E)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200
 NF Type		NF-TPGW 080201 080202 080204	0.1	3.1	—	—	●	▲
			0.2	3.0	—	—	●	▲
			0.4	2.9	—	—	●	▲
		TPGW 080202 080204 080208	0.2	2.9	—	●	—	—
			0.4	2.7	—	●	—	—
			0.8	2.4	—	—	—	—

Page for Applicable Holder (Ex.)

Boring Bars

E24

E25

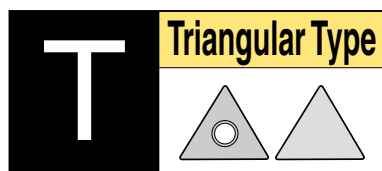
E26

		NF-TPMT 080202N-LD 080204N-LD	0.2	2.9	—	—	●	—	
			0.4	2.8	—	—	●	—	
		NF-TPMT 080202N-GD 080204N-GD	0.2	2.9	—	—	●	—	Boring Bars E24 E25 E26
			0.4	2.8	—	—	●	—	
		NU-TPMT 080202R-DM 080202L-DM 080204R-DM 080204L-DM	0.2	2.5	—	—	—	—	
			0.2	2.5	—	●	—	—	
			0.4	2.3	—	—	—	—	
			0.4	2.3	—	●	—	—	

		NF-TPGW 090202 090204	0.2	3.1	—	—	●	▲	Boring Bars E24
			0.4	2.9	—	—	●	▲	

		NF-TPMT 090202N-LD 090204N-LD	0.2	3.1	—	—	●	—	
			0.4	2.9	—	—	●	—	
		NF-TPMT 090202N-GD 090204N-GD	0.2	3.1	—	—	●	—	Boring Bars E24
			0.4	2.9	—	—	●	—	
		NF-TPMT 090202R-DM 090202L-DM 090204R-DM 090204L-DM	0.2	2.5	—	—	—	—	
			0.2	2.5	—	●	—	—	
			0.4	2.3	—	—	—	—	
			0.4	2.3	—	●	—	—	

SUMIDIA Inserts



11° Positive

TPGW 1102

Inscribed Circle ϕd : 6.35 Thickness s: 2.38 Hole Size: 2.8

TPMT 1102

Inscribed Circle ϕd : 6.35 Thickness s: 2.38 Hole Size: 2.8

TPGW 1103

Inscribed Circle ϕd : 6.35 Thickness s: 3.18 Hole Size: 3.4

TPMT 1103

Inscribed Circle ϕd : 6.35 Thickness s: 3.18 Hole Size: 3.4

(Legend) General Cutting ● : Recommended

Recommended Application	N Non-Ferrous Metal	DA90	DA150	DA1000	DA2200
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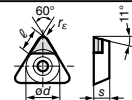
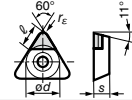
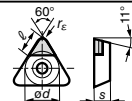
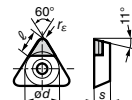
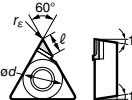
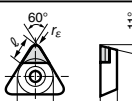
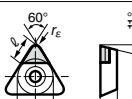
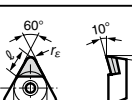
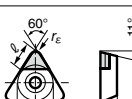
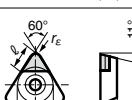
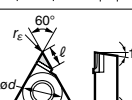
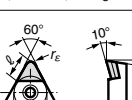
SUMIDIA

Dimensions (mm)

Nose Radius (r_e)

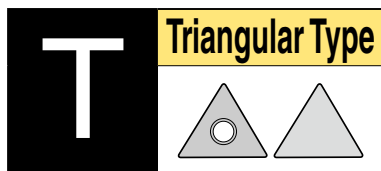
Cutting Edge (ℓ)

Page for Applicable Holder (Ex.)

Appearance	Shape	Cat. No.	Nose Radius (r_e)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200	
		NF-TPGW 110201 110202 110204	0.1 0.2 0.4	3.1 3.0 2.9	— — —	— — —	● ● ●	▲ ▲ ▲	(Special Holder)
NF Type									
		TPGW 110202 110204 110208	0.2 0.4 0.8	3.7 3.6 3.3	— — —	● ● ●	— — —	— — —	
		NF-TPMT 110202N-LD 110204N-LD	0.2 0.4	3.1 2.9	— —	— —	● ●	— —	(Special Holder)
Break Master									
		NF-TPMT 110202N-GD 110204N-GD	0.2 0.4	3.1 2.9	— —	— —	● ●	— —	
Break Master									(Special Holder)
		NU-TPMT 110202R-DM 110202L-DM 110204R-DM 110204L-DM	0.2 0.2 0.4 0.4	2.5 2.5 2.3 2.3	— — — —	● — — —	— — — —	— — — —	
Break Master	(Left Hand)								
		NF-TPGW 110301 110302 110304 110308	0.1 0.2 0.4 0.8	3.1 3.0 2.9 2.7	— — — —	— — — —	● ● ● ●	▲ ▲ ▲ ▲	Boring Bars E24 E25 E26
NF Type									
		TPGW 110300 110302 110304 110308	0.05 0.2 0.4 0.8	3.8 3.7 3.6 3.3	— — — —	● ● ● ●	— — — —	— — — —	
		NF-TPMT 110301 110302 110304 110308	0.1 0.2 0.4 0.8	3.1 2.9 2.8 2.5	— — — —	— — — —	● ● ● ●	▲ ▲ ▲ ▲	Boring Bars E24 E25 E26
NF Type									
		NF-TPMT 110302N-LD 110304N-LD 110308N-LD	0.2 0.4 0.8	3.1 2.9 2.7	— — —	— — —	● ● ●	— — —	
Break Master									Boring Bars E24 E25 E26
		NF-TPMT 110302N-GD 110304N-GD 110308N-GD	0.2 0.4 0.8	3.1 2.9 2.7	— — —	— — —	● ● ●	— — —	
Break Master									
		NU-TPMT 110302R-DM 110302L-DM 110304R-DM 110304L-DM	0.2 0.2 0.4 0.4	2.5 2.5 2.3 2.3	— — — —	● — — —	— — — —	— — — —	Boring Bars E24 E25 E26
Break Master	(Left Hand)								
		TPMT 110300 110302 110304 110308	0.05 0.2 0.4 0.8	3.7 3.6 3.5 3.2	— — — —	— — — —	— — — —	▲ ▲ ▲ ▲	

▲ mark: To be replaced by new item (Please confirm stock availability)

SUMIDIA Inserts



11° Positive

TPGW 1603 ●●
Inscribed Circle ϕd : 9.525 Thickness s: 3.18 Hole Size: 4.4

TPGW 1604 ●●
Inscribed Circle ϕd : 9.525 Thickness s: 4.76 Hole Size: 4.4

TPMT 1604 ●●
Inscribed Circle ϕd : 9.525 Thickness s: 4.76 Hole Size: 4.4

(Legend) General Cutting ● : Recommended

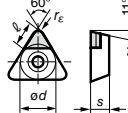
Recommended Application	N Non-Ferrous Metal		●	
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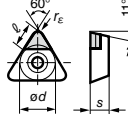
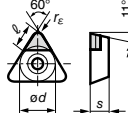
SUMIDIA

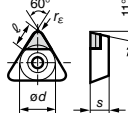
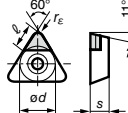
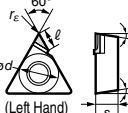
Dimensions (mm)

Nose Radius (r_e)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200
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Page for Applicable Holder (Ex.)

Appearance	Shape	Cat. No.	Nose Radius (r_e)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200	Page for Applicable Holder (Ex.)
		NF-TPGW 160302 160304 160308	0.2 0.4 0.8	3.1 2.9 2.7	— — —	— — —	● ● ●	▲ ▲ ▲	(Special Holder)
NF Type									

		NF-TPGW 160401 160402 160404 160408	0.1 0.2 0.4 0.8	3.1 3.0 2.9 2.7	— — — —	— — — —	● ● ● ●	▲ ▲ ▲ ▲	Boring Bars E25
NF Type									
		TPGW 160402 160404 160408 160412	0.2 0.4 0.8 1.2	3.7 3.6 3.3 3.0	— — — —	— — — —	● ● ● —	— — — —	

		NF-TPMT 160402N-LD 160404N-LD 160408N-LD	0.2 0.4 0.8	3.1 2.9 2.7	— — —	— — —	● ● ●	— — —	Boring Bars E25
Break Master									
		NF-TPMT 160402N-GD 160404N-GD 160408N-GD	0.2 0.4 0.8	3.1 2.9 2.7	— — —	— — —	● ● ●	— — —	
Break Master									
		NU-TPMT 160402R-DM 160402L-DM 160404R-DM 160404L-DM	0.2 0.2 0.4 0.4	2.5 2.5 2.3 2.3	— — — —	— — — —	— — — —	— — — —	
Break Master									

M

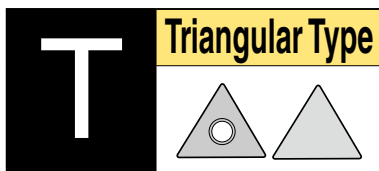
SUMIDIA

SUMIDIA

SUMIDIA Binderless

SUMICRYSTAL

SUMIDIA Inserts



Triangular Type

11° Positive

TPGN 0902

Inscribed Circle ϕd : 5.56 Thickness s: 2.38 Hole Size: -

Appearance	Shape	Cat. No.	Nose Radius (r_E)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200	Page for Applicable Holder (Ex.)
		NF-TPGN 090202 090204 090208	0.2 0.4 0.8	3.1 3.0 2.9	— — —	— — —	● ● ●	▲ ▲ ▲	(Cartridge) CP Type
		TPGN 090202 090204 090208	0.2 0.4 0.8	3.7 3.6 3.3	● ● ●	— — —	— — —	— — —	

TPGN 1103

Inscribed Circle ϕd : 6.35 Thickness s: 3.18 Hole Size: -

		NF-TPGN 110302 110304 110308	0.2 0.4 0.8	3.0 2.9 2.7	— — —	— — —	● ● ●	▲ ▲ ▲	Boring Bars E31
		NF-TPGN 110304P 110308P	0.4 0.8	10.4 9.8	— —	— —	● ●	▲ ▲	
		TPGN 110300 110302 110304 110308	0.05 0.2 0.4 0.8	3.8 3.7 3.6 3.3	— — — —	— — — —	● ● ● ●	— — — —	

P: Full-length Cutting Edge Type

TPMR 1103

Inscribed Circle ϕd : 6.35 Thickness s: 3.18 Hole Size: -

		NU-TPMR 110302R-DM 110302L-DM 110304R-DM 110304L-DM	0.2 0.2 0.4 0.4	2.5 2.5 2.3 2.3	— ● — ●	— — — —	— — — —	— — — —	Boring Bars E31
--	--	--	--------------------------	--------------------------	------------------	------------------	------------------	------------------	---------------------------

TPGN 1603

Inscribed Circle ϕd : 9.525 Thickness s: 3.18 Hole Size: -

		NF-TPGN 160302 160304 160308	0.2 0.4 0.8	3.0 2.9 2.7	— — —	— — —	● ● ●	▲ ▲ ▲	External Holders C32 Boring Bars E31
		NF-TPGN 160304P	0.4	15.9	—	—	●	▲	
		TPGN 160302 160304 160308 160312	0.2 0.4 0.8 1.2	3.7 3.6 3.3 3.0	— — — —	— — — —	● ● ● ●	— — — —	

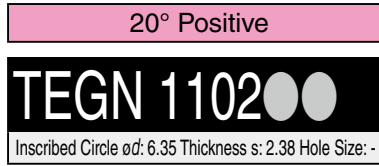
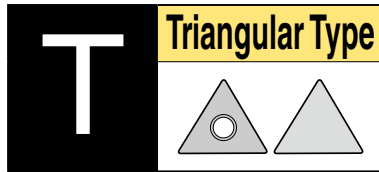
P: Full-length Cutting Edge Type

TPMR 1603

Inscribed Circle ϕd : 9.525 Thickness s: 3.18 Hole Size: -

		NU-TPMR 160302R-DM 160302L-DM 160304R-DM 160304L-DM	0.2 0.2 0.4 0.4	2.5 2.5 2.3 2.3	— — — —	— ● — ●	— — — —	— — — —	External Holders C32 Boring Bars E31
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SUMIDIA Inserts



(Legend) General Cutting ● : Recommended

			Recommended Application		N Non-Ferrous Metal							
							SUMIDIA					
			Dimensions (mm)									
</												

M

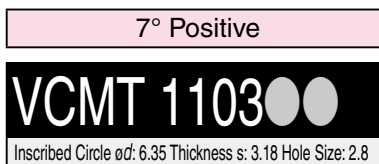
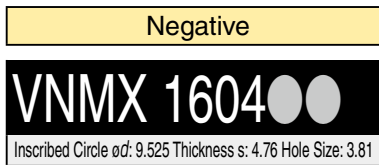
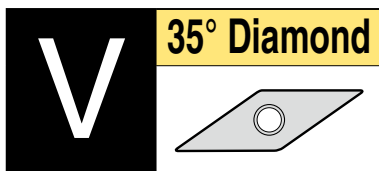
SUMIDIA

SUMIDIA

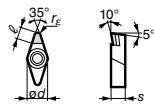
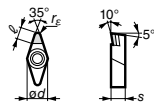
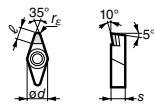
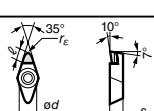
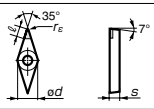
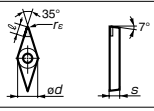
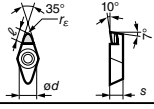
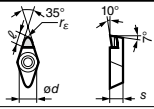
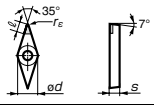
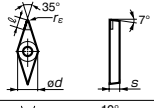
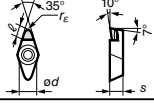
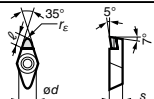
SUMIDIA
Binderless

SUMICRYSTAL

SUMIDIA Inserts



(Legend) General Cutting ● : Recommended

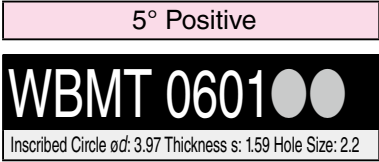
			N Non-Ferrous Metal		SUMIDIA				Page for Applicable Holder		
			Dimensions (mm)								
			Nose Radius (r _e)	Cutting Edge (ℓ)	DA90	DA150	DA1000	DA2200			
Appearance	Shape	Cat. No.									
 NF Type		NF-VNMX 160402 160404 160408 160412	0.2 0.4 0.8 1.2	6.9 6.4 5.6 4.7	— — — —	— — — —	● ● ● ●	▲ ▲ ▲ ▲	External Holders C26		
 One-use		NU-VNMX 160402 160404 160408 160412	0.2 0.4 0.8 1.2	3.6 3.1 2.3 2.3	— — — —	— — — —	— — — —	▲ ▲ ▲ ▲			
 VNMX		VNMX 160402 160404 160408 160412	0.2 0.4 0.8 1.2	6.9 6.4 5.6 4.7	— — — —	— — — —	● ● ● ●	▲ ▲ ▲ ▲			
 NF Type		NF-VCMT 110301 110302 110304	0.1 0.2 0.4	3.5 3.4 3.0	— — —	— — —	● ● ●	▲ ▲ ▲		External Holders C30 D15 D18 D30	
 Break Master		NF-VCMT 110302N-LD 110304N-LD	0.2 0.4	3.8 3.4	— —	— —	● ●	— —			
 Break Master		NF-VCMT 110302N-GD 110304N-GD	0.2 0.4	3.8 3.4	— —	— —	● ●	— —			
 VCMT		VCMT 110301 110302 110304	0.1 0.2 0.4	3.7 3.5 3.0	— — —	— — —	— — —	▲ ▲ ▲			Boring Bars E57 E58 E59 E60
 NF Type		NF-VCMT 160404 160408 160412	0.4 0.8 1.2	6.5 5.6 4.6	— — —	— — —	● ● ●	▲ ▲ ▲		Boring Bars E55 E56	
 Break Master		NF-VCMT 160404N-LD 160408N-LD 160412N-LD	0.4 0.8 1.2	6.5 5.6 4.8	— — —	— — —	● ● ●	— — —			
 Break Master		NF-VCMT 160404N-GD 160408N-GD 160412N-GD	0.4 0.8 1.2	6.5 5.6 4.8	— — —	— — —	● ● ●	— — —			
 VCMT		VCMT 160408 160412 160412-WF	0.8 1.2 1.2	5.8 4.9 4.9	— — —	— — —	● ● ●	▲ ▲ ▲			
 VCMT		VCMT 220520 220530	2.0 3.0	5.0 5.0	— —	— —	● ●	▲ ▲	External Holders C34		

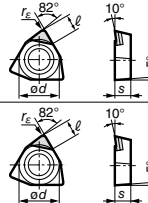
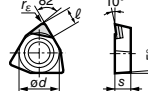
WF: Edge With Special Land For Aluminium Wheel Glossy Finishing

WF: Edge With Special Land For Aluminium Wheel Glossy Finishing

▲ mark: To be replaced by new item (Please confirm stock availability)

SUMIDIA Inserts



(Legend)		General Cutting		● : Recommended		
		N Non-Ferrous Metal		SUMIDIA		
		Dimensions (mm)		Page for Applicable Holder		
		Nose Radius (r _E)	Cutting Edge (ℓ)	DA90	DA150	
				DA1000	DA2200	
Appearance	Shape	Cat. No.				
 NF Type		NF-WBMT 060101L		0.1	1.8	
		060102L		0.2	1.8	
		060104L		0.4	1.7	
		WBMT 060101L		0.1	1.8	
		060102L		0.2	1.8	
		060104L		0.4	1.7	
				Boring Bars		
				E21		
				E68		

M

SUMIDIA

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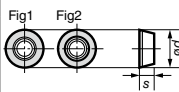
SUMIDIA
Binderless

SUMICRYSTAL

SUMIDIA Inserts

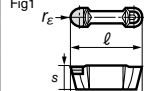
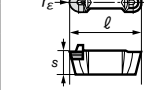
Turning Application

● Round Insert

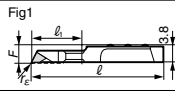
Appearance	Shape	Cat. No.	DA9	DA1	DA1	DA2	Inscr Circ	Thick (s)	Cuttin Len	Nos Rad	OilH		
		RPGW 0803M0			●	▲	8.0	3.18	—	—	3.3	1	Aluminium Wheel Turning Holders SEC-Copying Tool Holders RP Type (RP02 Type)
		RPGT 0803M0-WF										2	

WF: Edge With Special Land For Aluminium Wheel Glossy Finishing

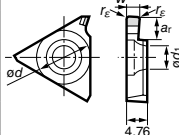
● Dogbone Type

Appearance	Shape	Cat. No.	DA90	DA150	DA1000	DA2200	Total Len	Thick (s)	Nose Rad						
	Fig1 	MDE 3R				●	26	8.5	3.0			1	Aluminium Wheel Turning Holders SEC-Copying Tool Holders GD Type (GDE Type) → C35		
		MDE 4R				●	30		4.0						
	Fig1 	MDE 3R-AW				●	26	8.5	3.0						
		MDE 4R-AW				●	30		4.0						

● Small Dia. Boring Bar Insert

Appearance	Shape	Cat. No.	Stock	Min. Bore	F	Nose Radius(r_e)	ℓ	ℓ_1	Fig	Applicable Holder
			DA2200							
		KBMX R0311-10	●	3.0	4.1	0.1			1	Very Small Dia. Boring CKB Type → M24
		KBMX R0411-10	●	4.0	4.3	0.1	28.5	11.0		
		KBMX R0511-10	●	5.0	4.5	0.1				

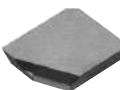
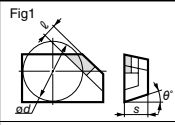
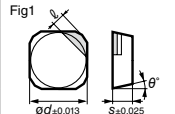
● Grooving Insert

Appearance	Shape	Cat. No.	DA22		Inscribed Circle(ϕ)	Grooving Width(w)	Nose Radius(r_f)	Max.Depth(a)	Oil Hole(ϕ)	Fig	Applicable Holder
			R	L							
		TGA R/L4125	●			1.25		2.0		1	SEC-Grooving Tools (GWC Type/GWCS Type/GWCI Type) → F4 to F5
		TGA R/L4150	●			1.50		3.5			
		TGA R/L4200	●			2.00		3.5			
		TGA R/L4250	●			2.50	0.1	4.0	5.5		
		TGA R/L4300	●			3.00		4.0			
		TGA R/L4350	●			3.50		5.0			
		TGA R/L4400	●			4.00		5.0			

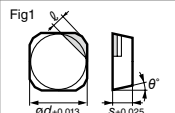
For Milling

For Milling			Stock				Dimensions (mm)				Fig	Applicable Cutter (Endmills)
Appearance	Shape	Cat. No.	DA150	DA1000	DA2200	SC10	Inscribed Circle(ϕd)	Thickness (s)	Cutting Edge Length(ℓ)	Relief Angle(θ°)		

● For SEC-ACE MILL APG Type

		APW 4R		●	▲	—	12.70	3.18	2.0	15	1	APG Type → H47
		APW 5R				—	15.875	4.76	2.0			
		NF-SDC 42R	—	●	▲	—	12.70	3.18	3.0			
		SDC 42R	●	●	▲	—	12.70	3.18	3.0	15	1	
		SDC 53R				—	15.88	4.76	3.0			

● For SEC-ACE MILL FPG Type / SEC-Multi Use Endmill FPE Type

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

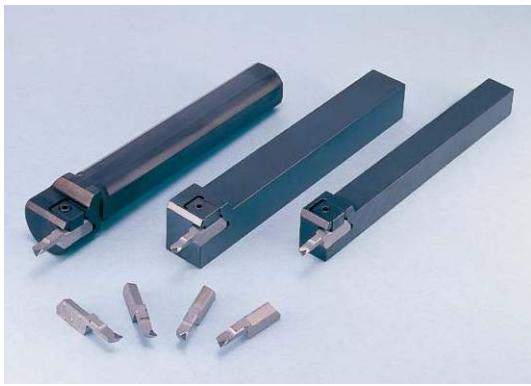
▲ mark: To be replaced by new item (Please confirm stock availability)

M
SUMIDIA

For Milling						Stock							Dimensions (mm)								Fig	Applicable Cutter (Endmills)
Appearance	Shape	Cat. No.	DA150	DA1000	DA2200	SC10	Inscribed Circle(ϕd)	Thickness (s)	Cutting Edge Length(ℓ)	Relief Angle(θ°)												
● For SUMIDIA Cutter FAM Type /SAM Type																						
		FABR	●	—	●	—	—	7.9	(5.7)	15	1	FAM Type → M34										
		FABL	—	—	—	—	—	—	—	—	—											
		SABR	●	—	●	—	—	7.9	(5.7)	15	2	SAM Type → From M34										
		SABL	—	—	—	—	—	—	—	—	—											
● For SEC-ACE MILL CHG Type / SEC-Multi Use Endmill CHE Type																						
		NF-TEEN 22R	—	●	▲	—	6.35	3.18	4.9	20	1	CHG Type → H98 CHE Type → From H99										
		NF-TEEN 32R	—	●	▲	—	9.525	—	4.9													
		NF-TEEN 43R	—	●	▲	—	12.70	4.76	4.8													
		TEEN 22R	●	—	—	—	6.35	3.18	4.9	20												
		TEEN 32R	●	—	—	—	9.525	—	4.9													
		TEEN 43R	●	▲	—	—	12.70	4.76	4.8													
● High-Efficiency Aluminum Cutter HF Type <i>New</i>																						
		NF-LDEN 12T3ZDFR-G	—	●	—	—	—	—	6.0	—	1	HF Type → From M26										
		NF-LDEN 12T3ZDFR-L	—	●	—	—																
		NF-LDEN 12T3ZDTR-H	—	●	—	—																
		NF-LDEN 12T3ZDFR-GX	—	—	—	—																
		NF-LDEN 12T3ZDFR-W	—	—	—	—																
● For Aluminium Body Cutter RF Type (Insert Type)																						
		NF-SNEW 1204ADFR	—	●	▲	—	12.70	4.76	4.7	15	1	RF Type → M30										
		NF-SNEW 120404ADFR-H	—	●	—	—																
		NF-SNEW 1204ADFR-W	—	●	▲	—																
		SNEW 1204ADFR-WS	—	—	—	●																
● For Aluminium Body Cutter RF Type (Insert Type)																						
		RFB	—	—	●	—	—	—	6.5	—	1	RF Type → M30										
		RFBW	—	—	●	—							4.5	2								
● For Small Diameter Cutter for Aluminium Machining SRF Type																						
		NF-SNEW 09T3ADTR	—	●	▲	—	9.525	3.96	6.0	15	1	SRF Type → M32										
		NF-SNEW 09T3ADTR-U	—	●	▲	—																
		NF-SNEW 09T3ADTR-R	—	●	▲	—																
			—	—	—	—																
● Shim For SEC-WGC																						
		NF-SECW13T3AGTN-N	—	●	▲	—	13.40	3.97	2.1	20	1	WGC Type → From H26										
			—	—	—	—																
		NF-XEEW13T3AGFR-W	—	●	▲	—	13.40	3.97	2.5	20	1	WGC Type → From H26										
			—	—	—	—																

M23

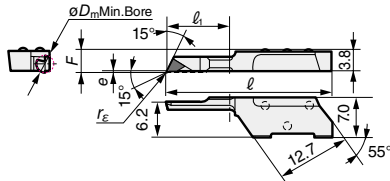
CKB Type



■ Characteristics

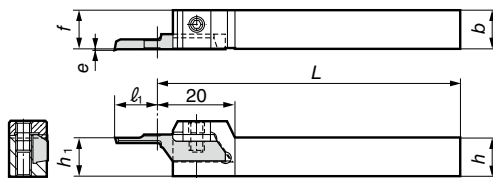
- High index accuracy with simple structure design and one-touch clamping.
- Utilises DA2200 grade with excellent edge sharpness.

■ Inserts



Cat. No.	Stock	Min. Bore	Dimensions (mm)				
	DA2200	ϕD_m	F	e	r_E	ℓ	ℓ_1
KBMX R0311-10	●	3.0	4.1	0.3	0.1	28.5	11
R0411-10	●	4.0	4.3	0.5	0.1	28.5	11
R0511-10	●	5.0	4.5	0.7	0.1	28.5	11

■ Square Shank



■ Holders

See Inserts for e , ℓ_1 dimensions

Cat. No.	Stock	Dimensions (mm)					Clamp	Double Screw	Spanner
		h	b	L	f	h_1			
CKB R1010-16	●	10	10	100	10	10	CKBW16	WB4-8	LH020
R1212-16	●	12	12	125	12	12			
R1616-16	●	16	16	125	16	16			
R2020-16	●	20	20	125	20	20			
R2525-16	●	25	25	150	25	25			

* Inserts are not included.

■ Round Shank

Fig 1

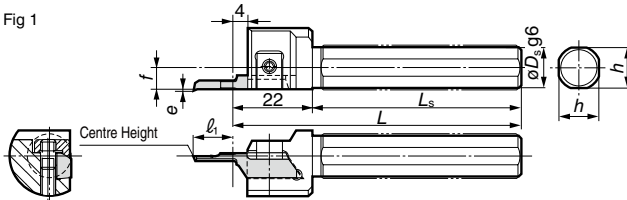
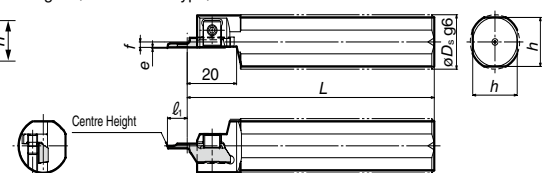
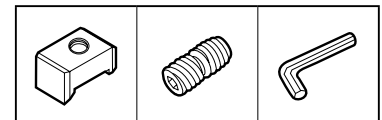
See Inserts for e , ℓ_1 dimensions

Fig 2 (Offset Small Type)



■ Spare Parts



■ Holders

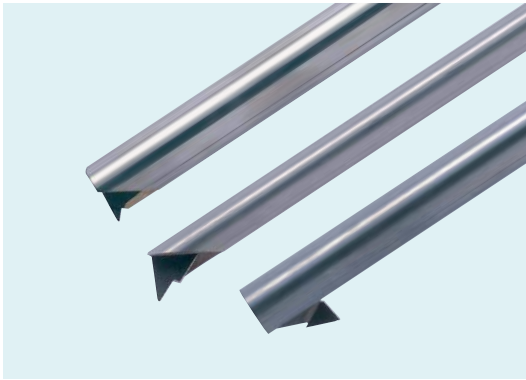
Cat. No.	Stock	Dimensions (mm)					Fig	Clamp	Double Screw	Spanner
		ϕD_s	h	L	L_s	f				
S10F-CKB R-16	●	10.0	9	80	58	5	1	CKBW16	WB4-8	LH020
S12F-CKB R-16	●	12.0	11	80	58	6	1			
S16H-CKB R-16	●	16.0	15	100	78	8	1			
S20K-CKB R-16	●	20.0	18	125	103	10	1			
S19K-CKB R-16	●	19.05	17	125	103	8	1			
S1905H-CKB RS-16	●	19.05	17	100	—	2	2			
S20H-CKB RS-16	●	20.0	18	100	—	2	2			
S22K-CKB RS-16	●	22.0	19	125	—	2	2			
S25K-CKB RS-16	●	25.0	23	125	—	2	2			
S254K-CKB RS-16	●	25.4	23	125	—	2	2			

* Inserts are not included.

■ Recommended Cutting Conditions

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

DABB Type



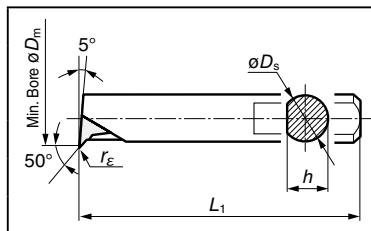
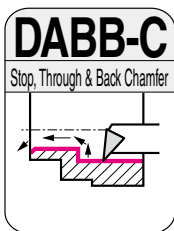
● Small Hole Boring of Aluminium Alloy

3 series ranges to cover general boring, necking and back-turning processes. 3 mm minimum bore diameter!

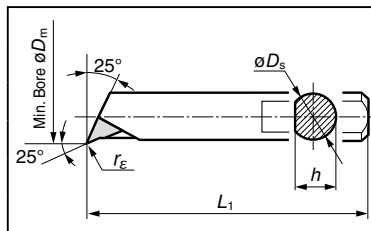
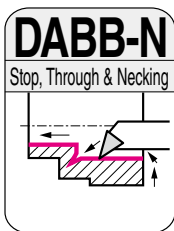
● Utilising High Toughness PCD Grade, SUMIDIA DA2200

For small hole general boring of $\phi 10$ to $\phi 22$ mm range, use small hole boring bar BNB Type + SUMIDIA Insert (Refer to page L105 for holder and insert selection)

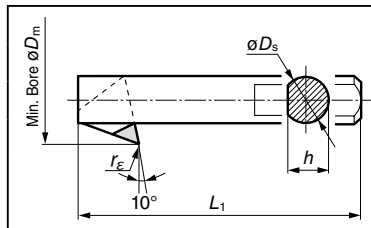
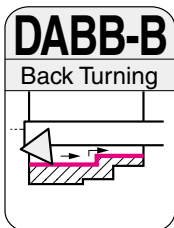
■ Tools



Cat. No.	Stock	Min. Bore	Dimensions (mm)				Applicable Sleeve
	DA2200	$\varnothing D_m$	$\varnothing D_s$	h	L_1	r_ε	
DABB 025CR	●	3.0	2.5	2.2	60	0.1	HBB 2516
035CR	●	4.0	3.5	3.2	60	0.1	HBB 3516
045CR	●	5.0	4.5	4.1	80	0.1	HBB 4516
060CR	●	7.0	6.0	5.2	80	0.1	HBB 616



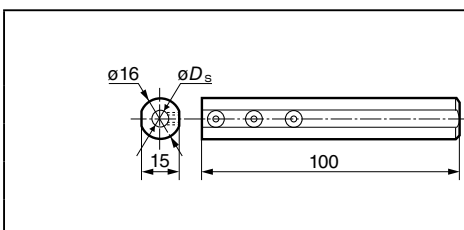
Cat. No.	Stock	Min. Bore	Dimensions (mm)				Applicable Sleeve
	DA2200	$\varnothing D_m$	$\varnothing D_s$	h	L_1	r_ε	
DABB 025NR	●	3.0	2.5	2.2	60	0.1	HBB 2516
035NR	●	4.0	3.5	3.2	60	0.1	HBB 3516
045NR	●	5.0	4.5	4.1	80	0.1	HBB 4516
060NR	●	7.0	6.0	5.2	80	0.1	HBB 616



Cat. No.	Stock	Min. Bore	Dimensions (mm)				Applicable Sleeve
	DA2200	ϕD_m	ϕD_s	h	L_1	r_ε	
DABB 045BR	▲	7.0	4.5	4.0	80	0.1	HBB 4516
060BR	▲	9.0	6.0	5.5	80	0.1	HBB 616

■ Spare Parts

■ Sleeves



Cat. No.	Stock	ϕD_s (mm)
HBB 2516	●	2.5
3516	●	3.5
4516	●	4.5
616	●	6.0



Set Screw



Spanner

BT 0404

TH 020

■ Recommended Cutting Conditions

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

HF Type



General Features

The HF Type high-efficiency aluminum cutter employs unique insert design to eliminate burrs and to achieve machining without burrs.

Work Material

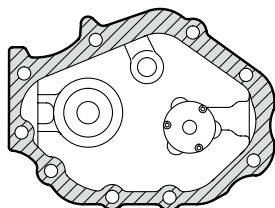
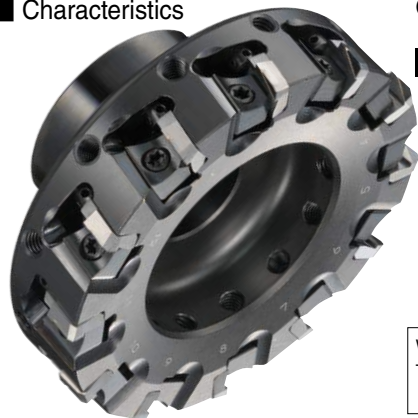
- Aluminum and aluminum alloys
- Other non-ferrous metal

(Not suited for cast iron or steel.)

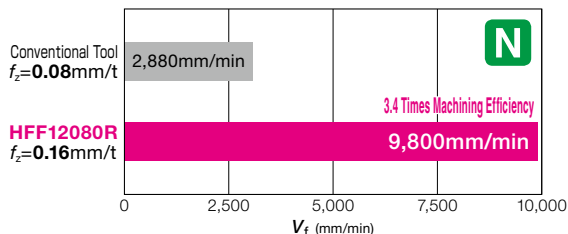
Characteristics

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

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



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



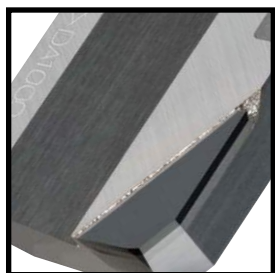
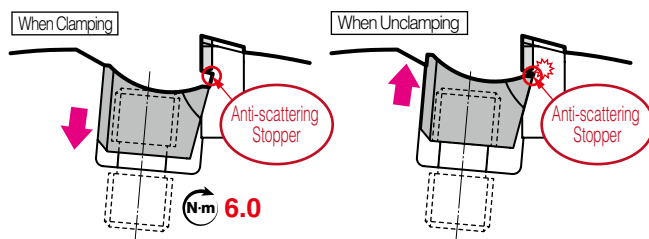
Cutter (mm)	s max (min ⁻¹)	v_c (m/min)	f_z (mm/t)	Max. Number of Edges (Edge)	V_f (mm/min)
ø80	11,000	2,763	to 0.2	10	to 22,000
ø100	9,500	2,983	to 0.2	12	to 22,800
ø125	7,500	2,944	to 0.2	15	to 22,500



- The wedge clamp with anti-scattering mechanism ensures safety and operability.

Shape and structure to prevent scattering outside.
Scattering by centrifugal force is prevented even when loosened by vibration.

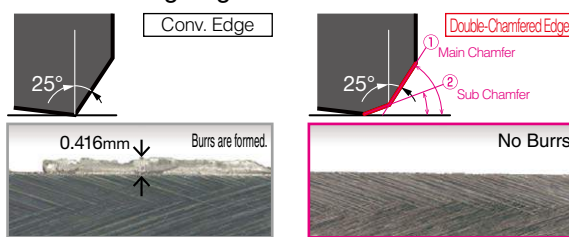
Ensure that the maximum allowable spindle speed (n_{max}) specified for each cutter diameter is not exceeded. Failing to do so is very dangerous.
(*See the table on the upper right.)



- Reduces burrs by using a double-chamfered cutting edge.

Drastically reduces burrs by preventing the plastic deformation that causes burrs.

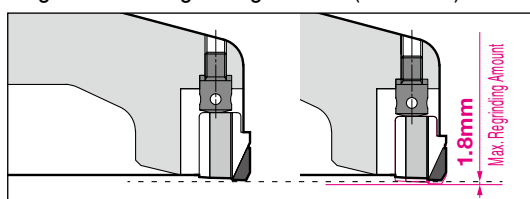
Work Material : **A6061** Blanks
Cutting Conditions : $v_c=3,142$ m/min, $f_z=0.10$ mm/t,
 $a_p=0.5$ mm, Dry



- Reduces running costs by drastically increasing the insert regrinding amount (to 1.8mm).

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

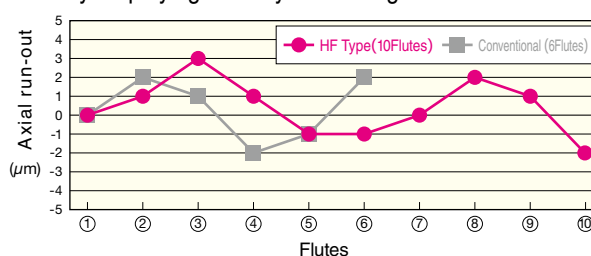
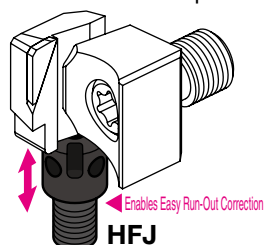
(* Given the condition of normal wear with a_p of 1.4mm or less)



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



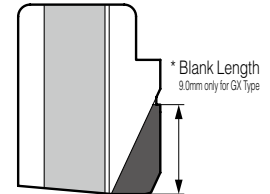
- Achieves a run-out precision of $5\mu\text{m}$ or less by employing an easy fine-tuning mechanism.



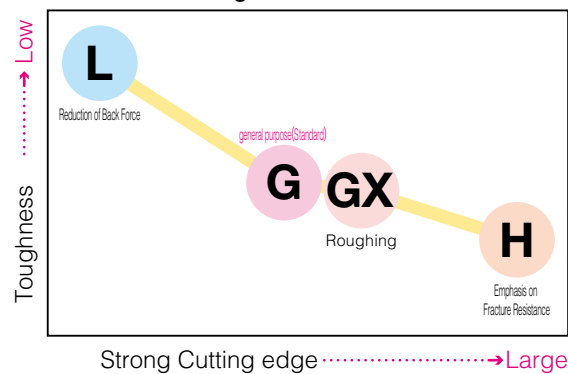
HF Type

Edge Selection Guide

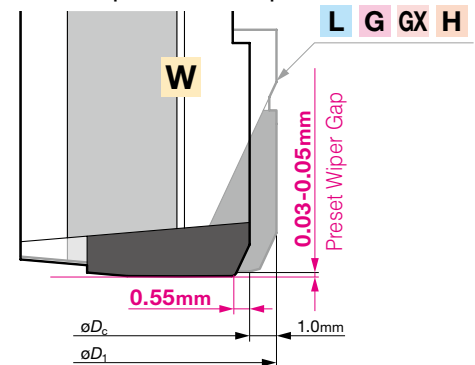
Work Material	N				
Type	L	G	GX	H	W
Cutting Edge Insert Figure					
Characteristics	Low cutting force	Standard	Long Edge	High Strength	Wiper
Application	Reduction of Back Force	general purpose	Roughing	Emphasis on Fracture Resistance	
Blank Length (*)	6.0mm	6.0mm	9.0mm	6.0mm	



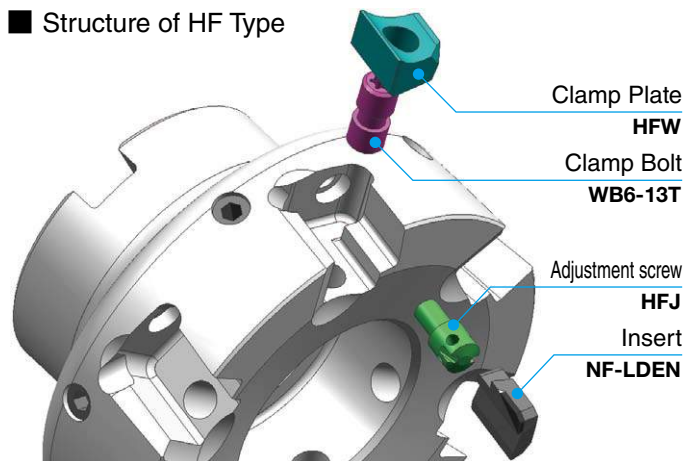
Guideline for Edge Selection



Amount of Wiper Insert Gap



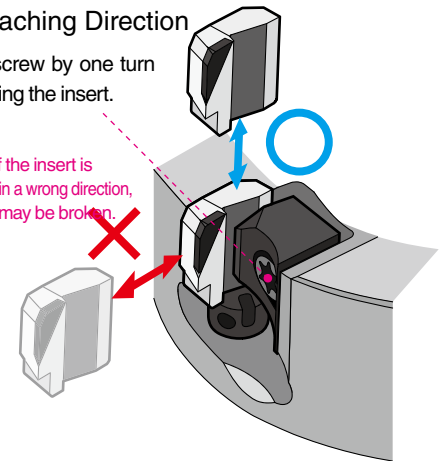
Structure of HF Type



Insert Attaching Direction

Loosen the screw by one turn before removing the insert.

⚠ Be aware that if the insert is forcibly removed in a wrong direction, the equipment may be broken.



Application Examples

● Work : Crankcase Cover		SEH Product	Competitor's Product
Work Material : Al 	Tool	HFF12080R	ø80
	Grade	DA1000	PCD
	No. of Teeth	10	8
	V_c (m/min)	2,510	2,510
	S (mm ⁻¹)	10,000	10,000
	V_f (mm/min)	8,000	6,400
	f_z (mm/t)	0.08	0.08
	a_p (mm)	1.2	1.2
	Coolant	Wet	Wet
	Results	Improves machining efficiency 1.25 times. Excellent surface roughness of $R_a=1.0\mu\text{m}$ or less.	

● Work : Engine Component		SEH Product	Competitor's Product
Work Material : Al 	Tool	HFF12100R	ø100
	Grade	DA1000	PCD
	No. of Teeth	12	8
	V_c (m/min)	2,000	2,000
	S (mm ⁻¹)	6,370	6,370
	V_f (mm/min)	4,585	3,060
	f_z (mm/t)	0.06	0.06
	a_p (mm)	0.8	0.8
	Coolant	Wet	Wet
	Results	Improves machining efficiency 1.5 times. 1.5 times longer tool life (Increases the number of units machined from 3000 to 4000.)	

M

SUMIDIA

SUMIDIA

SUMIDIA

SUMIDIA

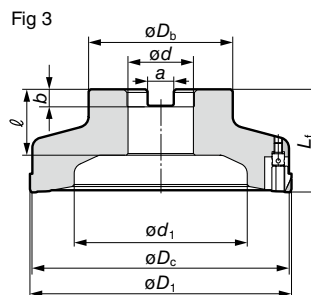
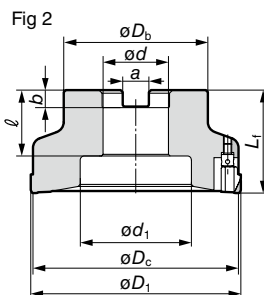
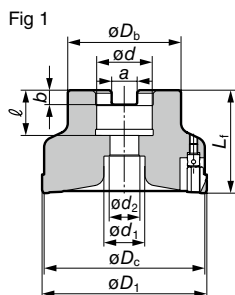
SUMICRYSTAL

HF Type

Rake Angle	Radial	+4°
	Axial	+10°

3mm 90°

P	M	K	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous Metal	Exotic Alloy	Hardened Steel



Body (Course Pitch : 2 Flutes/Inch)

Cat. No.		Stock	Dimensions (mm)										No. of Teeth	Weight (kg)	Fig
			ϕD_c	ϕD_1	ϕD_b	L_1	ϕd	a	b	ℓ	ϕd_1	ϕd_2			
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
Imperial	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

Inserts are not included.

Insert

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Grade		SUMIDIA				
Application	High Speed/Light	N				
	General Purpose	N				
	Roughing	N				
Cat. No.		DA1000	Cutting Edge Length	Unique wiper edge	Application	Fig
NF-LDEN 12T3ZDFR-L		●	6	Straight	general purpose	4
12T3ZDFR-G		●	6	Arc	general purpose	4
12T3ZDTR-H		●	6	Arc	Strong edge	4
12T3ZDFR-GX		●	9	Arc	Long Edge	5
12T3ZDFR-W		●	—	Arc	Wiper	6

Fig 4

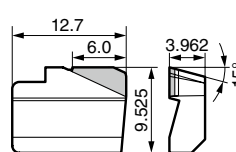


Fig 5

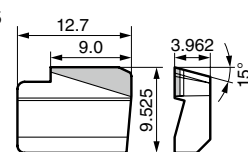


Fig 6



Parts

(Optional)

Clamp Plate	Clamp Bolt	Adjustment screw	Adjusting Wrench	Spanners	Assembling Wrench
HFW	WB6-13T	HFJ	TTX20	RFT	HFVT

Recommended Tightening Torque (N·m)

Recommended Cutting Conditions

Si content of 12.6% or less.

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Grade
N	Aluminium Alloy	—	2000- 2500 -3000	0.05- 0.13 -0.20	DA1000

Si content of over 12.6%

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Grade
N	Aluminium 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, cutting depth, and other factors.

Identification Details

HF M 12 080 R S -22

(1) Cutter Series (2) M : Fine Pitched F : Extra-Fine Pitched (3) Insert Size (4) Cutter (5) Direction (6) Metric Bore (7) Oil Hole

HF Type

Rake Angle	Radial	+4°
	Axial	+10°

3mm 90°

P	M	K	N	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous Metal	Aluminum	Exotic Alloy	Hardened Steel



Fig 1

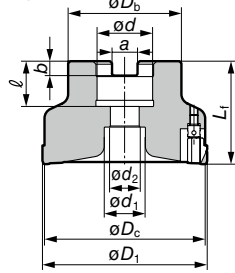


Fig 2

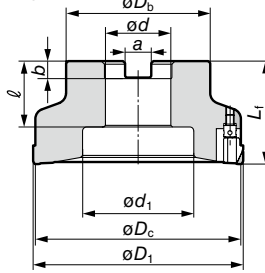
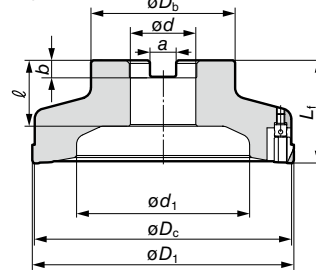


Fig 3



■ Body (Fine : 3 Flutes/Inch)

Cat. No.		Stock	Dimensions (mm)										No. of Teeth	Weight (kg)	Fig
			ϕD_c	ϕD_1	ϕD_b	L_1	ϕd	a	b	ℓ	ϕd_1	ϕd_2			
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
Imperial	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

Inserts are not included.

■ Insert

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Grade		SUMIDIA				
Application	High Speed/Light	N				
	General Purpose	N				
	Roughing	N				
Cat. No.		DA1000	Cutting Edge Length	Unique wiper edge	Application	Fig
NF-LDEN 12T3ZDFR-L		●	6	Straight	general purpose	4
12T3ZDFR-G		●	6	Arc	general purpose	4
12T3ZDTR-H		●	6	Arc	Strong edge	4
12T3ZDFR-GX			9	Arc	Long Edge	5
12T3ZDFR-W			—	Arc	Wiper	6

Fig 4

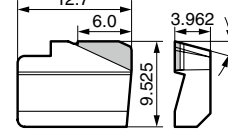


Fig 5

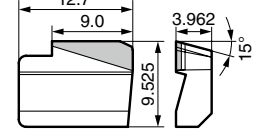
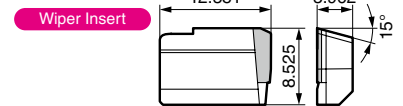


Fig 6



■ Parts

(Optional)

Clamp Plate	Clamp Bolt	Adjustment screw	Adjusting Wrench	Spanners	Assembling Wrench
HFW	WB6-13T	HFJ	TTX20	RFT	HFVT

Recommended Tightening Torque (N·m)

■ Recommended Cutting Conditions

Si content of 12.6% or less.

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Grade
N	Aluminium Alloy	—	2000- 2500 -3000	0.05- 0.13 -0.20	DA1000

Si content of over 12.6%

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Grade
N	Aluminium 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, cutting depth, and other factors.

■ Identification Details

HF F 12 080 R S -22

(1) Cutter Series M-Fine Pitched F-Fine Pitched
(2) Insert Size
(3) Cutter
(4) Direction
(5) Metric Bore
(6) Oil Hole
(7) Hole

M

SUMIDIA

SUMIDIA

SUMIDIA

SUMIDIA

SUMIDIA

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SUMIDIA

SUMIDIA

SUMIDIA

RF Type



General Features

The RF type cutter has a special light weight Aluminium body, designed for high speed, high efficiency roughing to finish milling of Aluminium and other non-ferrous metals.

Work Material

- Aluminium and aluminium alloy
- Other non-ferrous metal

(Not suited for cast iron or steel)

Characteristics

- From Roughing to Finishing Processes : Roughing : Economical carbide insert / High-precision finishing with SUMIDIA
- Strong and Light Cutter Body : Special Aluminium body /40% lighter than steel cutters / Hard-anodized plated body / Improved efficiency in higher rotational speeds, lower spindle loads and shorter tool change time
- Safe Design : Anti-centrifugal force design to prevent inserts from dislodging from cutter (Speeds must be within max. recommended conditions) /Non-wedge design to prevent deformation
- Easy Run-out Adjustment : External setting gauge is used for easy tool presetting / High precision cutter construction, units fitted are within 10 μm even before setting

Application Examples

Work (Work Material)	Cutter Insert (Grade)	Cutting Conditions v_c = Cutting Speed (m/min) v_f = Feed Rate (mm/min) a_p = Depth of Cut (mm)	Results
Case (ADC12)	RF4160R SUMIDIA Blade (DA2200)	v_c = 3,000 v_f = 5,730 a_p = 0.10	Surface Finish: $R_a=0.2\mu\text{m}$ Output: 30,000 units 30x tool life of carbide tool
Contact Surface of Transmission Case (ADC12)	RF4125R SUMIDIA Insert (DA1000)	v_c = 3,000 v_f = 7,640 a_p = 1.5	Surface Finish: $R_a=0.3\mu\text{m}$ Output: 20,000 units
Contact Surface of Cylinder Head (AC4C)	RF4250R Carbide Insert (H1)	v_c = 2,000 v_f = 7,535 a_p = 3.5	Rough Cutting Output: 10,000 units

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

Surface Finish

- Process: Finish Milling - M/C: Machining Centre - Arbour: HSK63A - Work: Si 10 to 12% Al Alloy - Cutter: RF4100R 6 Teeth (1 Wiper) - Grade: SUMIDIA (DA1000)	v_c = 4,990m/min n = 15,900min⁻¹ v_f = 11,400mm/min f_z = 0.12mm/t a_p = 0.5mm, Wiper a_p = 0.03mm - Dry
R_z(Highest Peak) : 0.69μm R_a : 0.092μm	

Recommended Cutting Conditions

Si content of 12.6% or less

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min. - Optimum -Max.	Feed Rate f_z (mm/t) Min. - Optimum -Max.	Grade
N	Aluminium Alloy	—	2000-3500-5000	0.05-0.13-0.20	DA1000 DA2200
		—	1000-1750-2500	0.05-0.13-0.20	H1

Si content of 12.6% or less

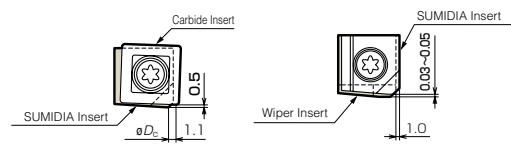
N	Aluminium Alloy	—	400-600-800	0.05-0.13-0.20	DA1000 DA2200
		—	200-300-400	0.05-0.13-0.20	H1

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

Insert Setup

For setting of Carbide inserts with SUMIDIA inserts/ blade

- Roughing and finishing in the same process
- When using wiper edge

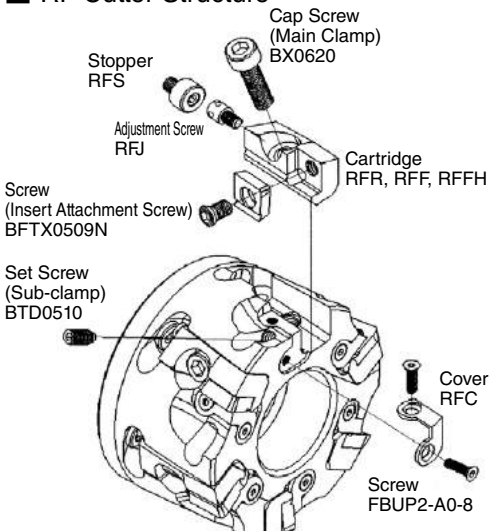


CAUTIONS (For more details, refer to the instruction manual included with the product)

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 even inserts with different regrinding amount on the same cutter.
- Carbide and SUMIDIA inserts must be arrange in an alternate manner.
- Ensure proper balancing by fixing SUMIDIA inserts of blades on opposite positions of the cutter.

RF Cutter Structure



M

SUMIDIA

SUMIDIA

SUMIDIA

SUMIDIA

SUMIDIA



SUMIDIA Inserts Carbide Inserts

High-Efficiency Aluminum Cutter

RF 4000 Type

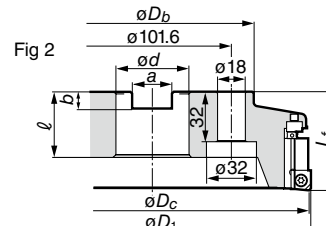
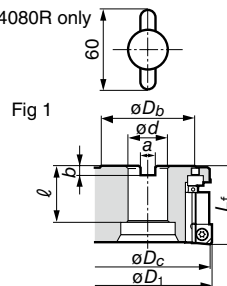
High Speed Milling Cutter RF4000 Series for Aluminum

High-speed Finishing for Non-Ferrous Metal



Body Imperial

RF4080R only



Cat. No.	Stock	Dimensions (mm)								No. of Teeth	Weight (kg)	Fig
		ϕD_c	ϕD_1	ϕD_b	L_f	ϕd	a	b	ℓ			
RF 4080R	●	80	82	60	50	25.40	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	38.10	15.9	10	38	8	1.6	1
4160R	●	160	162	100	63	50.80	19.1	11	38	10	2.6	1
RF 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

* Please use a collar bolt for securing the cutter to the arbour.

Inserts / Cartridges

P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Grade		Carbide	DLC-Coat	SUMIDIA	SUMICRYSTAL					
Application	High Speed/Light	N	N	N	N	N	Refer to page M44 for details of SUMICRYST.			
	General Purpose	N	N	N	N					
	Roughing	N	N	N	N					
Cat. No.		⊕	DL1000	DA1000	DA2200	SC10	Fig	Cartridge		
								Cat. No.	Stock	Fig
SDET 1204ZDFR		●	●	—	—	—	3	RFR	●	8
NF-SNEW 1204ADFR		—	—	●	▲	—	4	RFF	●	9
120404ADFR-H		—	—	●	—	—	5	RFF(Others)	●	9
1204ADFR-W		—	—	●	▲	—	6	RFF(RF4080R)	●	9
SNEW 1204ADFR-WS		—	—	—	—	●	7	RFF	●	9

Refer to page M44 for details of SUMICRYSTAL.

Cartridge

Fig 8



(RFR)

Fig 9



(RFF)

* When using large depth of cut ($a_p = 3\text{mm}$ or longer) with RF4080R, use RFFH unit. (RFF is possible for normal cutting.)

* Wiper inserts are indicated by a -W or -WS suffix. -H indicates deep cutting (a_p) insert

Fig 3

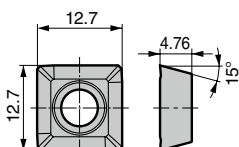


Fig 4

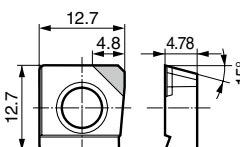


Fig 5

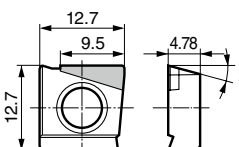


Fig 6

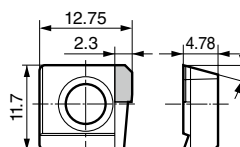
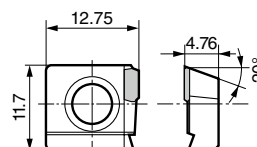


Fig 7



Spare Parts

Recommended Tightening Torque (N·m)

Cover	Stopper	Cap Screw	Set Screw	Screw	Adjustment Screw	Screw	Spanners	Spanners
RFC	RFS	BX 0620	BTD 0510	FBUP2 -A0-8	RFJ	BFTX 0509N	TH050 TH025 RFT	TTX20
		10.0	3.0			6.0		

Blades / Dummy Blades

RFB	RFBW	RFD
Description	Cat. No.	SUMIDIA
SUMIDIA Blade	RFB	●
SUMIDIA Wiper Blade	RFBW	●
Dummy Blade	RFD	●(Steel)

* Protect the body as well as maintain balance by using dummy blades for unused teeth.

Internal Coolant Attachments

Use an internal coolant holder or a standard clamp bolt with coolant hole when using internal coolant. Typical examples are given in the table below. For standards, contact each manufacturer directly.

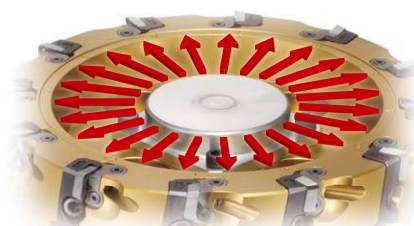
Body Cat. No.	Internal Coolant Holder	Standard Clamp Bolt with Coolant Hole (Ex.)
RF 4080R	—	MBC-M12 TMBA-M12
RF 4100R	—	MBC-M16 TMBA-M16
RF 4125R	—	MBC-M20 TMBA-M20
RF 4160R	—	MBC-M24 TMBA-M24
RF 4200R	RF-CLT	—
RF 4250R	RF-CLT	—
RF 4315R	RF-CLT	—



Internal Coolant Holder
RF-CLT (Standard stocked item)



Standard Clamp Bolt with Coolant Hole
[Representative example: MBC-M12 to M24 (Sold Separately)]



Direction of Coolant Supply

External Setting Parts

Cartridge design allows inserts to be mounted away from the machine with high precision.



Setting Gauge
RF-SET (Sold separately, Standard stocked item)



Clamp Jig
RF-JIG (Sold separately, Standard stocked item)

▲mark : To be replaced by new item (Please confirm stock availability)

M31

SRF Type



General Features

Small diameter milling cutter SRF type is most suited for high-speed aluminium machining on small machines.

Characteristics

- **Best Suited For Small Machines**
Especially reliable on BT30 class small machines.
- **From Roughing To Finishing Processes Utilising SUMIDIA DA1000**
Insert with a side edge of 5mm.
- **Economical NF-type Inserts**
NF-type SUMIDIA DA1000 inserts lower tooling costs.
- **High Speed Cutting With SUMIDIA**
Maximum spindle speeds of up to $n = 20,000\text{min}^{-1}$
(Actual spindle speeds must be set within the rotational limits of your machine and arbour.)
- **Simple design for insert run-out**
Simple insert mounting design for easy yet precise tool adjustments.

Application Examples

Work (Work Material)	Cutter Insert (Grade)	Cutting Conditions n = Spindle Speed (min^{-1}) v_f = Feed Rate (mm/min) a_p = Depth of Cut (mm)	Results
Cam Case (ADC12)	SRF50R NF-SNEW09T3ADTR (DA1000)	$n = 6,000$ $v_f = 2,400$ $a_p = 0.5$	12,000 pcs produced with no problems.
Computer Case (ADC12)	SRF50R NF-SNEW09T3ADTR (DA1000)	$n = 15,000$ $v_f = 7,500$ $a_p = 0.2$	Improved efficiency of endmill operation by 2.5 times.
Differential Case (ADC12)	SRF63R NF-SNEW09T3ADTR (DA1000)	$n = 8,000$ $v_f = 4,000$ $a_p = 0.5$	No obstructions on tool magazine when mounting $\phi 63\text{mm}$ cutter on small machines.

Recommended Cutting Conditions

Si content of 13% or less.

ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min. - Optimum -Max.	Feed Rate f_z (mm/t) Min. - Optimum -Max.	Grade
N	Aluminium Alloy	—	2,000- 3,000 -4,000	0.05- 0.13 -0.20	DA1000

Si content of over 13%

N	Aluminium Alloy	—	400- 600 -800	0.05- 0.13 -0.20	DA1000
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Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, cutting depth, and other factors.

Rake Angle	Radial	-2° to +4°
	Axial	+6°

5mm 90°

P	M	K	N	S	H
Steel	Stainless Steel	Cast Iron	Non-Ferrous Metal	Exotic Alloy	Hardened Steel

Aluminum Machining Cutter SRF Type

High-speed Finishing for Non-Ferrous Metal

Fig 1

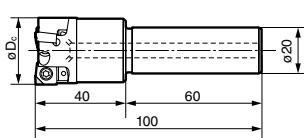


Fig 2

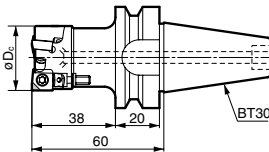


Fig 3

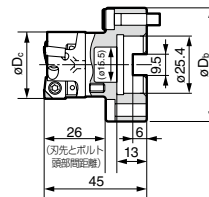
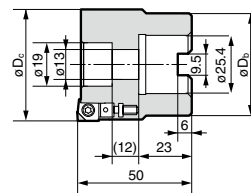


Fig 4



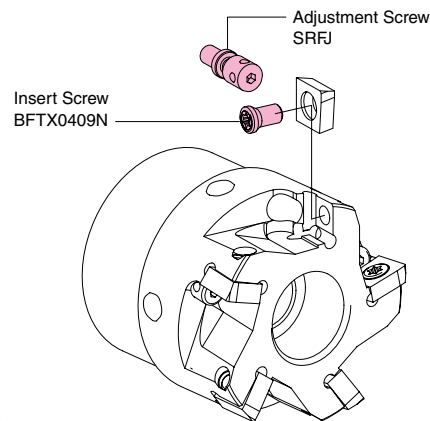
Body Imperial

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

Inserts are not included.



Please use hexagonal bolt (JISB1176) M12 x 30-35 mm for securing ø50 and ø63 cutter to the arbour.



Inserts

Wiper Insert

Fig 5

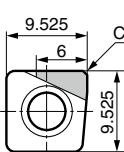


Fig 6

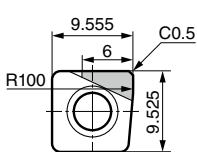
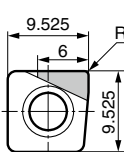
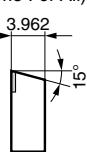


Fig 7



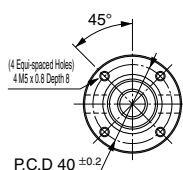
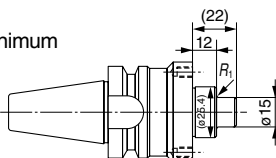
Side View (Same For All)



P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Grade		SUMIDIA			
Application	High Speed/Light	N	N		
	General Purpose	N	N		
	Roughing	N	N		
Cat. No.		DA1000	DA2200	Fig	Cutting Edge
NF-SNEW 09T3ADTR		●	▲	5	Standard
09T3ADTR-U		●	▲	6	Wiper
09T3ADTR-R		●	▲	7	Nose Radius

- Standard inserts and wiper inserts can be used on the same cutter body.
- Inserts with nose radius can reduce the clattering. These cannot be used with wiper inserts.
- Inserts can be reground 3 times (up to minimum IC diameter 9.225mm).
- Do not mix new and reground inserts, or even inserts with different regrind amount on the same cutter.
- When using reground inserts, it is advisable to re-confirm insert height and cutting diameter with a tool pre-setter.
- Arbour for SRF30R, SRF40RS



When using SRF30R and SRF40R cutters, there is a requirement to modify the arbour as shown above.

- (1. Reduce part of the arbour's adaptor shaft from ø25.4mm to ø15mm.
- (2. Add 4 tap holes for (M5) cap screws.) Please use a hexagonal bolt M5 x 20 mm for securing the body.

Spare Parts

Insert Screw	Adjustment Screw	Spanners
BFTX0409N	SRFJ	TH015
N·m		TTX15W

Recommended Tightening Torque (N·m)

Maximum Depth Of Cut Guide (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 actual machine and work characteristics.

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

Cutting Conditions

Cutter: SRF50R

Insert: NF-SNEW 09T3ADTR (DA1000)

n = 10,000min⁻¹

Arbour: BT30 FMA25.4-45

Work: A-5052

Width: 35mm at depth of cut indicated above



▲mark :To be replaced by new item (Please confirm stock availability)

M33

FAM / SAM Type

Rake Angle	Radial	+4°	+6°	5.8mm 65°	5.7mm 0°
	Axial	+13°	+10°		
		(FAM Type)	(SAM Type)	(FAM Type)	(SAM Type)

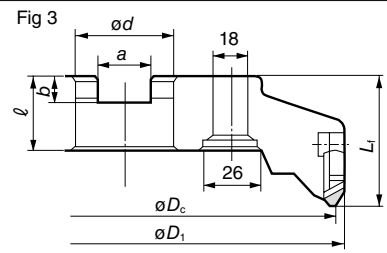
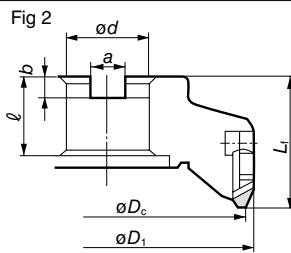
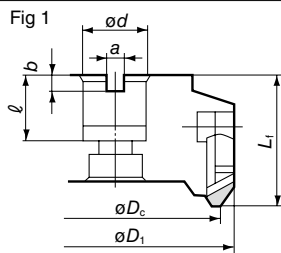
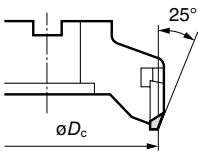
P	M	K	N	N	S	H
Steel	Aluminum	Cast Iron	Inconel	Aluminum	Exotic Alloy	Inconel
×	×	×	○	○	○	×



- Special cutting edge design makes it suitable for mirror finishing of Aluminium alloys and non-ferrous metals.
- Uniquely designed clamping system enables fine adjustment for precise run-out.
- Rigid body and excellent clamping force design permits high speed milling even for roughing process.

Body (FAM Type)

Approach Angle: 25°
Axial Rake: +13°
Radial Rake: +4°

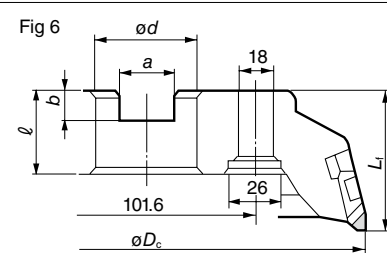
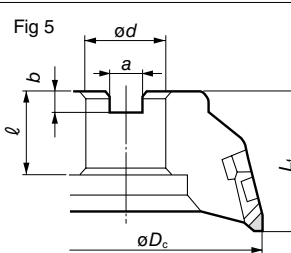
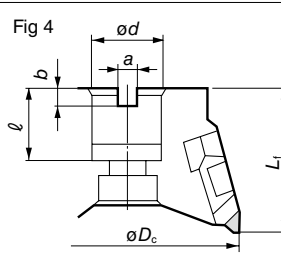
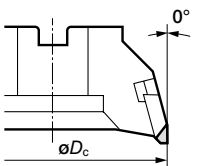


Cat. No.	Stock		Dimensions (mm)							No. of Teeth	Weight (kg)	Fig
	R	L	ϕD_c	ϕD_1	L_f	ϕd	ℓ	a	b			
FAM080 R/L	●		80	92	50	25.4	25	9.5	6	4	2.1	1
FAM100 R/L	●		100	112	50	31.75	32	12.7	8	4	2.9	2
125 R/L	●		125	137	63	38.1	38	15.9	10	5	3.8	2
160 R/L	●		160	171	63	50.8	38	19.0	11	6	6.6	2
FAM200 R/L	●		200	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 not included.

Body (SAM Type)

Approach Angle: 0°
Axial Rake: +10°
Radial Rake: +6°



Cat. No.	Stock		Dimensions (mm)							No. of Teeth	Weight (kg)	Fig
	R	L	ϕD_c	L_f	ϕd	ℓ	a	b				
SAM080 R/L	●		80	50	25.4	25	9.5	6		4	1.6	4
SAM100 R/L	●		100	50	31.75	32	12.7	8		4	2.3	5
125 R/L			125	63	38.1	38	15.9	10		5	3.7	5
160 R/L			160	63	50.8	38	19.0	11		6	5.9	5
SAM200 R/L			200	63	47.625	38	25.4	14		8	8.5	6
250 R/L			250	63	47.625	40	25.4	14		10	14.3	6
315 R/L			315	63	47.625	40	25.4	14		12	30.3	6

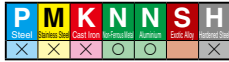
● Refer to next page for blade, parts and cutting conditions.

Inserts are not included.

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

Rake Angle	Radial	0° to 2°
	Axial	+10°

5.7mm 90°



SUMIDIA Cutter

SAM-E Type



SUMIDIA Cutter Range Expansion

- **Special Design Edge**
 - Strong cutting edge improves performance.
- **High Precision**
 - Thin pitch screw allows fine adjustment.
- **High Speed Machining**
 - Strong clamp improves rigidity and enhances precision.

Body (SAM-E Type)

Cat. No.	Stock		Dimensions (mm)		No. of Teeth	Axial Rake	Radial Rake
	R	L	ϕD_c	ϕD_s			
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 not included.

Blades

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

Spare Parts

Blade Clamp	Blade Side Clamp	Adjuster Wedge	Double Screw	Double Screw	Spanner	Applicable Cutter Cat. No.
FADR	FAWR	FAAR*	WB7-15T	WB7F-15T	TT25	FAM Type SAM Type

* Adjuster Wedge for SAM050ER/L and SAM063ER/L is SAAR.

Recommended Cutting Conditions

ISO	Work Material	Process	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Grade
N	Aluminium Alloy (AC)	Rough	400-1700-3000	0.05-0.13-0.20	DA150 DA2200
	Aluminium Alloy (ADC)	Finishing	400-1700-3000	0.04-0.10-0.15	DA150 DA2200
	Aluminium Alloy (A390)	Finishing	300-450-600	0.04-0.10-0.15	DA150 DA2200

Comparison Test

● Finishing Surface Roughness	● Finishing Surface Roughness
Work Material: AC2C $v_c=1,500\text{m/min}$ $a_p=0.5\text{mm}$ $f_z=0.04$ to 0.15mm/t Dry Surface Milling	Work Material: AC2C $v_c=1,000\text{m/min}$ $a_p=5.0\text{mm}$ $a_e=0.1\text{mm}$ $f_z=0.06\text{mm/t}$ Dry Surface Milling

M

SUMIDIA

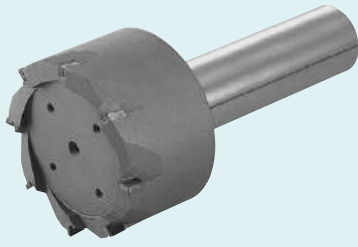
SUMIDIA

SUMIDIA

Binderless

SUMICRYSTAL

DFE Type



■ Characteristics

- Multiple brazed teeth for high feed milling.
- Uses DA2200, with excellent fracture resistance and sharpness, for milling of aluminium and non-ferrous metals.
- Excellent for small machines with small diameter endmills.
- Coolant through holes for high speed machining.

■ Endmill Shape

Fig 1

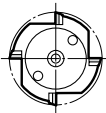


Fig 2

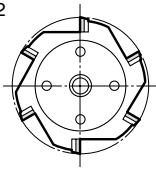
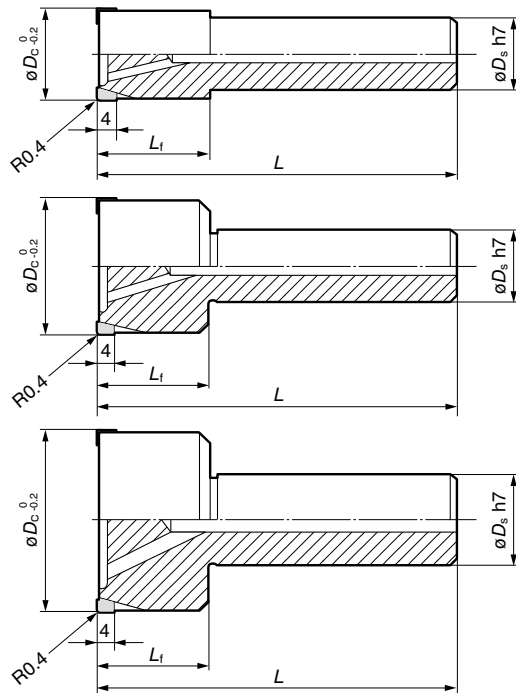
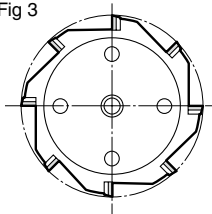


Fig 3



Cat. No.	Stock	Dimensions (mm)				No. of Teeth	Fig
	DA2200	ϕD_c	L	L_f	ϕD_s		
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) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Grade
		N	Aluminium Alloy	200-800-2000	0.02-0.05-0.10	DA2200

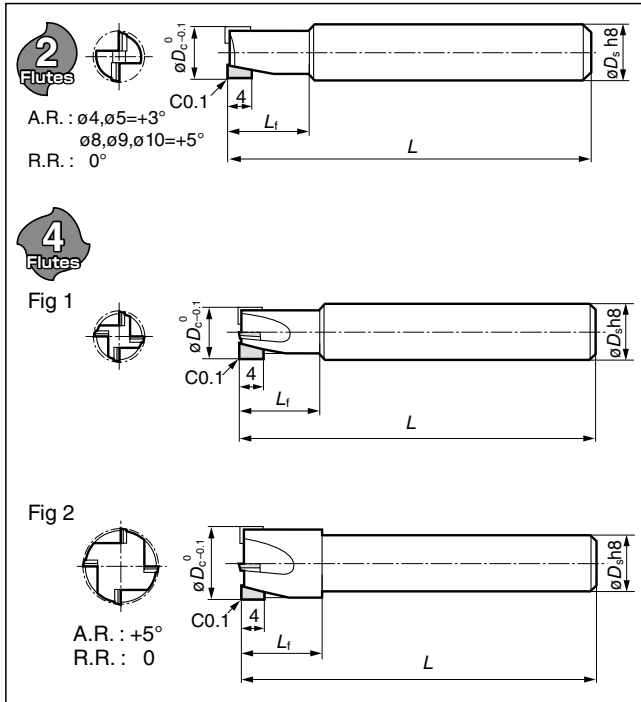
■ Application Examples

	Work Material	Cutting Conditions	Results
	ADC12 Aluminium Alloy Motor Casing Part	Tool: DFE8400GS 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	· Good machined surface because burrs do not occur. · More cutting teeth than indexable type cutters, and much shorter cycle time.

DFE Type



PCD	Coated Carbide	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Steel	Hardened Steel	Stainless Steel	Ti Alloy	Cast Iron	Al Alloy	Copper Alloy	Graphite	CFRP
Grade	×	×	×	×	×	×	×	×	×	○	○	○	○



■ 2 Flutes (mm)

Cat. No.	Stock	ϕD_c	L_f	L	ϕD_s
DFE 2040S	●	4.0	15	50	6
2050S	●	5.0	15	50	6
DFE 2080S	●	8.0	15	60	10
2090S	●	9.0	15	70	10
2100S	●	10.0	15	70	10

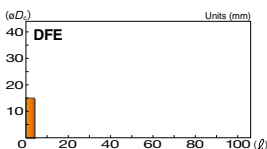
Grade: DA2200

■ 4 Flutes (mm)

Cat. No.	Stock	ϕD_c	L_f	L	ϕD_s	Fig
DFE 4090S	●	9.0	15	70	10	1
4100S	●	10.0	15	70	10	1
DFE 4130GS	●	13.0	15	70	10	2

Grade: DA2200

- High rake cutting edge with DA2200 grade reduces burrs and enables high-speed, high-efficiency machining.
- For face milling of Al-alloy, such as computer parts.



■ Recommended Cutting Conditions

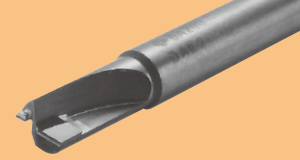
2 Flutes

Work Material	Aluminium Alloy	Copper Alloy
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
D_c (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	0.4 D_c	

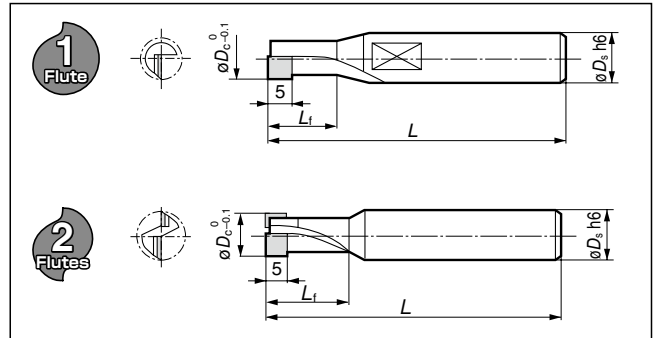
4 Flutes

Work Material	Aluminium Alloy	Copper Alloy
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
D_c (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	0.4 D_c	

DAE Type



PCD	Coated Carbide	Carbon Steel	Alloy Steel	Pre-hardened Steel	Tempered Steel	Hardened Steel	Stainless Steel	Ti Alloy	Cast Iron	Al Alloy	Copper Alloy	Graphite	CFRP
Grade	×	×	×	×	×	×	×	×	×	○	○	○	○



■ 1 Flute (mm)

Cat. No.	Stock	ϕD_c	L_f	L	ϕD_s
DAE 1040	●	4.0	10	45	6
1050	●	5.0	12	50	6

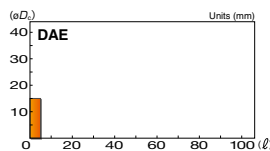
Grade: DA200

■ 2 Flutes (mm)

Cat. No.	Stock	ϕD_c	L_f	L	ϕD_s
DAE 2060	●	6.0	20	50	6
DAE 2070	●	7.0	20	60	8
2080	●	8.0	20	60	8
DAE 2090	●	9.0	25	71	10
2100	●	10.0	25	71	10
DAE 2110	●	11.0	25	75	12
2120	●	12.0	25	75	12

Grade: DA200

- Long tool life with excellent surface finish
- Finishing of aluminium and copper alloys
- Machining of reinforced plastics such as GFRP and CFRP



■ Recommended Cutting Conditions

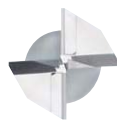
1 Flute

Work Material	Aluminium Alloy	Copper Alloy
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
D_c (mm)		
4.0	6,000	210
5.0	5,000	175
Standard Depth of cut a_p	0.4 D_c	

2 Flutes

Work Material	Aluminium Alloy	Copper Alloy
Cutting Conditions	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)
D_c (mm)		
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	0.4 D_c	

DAL / DDL Type



DAL Type



DDL Type

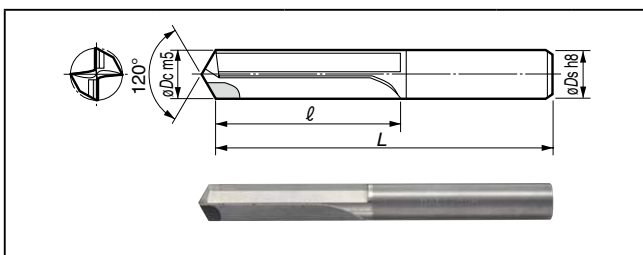
Carbon Steel/Alloy Steel Up to 0.28%N From 0.28%N Steel	Tempered Up to 43HRC From 43HRC Steel	Hardened Steel Up to 49HRC From 49HRC Steel	Stainless Steel Up to 43HRC From 43HRC Steel	Ti Alloy	Heat-resistant Steel	Cast Iron	Ductile Cast Iron	Al Alloy	Copper Alloy	Composite CFRP	PCD	3D
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From general to High Precision Drilling of Aluminium 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 of 11 to 12, mainly for drilling of pre-tap holes.

DAL Type



Grade		SUMIDIA	P Steel M Stainless Steel	
Application	High Speed/Light	N	K Cast Iron	N Non-Ferrous Metal
	General Purpose		S Exotic Alloy	H Hardened Steel
	Roughing			
Cat. No.	DA2200	$\phi D_c(\phi D_s)$	L	ℓ
DAL 0500H to 0600H		$\phi 5 \leq D_c \leq \phi 6$	80	30
0601H to 0700H		$\phi 6 < D_c \leq \phi 7$	90	35
0701H to 0800H		$\phi 7 < D_c \leq \phi 8$	90	35
0801H to 0900H		$\phi 8 < D_c \leq \phi 9$	100	40
0901H to 1000H		$\phi 9 < D_c \leq \phi 10$	100	40
1001H to 1100H		$\phi 10 < D_c \leq \phi 11$	110	50
1101H to 1200H		$\phi 11 < D_c \leq \phi 12$	110	50

Note: Ordering number for (ex.) $\phi 6.05\text{mm}$ drill is DAL0605H.

Recommended Cutting Conditions

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

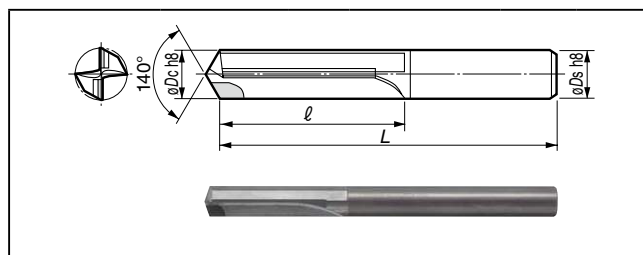
Diameter ϕD_c (mm)	Conditions	DALType	DDLType	Depth	Oil
Up to $\phi 8.0$	v_c	80 - 100 - 150	150 - 200 - 250	L/D= Below 3	Emulsion Type
	f	0.05 - 0.1 - 0.15	0.1 - 0.15 - 0.25		
Up to $\phi 12.0$	v_c	80 - 100 - 150	150 - 200 - 250	L/D= Below 3	Emulsion Type
	f	0.08 - 0.13 - 0.2	0.15 - 0.2 - 0.3		

Min. — Optimum — Max.

Application Examples (DAL Type)

Work Shape	Work Material	Cutting Conditions	Results
	17%Si-Al High Silicon Aluminium Alloy	$v_c=100\text{m/min}$ $f=0.1\text{mm/rev}$	· Holes by carbide drill was out of specifications after 2,000 holes/reg. · The SUMIDIA drill could drill up to 30,000 holes/reg. · 15 times tool life of carbide drills.
	17%Si-Al High Silicon Aluminium Alloy	$v_c=120\text{m/min}$ $f=0.12\text{mm/rev}$	· Average 40,000 holes/reg (1600m) · Surface roughness $R_y = 1\mu\text{m}$
	ADC10 Aluminium Alloy Die Cast	$v_c=90\text{m/min}$ $f=0.08\text{mm/rev}$	· More than 50,000 holes (600m) and still running

DDL Type



Grade		SUMIDIA	P Steel M Stainless Steel	
Application	High Speed/Light	N	K Cast Iron	N Non-Ferrous Metal
	General Purpose		S Exotic Alloy	H Hardened Steel
	Roughing			
Cat. No.	DA2200	$\phi D_c(\phi D_s)$	L	ℓ
DDL 050V to 060V		$\phi 5 \leq D_c \leq \phi 6$	80	30
061V to 070V		$\phi 6 < D_c \leq \phi 7$	90	35
071V to 080V		$\phi 7 < D_c \leq \phi 8$	90	35
081V to 090V		$\phi 8 < D_c \leq \phi 9$	100	40
091V to 100V		$\phi 9 < D_c \leq \phi 10$	100	40
101V to 110V		$\phi 10 < D_c \leq \phi 11$	110	50
111V to 120V		$\phi 11 < D_c \leq \phi 12$	110	50

Note: Ordering number for (ex.) $\phi 10.5\text{mm}$ drill is DDL105V.

Important Notes

- When using DAL type for high precision machining, select a high rigidity machine and high precision holder.
- Apply enough coolant to drilled hole.

Application Examples (DDL Type)

Work Shape	Work Material	Cutting Conditions	Results
	ADC12 Aluminium Alloy Die Cast	$v_c=214\text{m/min}$ $f=0.14\text{mm/rev}$	· Regrind after 100,000 holes/reg
	ADC12 Aluminium Alloy Die Cast	$v_c=200\text{m/min}$ $f=0.17\text{mm/rev}$	· Regrind after 74,000 holes/reg (2,000m) (Preset tool change)
	AC2A Aluminium Casting	$v_c=234\text{m/min}$ $f=0.28\text{mm/rev}$	· Regrind after 80,000 holes/reg (Preset tool change)