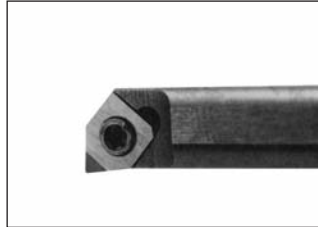




BNBB

Small hole boring tools

- CBN cutting edge is brazed on to a solid carbide shank.
- Small hole boring for hardened steels.
- Min. boring dia. is \varnothing 3,5 mm.



BNZ

Small hole boring bars

- Solid carbide boring bars with economical CBN insert.
- Small hole boring for hardened steels.
- Min. boring dia. is \varnothing 7,0 mm.



BNB

Small hole boring bars

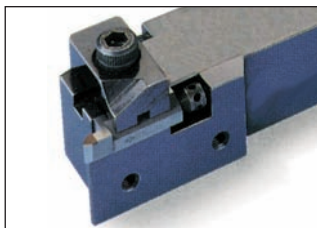
- Solid carbide boring bars with economical CBN and PCD insert.
- Min. boring dia. is \varnothing 10,0 mm.



GWB

CBN Grooving System for Hardened Steels

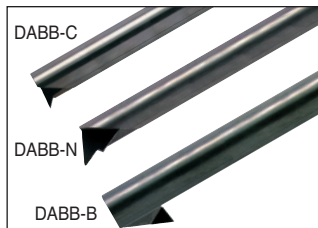
- Tangential Inserts – Double clamp holder
- Groove Widths from 1,5 – 6,0mm
- New CBN grade for interrupted grooving



BNGG

Threading holders

- CBN cutting edge for hardened steel
- Adjustable threading after regrinding.



DABB

Small hole boring tools

- PCD cutting edge for finishing of small non-ferrous parts
- Min. boring dia. is \varnothing 3,0 mm.
- DABB-C for boring
- DABB-N for profiling and corner grooving
- DABB-B for back boring



DAL / DDL / DML

High precision SUMIDIA Drills

- PCD cutting edge is brazed on to a solid carbide shank.
- From general to high precision drilling of Aluminium alloys
- DML type is suitable for chamfering and stepped drilling



RF

High speed face mill for Aluminium

- Finishing and roughing aluminium alloys and non-ferrous materials
- High precision and highspeed machining $vc=5000$ m/min
- Aluminium alloy body
- Run-out less than $10\mu m$
- Easy assembling



SRF

High speed face mill for Aluminium

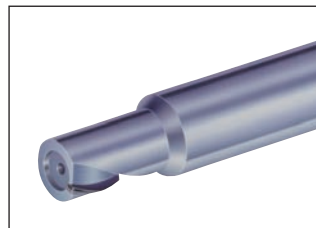
- Small diameter cutter for small machines
- High speed roughing and finishing with SumiDia DA2200
- High speed capability of $rpm = 20.000$
- Economical PCD insert NF type



FMU

"BN Finish Mill" for finishing grey cast iron

- High speed machining $vc=1500$ m/min
- Excellent surface roughness $Rz=3,2$
- Run-out less than $10\mu m$
- Easy assembling



BNES

"Helical Master" SUMIBORON Endmill

- Spiral CBN brazed cutting edge for super finishing hardened steel (HRC50~60)
- Dry machining
- Stable cutting
- High accuracy
- Excellent swarf evacuation



BNBP

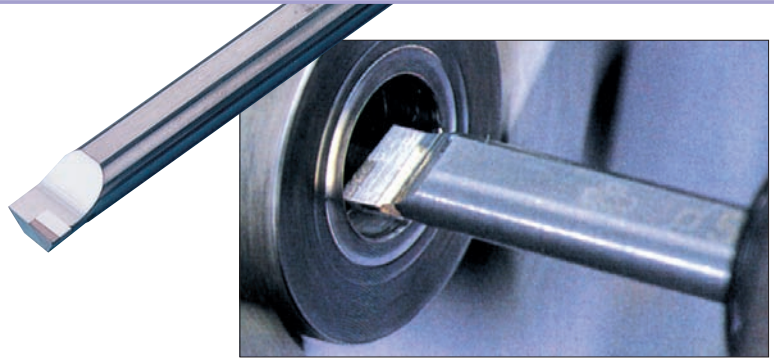
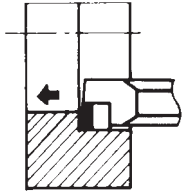
"Mould Finish Master" Micro Ball Nose Endmills

- High precision machining of hardened steels < HRC70 with long tool life
- Super tough grade SUMIBORON BN350 prevents chipping of the cutting edge
- R accuracy : $\pm 0,005mm$

SUMIBORON Small Hole Boring Tools BNBB Type

For Hardened Steel

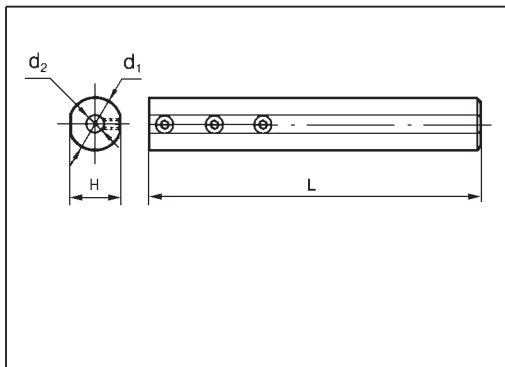
BNBB type small hole boring tools for hardened work pieces up to diameter 3,5 mm



■ "Sumiboron" Brazed Boring Tools for Small Hole Boring

	Cat. No.	Stock	Dimensions (mm)					Applicable holder	Grade of brazed cutting edge
			D _{min}	d	l ₁	h	r		
BNBB (Carbide shank) 	BNBB 03 R	●	3,5	3	60	2,4	0,2	HBB 316	SUMIBORON (CBN) BN250
	BNBB 04 R	●	4,5	4	60	3,4	0,2	HBB 416	
	BNBB 05 R	●	5,5	5	80	4,4	0,2	HBB 516	
	BNBB 06 R	●	6,5	6	80	5,4	0,2	HBB 616	
	BNBB 08 R	●	8,5	8	100	7,4	0,2	HBB 816	

■ Holder



Cat. No.	Stock	Dimensions (mm)			
		d ₁	L	d ₂	H
HBB 316	●	16	100	3	15
HBB 416	●			4	
HBB 516	●			5	
HBB 616	●			6	
HBB 816	●			8	

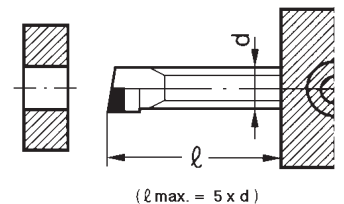
■ Spare Parts

Screw	Wrench
BT 0404	TH 020

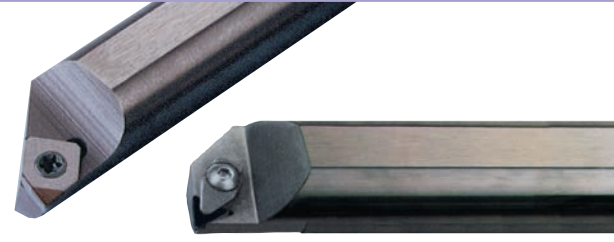
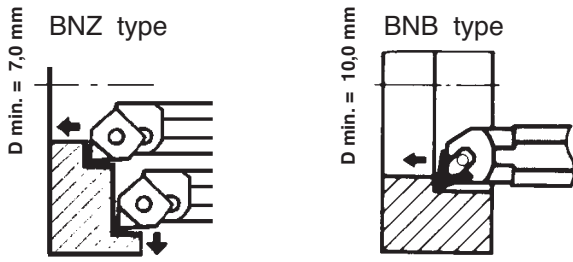
■ Recommended Cutting Conditions

Work material	SUMIBORON BN250		Notes
Hardened steels (H_{RC}45~68)	Cutting speed (v _c)	30 ~ 150 m/min	Low speed may cause chattering in cutting process and chipping occurrence on the cutting edge.
	Feed rate (f)	0,03 ~ 0,1 mm/rev	-
	Depth of cut (d _{oc})	0,03 ~ 0,2 mm	Excessive depth of cut may cause larger deformation of tool, resulting in deterioration of bore accuracy.

■ Precaution On Use



- Adjust overhang to achieve absolute minimum.
- For use of a small diameter brazed boring tool, select high speed and small feed rate, as much as possible.



■ Boring Bars for Small Hole Boring

	Cat. No.	Stock	Dimensions (mm)						Applicable insert	
			D _{min}	d	l ₁	h	f	γ		
	BNZ 606 R	●	7	6	80	5,5	3,5	-14°	ZNEX 0401○○	 ZNEX (CBN)
	BNZ 608 R	●	9	8	100	7,5	4,5	-12°		
	BNZ 610 R	●	11	10	125	9,5	5,5	-10°		
	BNZ 612 R	●	13	12	130	11	6,5	-8°		
	BNB 508 R/L	● ●	10	8	140	7	5	-9°	TBGN 0601○○	 TBGN (CBN)
	BNB 512 R/L	● ●	14	12	160	11	7	-6°		
	BNB 516 R/L	● ●	18	16	180	14	9	-5°		
	BNB 520 R/L	● ●	22	20	180	18	11	-4°		

■ Spare Parts for BNZ

Holder	Screw	Wrench
BNZ 606 R	 BFTX 0204 N	 TRX 06
BNZ 608 R		
BNZ 610 R		

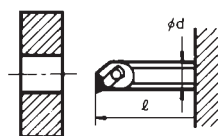
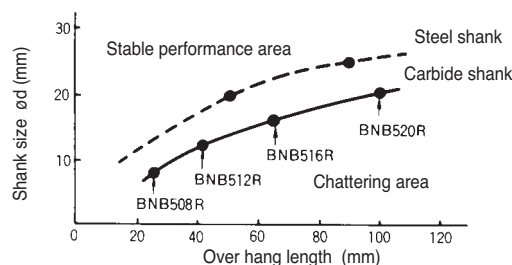
■ Spare Parts for BNB

Holder	Clamp	Clamp bold	Nut	Wrench
BNB 508 R/L	BNBC	BH 0306	BNBW-2	TH 020
BNB 512 R/L	BNBC	FBUP-3-A0-9	BNBW-4	TH 020
BNB 516 R/L	BNBC	BH 0310	BNBW-4	TH 020
BNB 520 R/L	BNBC	BH 0310	BNBW-7	TH 020

■ Recommended Cutting Conditions

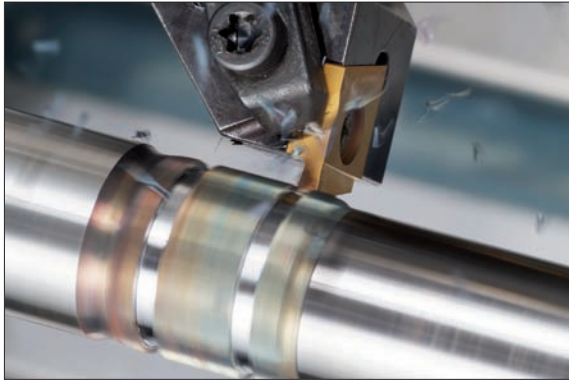
Cutting speed	80 ~ 120 m/min
Feed rate	0,03 ~ 0,1 mm/rev
Depth of cut	0,03 ~ 0,2 mm

■ Holders Performance Area



Work material: Alloy steel (H_RC 60)
 Cutting conditions: v_c = 100 m/min
 f = 0,1 mm/rev
 d_{oc} = 0,2 mm

SUMIBORON Grooving Tool Holder GWB Type



New CBN Grooving System for Hardened Steels

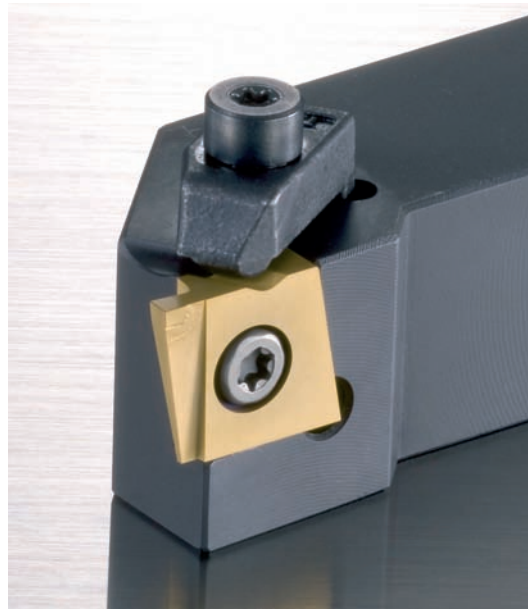
■ Features

Tangential insert

80 degree tangentially mounted insert improves rigidity

New coated CBN grade BNC30G

Tough new coated CBN grade for interrupted hard grooving



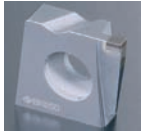
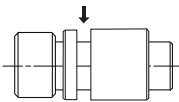

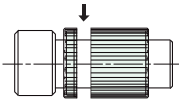
Double clamping system

The double clamping system increases stability so even axial feeds are possible.


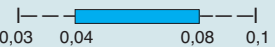
Wide insert range 1,5 – 6,0mm

Wide range of width's and grades for continuous and interrupted cut grooving operations

■ Grades

Grade	Application	Features
 BN250	Continuous grooving 	Uncoated CBN grade for continuous cut grooving applications
 BNC30G	Interrupted grooving 	Tough new CBN coated grade developed for interrupted cut grooving applications

■ Recommended cutting Conditions

Material	Hardened steel
Cutting speed (m/min)	
Feed rate (mm/rev)	
Grade	BN250, BNC30G

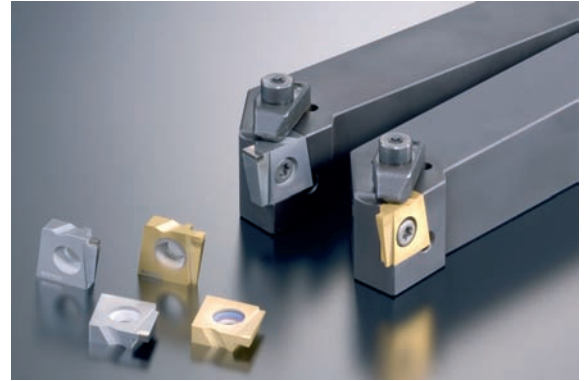
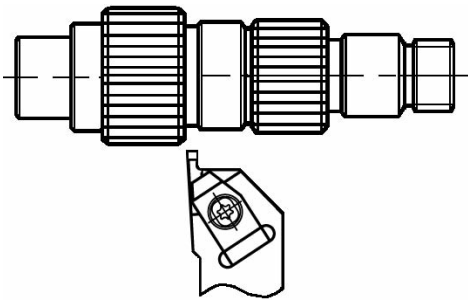
Coolant:

Dry / Wet (for continuous cut)
Dry only (for interrupted cut)

Remarks:

To avoid thermal cracking of the cutting edge when interrupted cutting please ensure workpiece remains dry.

SUMIBORON Grooving Tool Holder GWB Type



■ Holders

	Cat. No.	Stock		Dimensions (mm)						Applicable Insert		
		R	L	h	h ₁	b	f	l ₁	t ^(*)		ℓ	
	GWB R/L 2020 - 45	○	○	20	25	20	30	150	1,5 < t ≤ 2,0	3,5	CGA R/L 1504 ○○○	
									2,0 < t ≤ 3,0	4,0		
	GWB R/L 2525 - 45	●	●	25	25	25	30	150	1,5 < t ≤ 2,0	3,5		
									2,0 < t ≤ 3,0	4,0		
	GWB R/L 2525 - 60	●	●	25	25	25	30	151	4,5 < t ≤ 6,0	5,0		CGA R/L 1506 ○○○

Remark: Inserts are not included.

● = Euro stock

○ = Delivery on request

■ Inserts

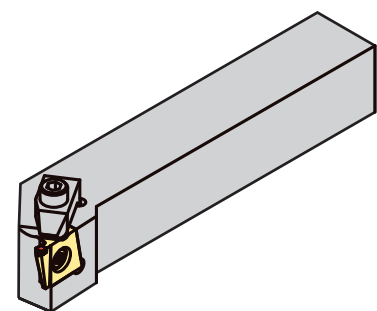
	Cat. No.	Stock				Dimensions (mm)					Applicable Holder	
		BN250		BNC30G		t ^(*)	ℓ	r	I.C.	T		
		R	L	R	L							
	CGA R/L 1504 150	●	●	●	●	1,5	3,5	0,2	15,875	4,76	GWB R/L 2020 - 45 GWB R/L 2525 - 45	
	CGA R/L 1504 200	●	●	●	●	2,0						
	CGA R/L 1504 250	●	●	●	●	2,5						
	CGA R/L 1504 300	●	●	●	●	3,0						
	CGA R/L 1504 350	●	●	●	●	3,5						
	CGA R/L 1504 400	●	●	●	●	4,0						
	CGA R/L 1504 450	●	●	●	●	4,5						
	CGA R/L 1506 500	●	●	●	●	5,0	5,0					6,35
	CGA R/L 1506 550	●	●	●	●	5,5						
	CGA R/L 1506 600	●	●	●	●	6,0						

*) Special widths available on request

● = Euro stock

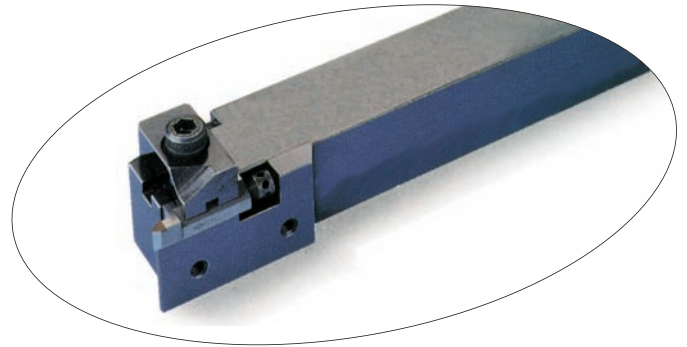
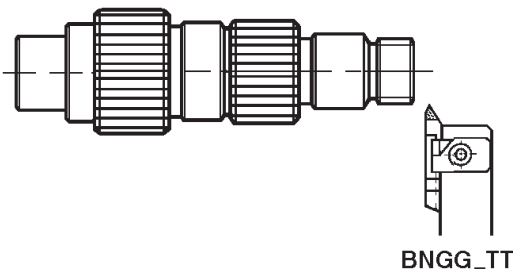
■ Spare Parts

Holder	Clamp finger	Clamp screw	Insert screw	Spring	Wrench
GWB R/L 2020 - 45					
GWB R/L 2525 - 45	TF 72 (Right handed)	BX 0520 T	BFTX 0511 N	GSP 06	TRX 20
GWB R/L 2525 - 60	TF 73 (Left handed)				



SUMIBORON Threading Tool Holder BNGG Type

For Hardened Steel



■ "Sumiboron" Holders

	Cat. No.	Stock		Dimensions (mm)			Applicable Insert
		R	L	f	l ₂	l ₁	
	BNGG R/L 2525-TT	●		28,5	5	150	BNTT 1020 R/L BNTT 1530 R/L

■ Inserts

	Cat. No.	Stock						Dimensions (mm)				Applicable Holder
		BN250		BN300		BNX20		Pitch	r	l ₁	s	
		R	L	R	L	R	L					
	BNTT 1020 R/L	●	●			●	●	1,0 ~ 2,0	0,13	25	6,0	BNGG R/L 2525 - TT
	BNTT 1530 R/L	●	●			●	●	1,5 ~ 3,0	0,13	25	6,0	

• Inserts also suitable for existing BNG2525R type holders

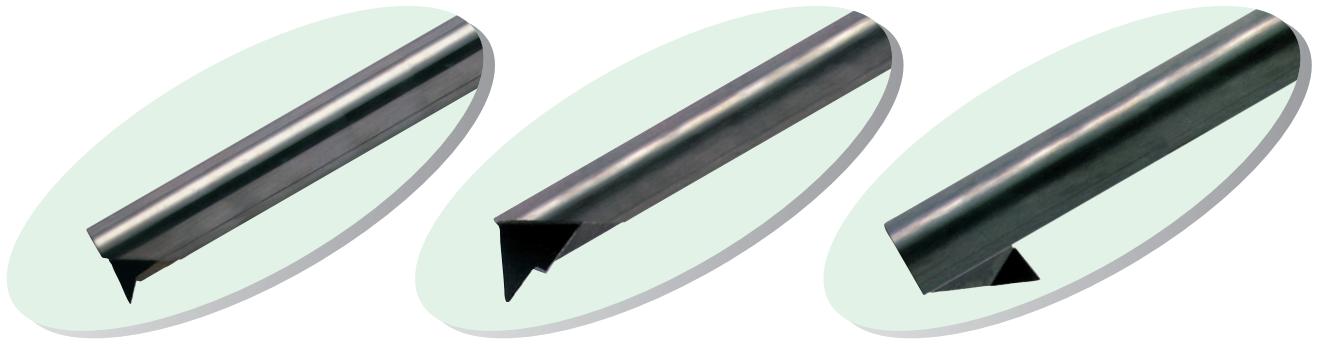
■ Spare Parts

Holder	Support	Clamp	Adjust screw	Spring	Screw	Wrench
BNGG R/L 2525 - TT	BNGS R/L TT	BNGC R/L	FMJ	GSP 6	BX 0615 LH050 (for Clamp) BX 0414 LH03 (for support)	ø1,8x45

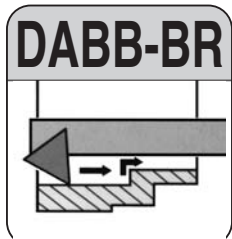
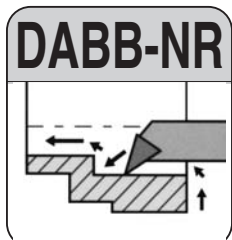
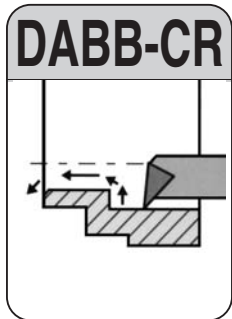
■ Recommended Cutting Conditions

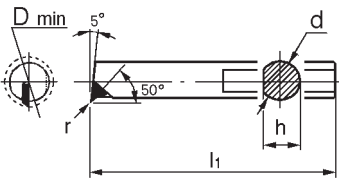
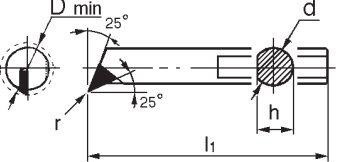
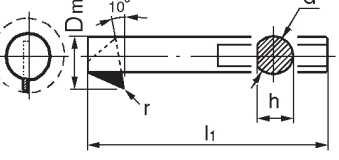
● Threading

Cutting speed (v _c)	80 ~ 120 m/min
Feed rate (f)	Max. pitch: 3,0 mm



■ "Sumidia" Brazed Boring Tools for Small Hole Boring

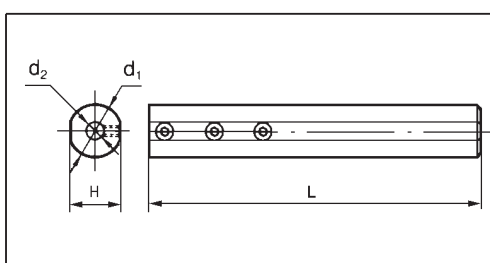


DABB (Solid carbide shank)	Cat. No.	Stock	Dimensions (mm)					Applicable Holder
		DA2200	D _{min}	d	l ₁	h	r	
For small boring 	DABB 025 CR	●	3,0	2,5	60	2,2	0,1	HBB 2516
	DABB 035 CR	○	4,0	3,5	60	3,2	0,1	HBB 3516
	DABB 045 CR	●	5,0	4,5	80	4,1	0,1	HBB 4516
	DABB 060 CR		7,0	6,0	80	5,2	0,1	HBB 616
For profiling and corner grooving 	DABB 025 NR	○	3,0	2,5	60	2,2	0,1	HBB 2516
	DABB 035 NR	●	4,0	3,5	60	3,2	0,1	HBB 3516
	DABB 045 NR	○	5,0	4,5	80	4,1	0,1	HBB 4516
	DABB 060 NR		7,0	6,0	80	5,2	0,1	HBB 616
For back boring 	DABB 045 BR	○	7,0	4,5	80	4,0	0,1	HBB 4516
	DABB 060 BR		9,0	6,0	80	5,5	0,1	HBB 616

■ Recommended Cutting Conditions



Spindle revolution	Feed rate	Depth of cut	Coolant
> 2000 rpm	0,03 ~ 0,1 mm/rev	0,03 ~ 0,2 mm	Wet

■ Holder



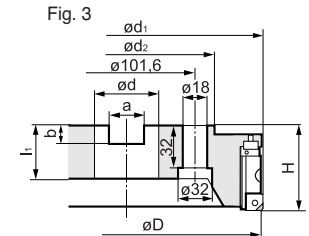
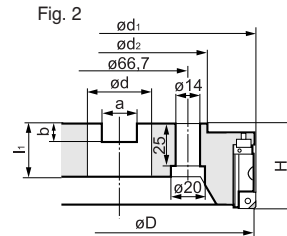
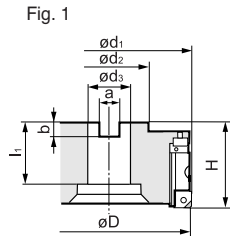
Cat. No.	Stock	Dimensions (mm)			
		d ₁	L	d ₂	H
HBB 2516	●	16	100	2,5	15
HBB 3516	●			3,5	
HBB 4516	●			4,5	
HBB 616	●			6,0	

■ Spare Parts

Screw	Wrench
 BT 0404	 TH 020

SUMIDIA Face Mill RF Type

High Speed Finishing of Aluminium Alloy



Body

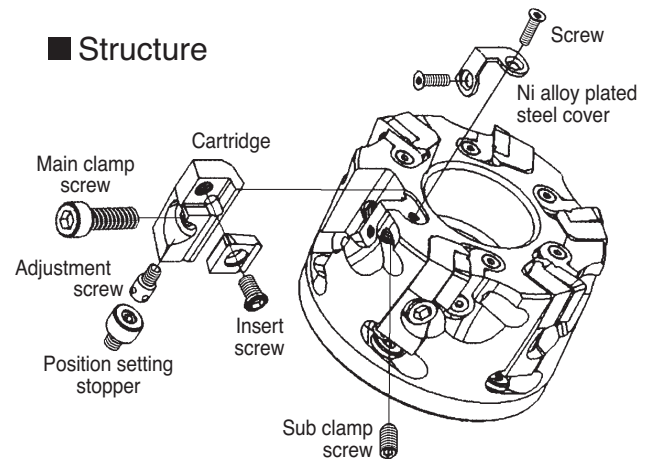
Type	Cat. No.	Stock	Dimensions (mm)				Mounting				Number of teeth	max. depth of cut	Weight (Kg)	Fig.
			$\varnothing D$	$\varnothing d_1$	$\varnothing d_2$	H	$\varnothing d_3$	a	b	l_1				
RF 4000	RF 4080 R-S	●	80	82	60	50	27	12,4	7,0	29	6	3,0	0,7	1.
	RF 4100 R-S	●	100	102	75	50	32	14,4	8,5	29	6		1,0	
	RF 4125 R-S	●	125	127	75	63	40	16,4	9,5	29	8		1,6	
	RF 4160 R-S	○	160	162	100	63	40	16,4	9,5	29	10	2,6	2.	
	RF 4200 R-S		200	202	130	63	60	25,7	14,0	38	12	3,6	3.	
	RF 4250 R-S		250	252	130	63	60	25,7	14,0	38	16	6,0		
	RF 4315 R-S		315	317	240	80	60	25,7	14,0	40	18	11,0		

Remark: PCD blades, cartridges and inserts are not included.

Insert for Roughing and Finishing

Shape	Cat. No.	Grade	Stock
	Carbide insert SDET 1204 ZDFR	H1	●
	PCD insert SNEW 1204 ADFR-NF	DA2200	●
	PCD insert wiper type SNEW 1204 ADFR-W-NF	DA2200	●

Structure



"Sumidia" Blade

PCD grade DA2200	Cat. No.	Stock
Standard type	RFB	○
Wiper type	RFBW	○

Cartridge

Shape	Cat. No.	Stock
For carbide insert	RFR	●
For Sumidia insert	RFF	●

● = Euro stock
○ = Delivery on request

Cutting Insert Selection

For easy assembling:

PCD blade **RFB**
PCD blade **RFB** (wiper type)

For finishing:

Cartridge **RFF**
PCD insert SNEW 1204 ADFR-NF (standard type)
SNEW 1204 ADFR-W-NF (wiper type)
PCD grade: DA2200

For roughing:

Cartridge **RFR**
Uncoated carbide insert
SDET 1204 ZDFR, grade: H1

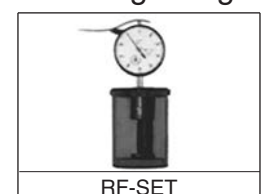
Dummy Blade

Shape	Cat. No.	Stock
	RFD	○

Spare Parts

Cover	Position setting stopper	Main clamp screw	Sub clamp screw	Cover clamp screw	Adjustment screw	Insert clamp screw	Hex wrench TH015, TH025, TH050	TTX20
RFC	RFS	BX0620	BTD0510	FBUP2-A0-8	RFJ	BFTX0509N		

Setting Gauge



Dial-gauge is not included.

SUMIDIA Face Mill SRF Type

High Speed Finishing of Aluminium Alloy



Fig. 1

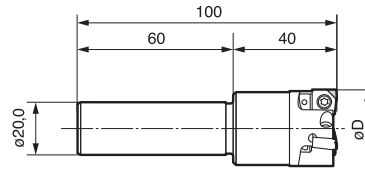
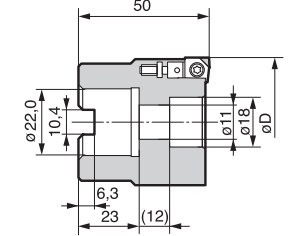


Fig. 2

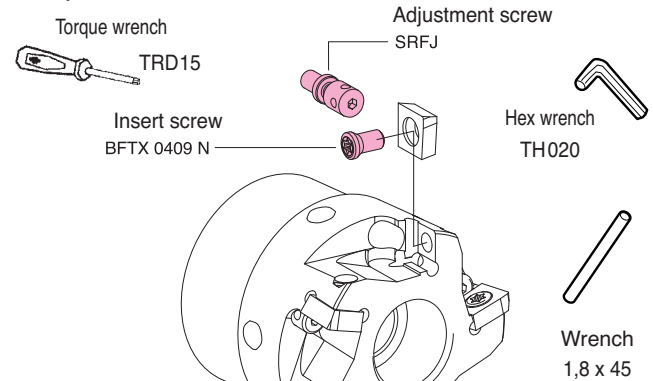


Body

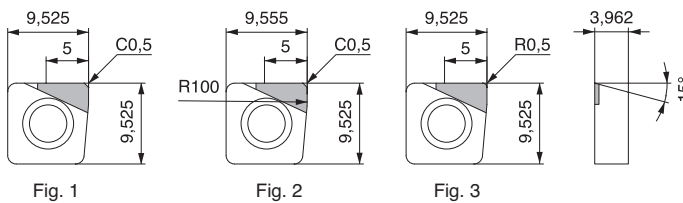
Cat. No.	Stock	ϕD (mm)	No. of teeth	Shape	Weight (Kg)
SRF 30 R-ST	○	30	3	Obr. 1	0,34
SRF 40 R-ST	○	40	4	Obr. 1	0,50
SRF 50 RS	○	50	5	Obr. 2	0,59
SRF 63 RS	○	63	6	Obr. 2	0,67

Inserts are sold separately.
○ = Delivery on request

Spare Parts



Insert



Maximum D.O.C. Guide (SRF50RS, 5 teeth)

The contains guidelines on the maximum D.O.C., determined from internal tests. "O" mark indicates the possible application range. Actual cutting conditions should be set, based on actual machine and work characteristics.

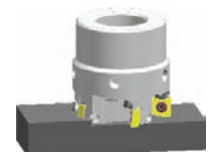
Cat. No.	Cutting Edge	SUMIDIA	Shape
		DA2200	
SNEW 09T3 ADTR-NF	Standard	○	Fig. 1
SNEW 09T3 ADTR-U-NF	Wiper	○	Fig. 2
SNEW 09T3 ADTR-R-NF	Nose Radius	○	Fig. 3

○ = Delivery on request

Feed	Feed Speed, v_f (mm/min)		
	2.500	4.000	5.000
	Feed Rate, f_t (mm/tooth)		
D.O.C. (mm)	0,05	0,08	0,10
0,5	○	○	○
1,0	○	○	○
1,5	○	○	○
2,0	○	○	○
2,5	○	○	○
3,0	○	○	○
3,5	○	○	-
4,0	○	-	-
4,5	○	-	-
5,0	○	-	-

Cutting Conditions

Cutter: SRF 50 RS
Insert: SNEW 09T3 ADFR-NF (DA2200)
n : 10.000 rpm
Width: 35mm at D.O.C. indicated above

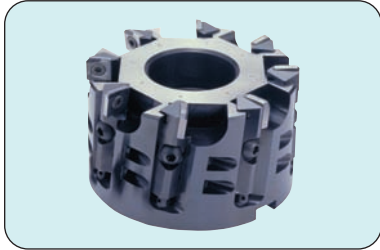


Recommended Cutting Conditions for RF and SRF Type Cutters

Work Material	Process	Grade	Cutting Speed (m/min)		Feed Rate (mm/tooth)	Depth of Cut (mm)	
			RF Type	SRF Type		RF Type	SRF Type
Aluminium Alloy	Finishing	DA2200 (PCD)	2.000 ~ 5.000	~ 4.000	0,05 ~ 0,2	~ 3,0	~ 5,0
		H1 (Carbide)	1.000 ~ 2.500	-			
	Roughing	DA2200 (PCD)	400 ~ 800	~ 800			
		H1 (Carbide)	200 ~ 400	-			

SUMIBORON "BN Finish Mill" FMU Type

High Speed Finishing of Grey Cast Iron



■ Features

- High speed machining $v_c=1.500\text{m/min}$
- Excellent surface roughness $Rz=3,2$ ($Ra=1,0$)
- Safety structure for the centrifugal force under high speed cutting conditions
- Run-out is less than $10\mu\text{m}$
- Easy assembling method using the setting gauge
- Running cost is reduced because of economical insert

SUMIBORON "BN Finish Mill"

■ Application

GG25~GG30 (HB200~250) grey cast iron with pearlite matrix, and ferrite matrix (HB130~160)
Application examples: engine block, cylinder block, etc

■ Specifications

FMU Type: $\phi 80 \sim \phi 315 \text{ mm}$
Insert: SNEW1203ADTR/L
Low cutting force type: SNEW1203ADTR/L-S

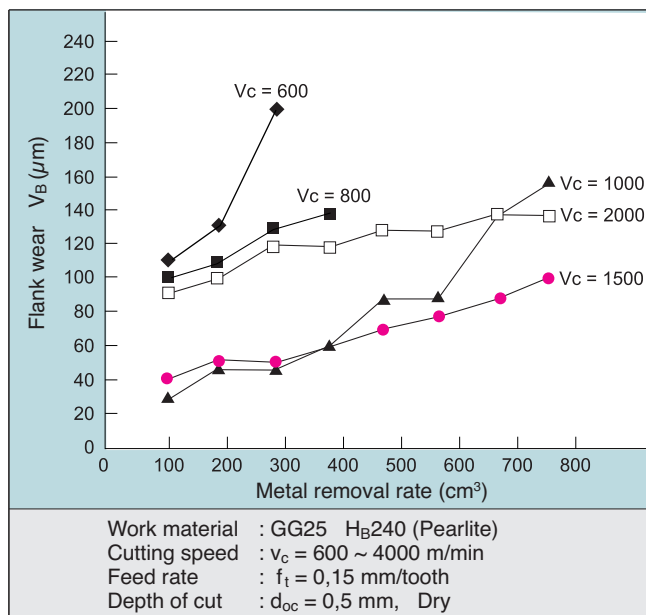
■ Recommended Cutting Conditions

Speed: $v_c = 800 \sim 2000 \text{ m/min}$
Feed: $f_t = 0,1 \sim 0,3 \text{ mm/tooth}$
Depth: $d_{oc} = 0,5 \text{ mm or less}$
Dry cutting

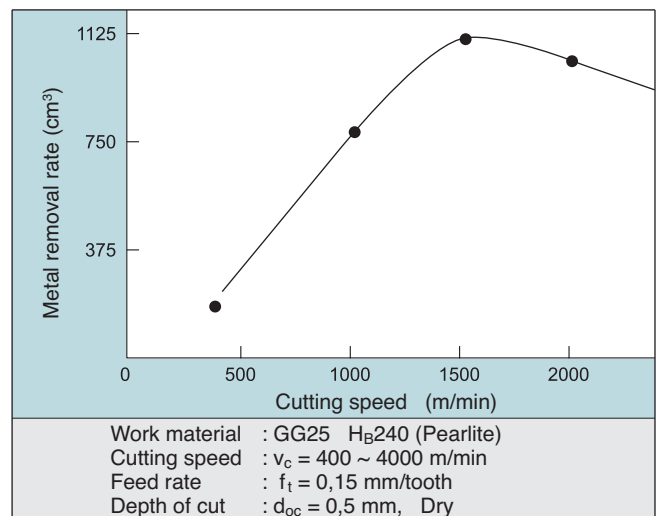


■ Performance

● Tool Life Diagram



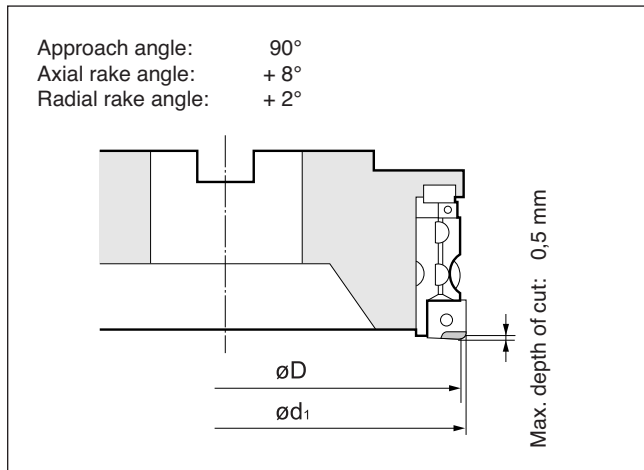
● Estimated Tool Life



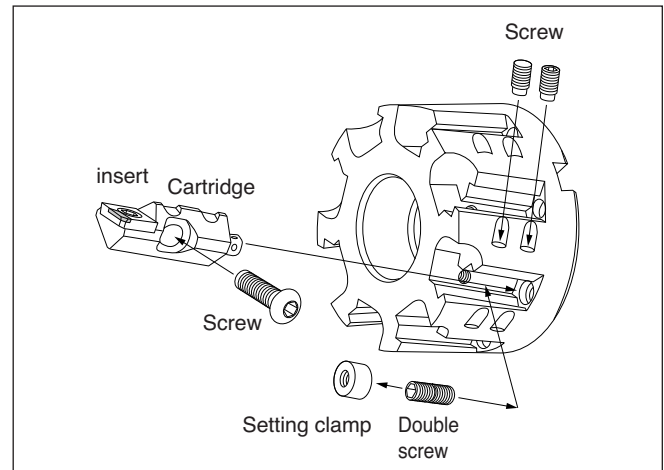
- Milling of ductile cast iron and alloy steel casting do not produce the best results.
- Dry cutting is recommended. Wet cutting will result in chipping of cutting edges in the early stages due to thermal cracking.

SUMIBORON "BN Finish Mill" FMU Type

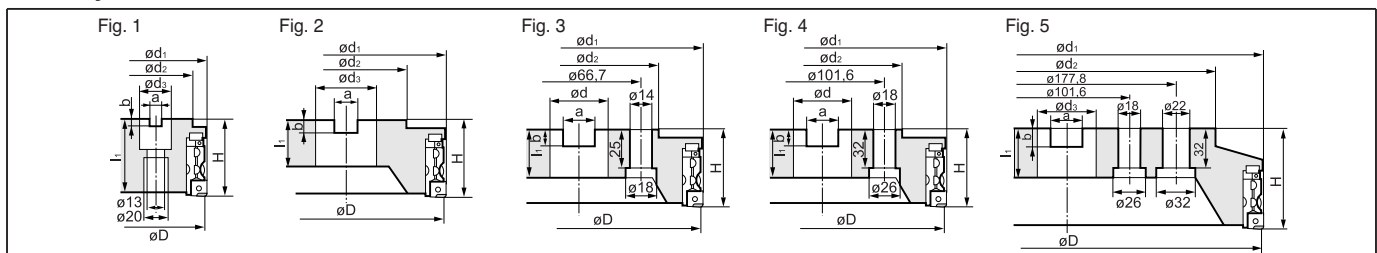
Specifications



Structure



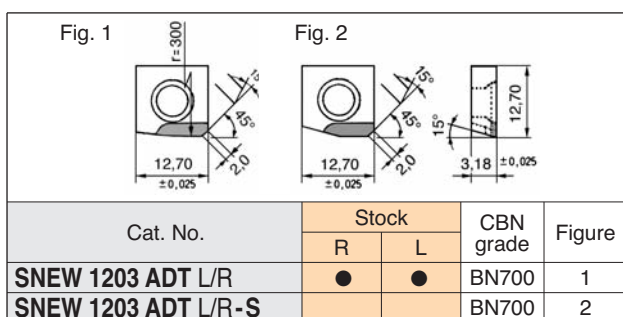
Body



Type	Cat. No.	Stock		Dimensions (mm)				Mounting				Number of teeth	max. depth of cut	Weight (Kg)	Fig.	
		R	L	ø D	ø d ₁	ø d ₂	H	ø d ₃	a	b	l ₁					
FMU 4000	FMU 4080 R-S	●		80	82,8	60	63	27	12,4	7,0	25	6	0,5	1,6	1.	
	FMU 4100 R-S	●		100	102,8	76	63	32	14,4	8,5	29			2,4		
	FMU 4125 R-S	○		125	127,8	75	63	40	16,4	9,5	29			3,4	2.	
	FMU 4160 R-S	○		160	162,8	100	63	40	16,4	9,5	29			5,6		
	FMU 4200 R-S			200	202,8	130	63	60	25,7	14,0	38			16	9,2	4.
	FMU 4250 R-S			250	252,8	130	63	60	25,7	14,0	38			20	14,3	
FMU 4315 R-S			315	317,8	240	80	60	25,7	14,0	40	28	27,8	5.			

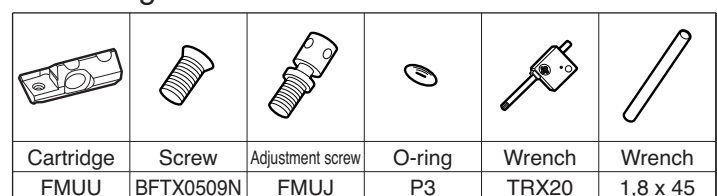
● = Euro stock
○ = Delivery on request

Insert

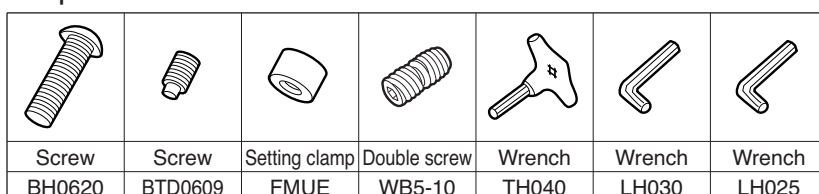


● = Euro stock

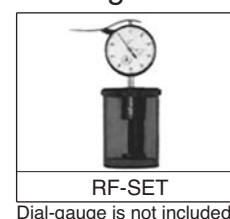
Cartridge



Spare Parts

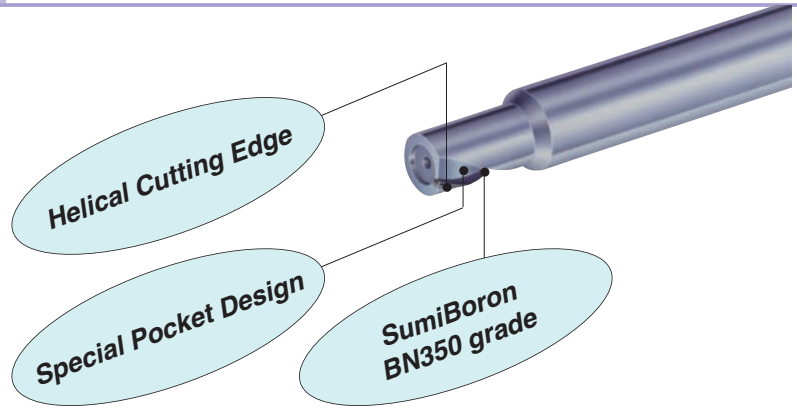


Gauge



SUMIBORON "Helical Master" BNES Type

Spiral CBN Endmill for Hardened Steel



Endmills BNES Type with 1 Spiral Flute

	Cat. No.	Stock	Dimensions (mm)				
		BN350	ϕD	ϕd	ℓ_1	ℓ_2	L
	BNES 1060	○	6,0	10	7,0	11	60
	BNES 1080	○	8,0	10	10,0	14	70
	BNES 1100	○	10,0	12	12,0	17	75
	BNES 1120	○	12,0	12	14,0	20	80
	BNES 1140	○	14,0	16	16,0	21,5	80
	BNES 1160	○	16,0	16	18,0	24	80

○ = Delivery on request

Recommended Cutting Conditions

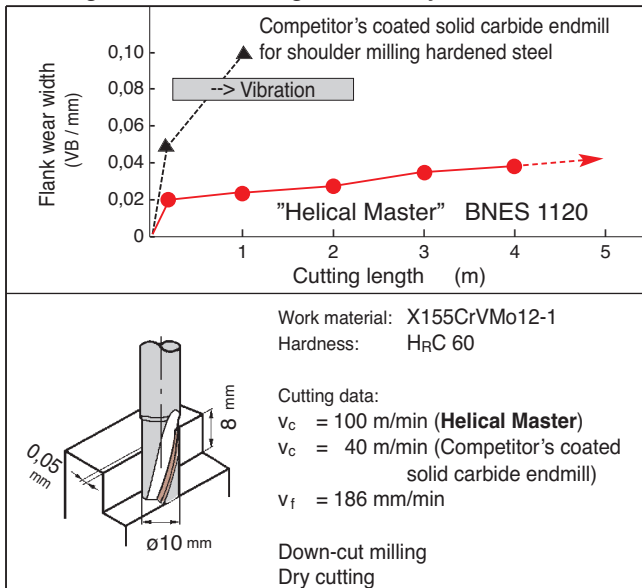
Cutting speed: v_c (m/min), Spindle revolutions: n (rpm), Feed per tooth: f_t (mm/tooth), Feed speed: v_f (mm/min)

Tooling example	ϕD	Hardened steel (H _R C 50 ~ 57)			Hardened steel (H _R C 58 ~ 65)		
		$v_c = 100 \sim 170$ m/min			$v_c = 80 \sim 150$ m/min		
<p>Depth of cut : $d_{oc} \leq D$</p>	$\phi 6 \sim 8$	$W_{oc} \leq 0,1$ mm	$n = 4000 \sim 9000$	V_f (mm/min) = 240 ~ 540	$W_{oc} \leq 0,08$ mm	$n = 3200 \sim 8000$	V_f (mm/min) = 150 ~ 370
	$\phi 10 \sim 12$	$W_{oc} \leq 0,15$ mm	$n = 2700 \sim 5400$	V_f (mm/min) = 180 ~ 360	$W_{oc} \leq 0,12$ mm	$n = 2100 \sim 4800$	V_f (mm/min) = 120 ~ 270
	$\phi 14 \sim 16$	$W_{oc} \leq 0,2$ mm	$n = 2000 \sim 3800$	V_f (mm/min) = 140 ~ 260	$W_{oc} \leq 0,15$ mm	$n = 1600 \sim 3400$	V_f (mm/min) = 110 ~ 230

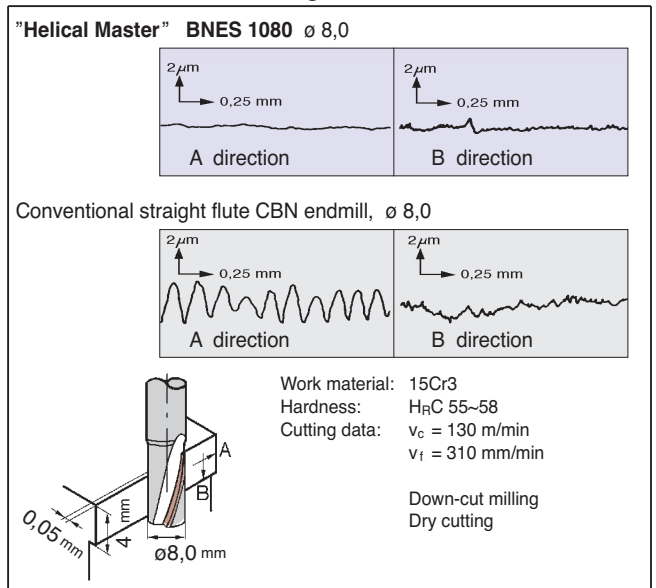
Recommendation: Dry cutting (Air coolant)
Down-cut milling
Minimise the overhang
Use a rigid machine

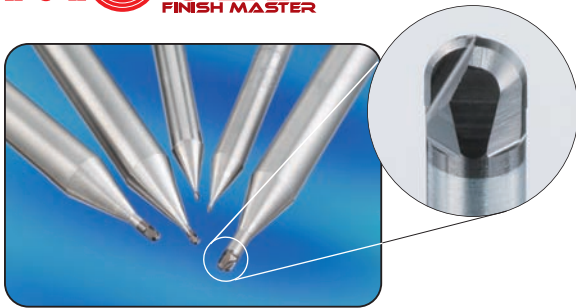
Performance

● Long Tool Life and High Efficiency



● Excellent Surface Roughness





Characteristics / Application

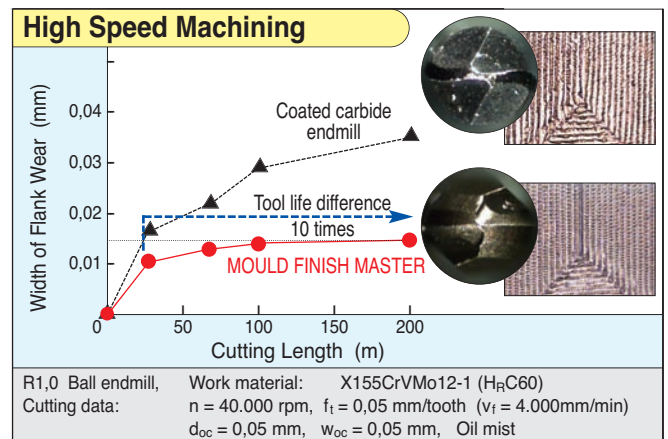
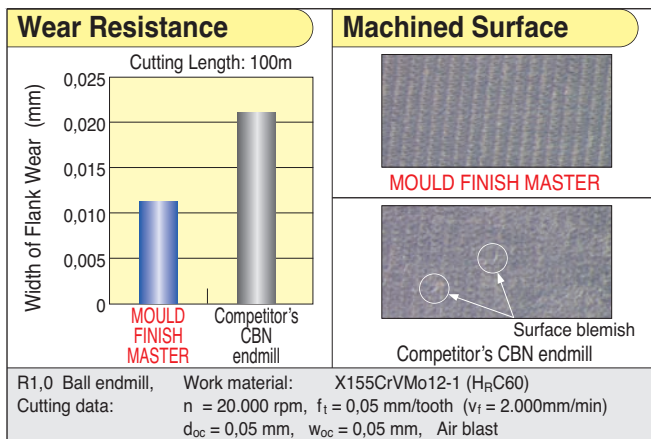
- High precision machining of hardened steels < HRC70 with long tool life
- Super tough grade SUMIBORON BN350 prevents chipping of the cutting edge
- R accuracy : $\pm 0,005\text{mm}$

Endmills

Cat. No.	Stock	Dimensions (mm)							
		R	ϕD	L	ϕd_1	ϕd	l_1	l_2	
4,0 mm (Shank Diam.)									
BNBP 2 R020-012 4	●	0,2	0,4	50	0,37	4	0,3	1,2	
BNBP 2 R030-015 4	●	0,3	0,6	50	0,57	4	0,4	1,5	
BNBP 2 R050-025 4	●	0,5	1,0	50	0,97	4	0,6	2,5	
BNBP 2 R075-040 4	●	0,75	1,5	50	1,47	4	0,9	4,0	
BNBP 2 R100-055 4	●	1,0	2,0	50	1,97	4	1,4	5,5	
6,0 mm (Shank Diam.)									
BNBP 2 R020-012 6	●	0,2	0,4	50	0,37	6	0,3	1,2	
BNBP 2 R030-015 6	●	0,3	0,6	50	0,57	6	0,4	1,5	
BNBP 2 R050-025 6	●	0,5	1,0	50	0,97	6	0,6	2,5	
BNBP 2 R075-040 6	●	0,75	1,5	50	1,47	6	0,9	4,0	
BNBP 2 R100-055 6	●	1,0	2,0	50	1,97	6	1,4	5,5	

● = Euro stock

Performance



- Excellent surface finish compared with competitor's CBN and coated carbide endmills

Recommended Cutting Conditions

Spindle revolutions: N (rpm), Feed rate per tooth: f_t (mm/tooth), Depth of cut: d_{oc} (mm), Wide of cut: w_{oc} (mm)

Material Cutting data	Pre-hardened steel, Die steel (~ HRC52)				Die steel (~ HRC62)				High speed tool steel (~ HRC70)			
	n (rpm)	f _t (mm/tooth)	d _{oc} (mm)	w _{oc} (mm)	n (rpm)	f _t (mm/tooth)	d _{oc} (mm)	w _{oc} (mm)	n (rpm)	f _t (mm/tooth)	d _{oc} (mm)	w _{oc} (mm)
R 0,2	20.000~50.000	0,02	0,03	0,03	20.000~50.000	0,02	0,01	0,02	20.000~50.000	0,015	0,01	0,02
R 0,3	20.000~50.000	0,02	0,03	0,03	20.000~50.000	0,02	0,01	0,02	20.000~50.000	0,015	0,01	0,02
R 0,5	20.000~50.000	0,03	0,05	0,05	20.000~50.000	0,03	0,03	0,04	20.000~50.000	0,02	0,02	0,03
R 0,75	20.000~50.000	0,04	0,08	0,1	20.000~50.000	0,04	0,05	0,05	20.000~50.000	0,03	0,02	0,05
R 1,0	20.000~50.000	0,05	0,1	0,1	17.000~50.000	0,05	0,05	0,05	17.000~50.000	0,03	0,03	0,05

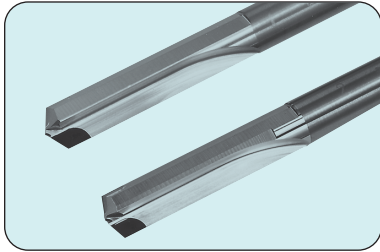
Important Notes

- (1) For stable machining, a more rigid machine is recommended.
- (2) Air blast or oil mist coolant is recommended.
- (3) Shorten overhang as much as possible.



SUMIDIA Drills

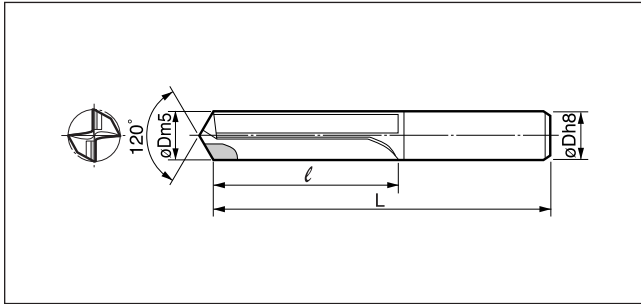
DAL/DDL/DML Type



From general to High Precision Drilling of Aluminum Alloys!

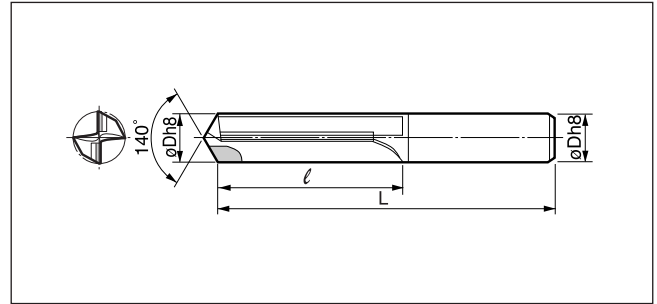
- High precision DAL type is able to produce holes of IT Class of 7~8.
- General DDL type is able to produce holes of IT class of 11~12, mainly for drilling of pre-tap holes.
- DML type is DDL type with a chamfer edge, incorporating 2 processes in one operation.

■ DAL Type



Cat. No.	Stock	ϕD	L	ℓ
	DA2200			
DAL 0500H ~ 0600H		$\phi 5 \leq D \leq \phi 6$	80	30
DAL 0601H ~ 0700H		$\phi 6 < D \leq \phi 7$	90	35
DAL 0701H ~ 0800H		$\phi 7 < D \leq \phi 8$	90	35
DAL 0801H ~ 0900H		$\phi 8 < D \leq \phi 9$	100	40
DAL 0901H ~ 1000H		$\phi 9 < D \leq \phi 10$	100	40
DAL 1001H ~ 1100H		$\phi 10 < D \leq \phi 11$	110	50
DAL 1101H ~ 1200H		$\phi 11 < D \leq \phi 12$	110	50

■ DDL Type



Cat. No.	Stock	ϕD	L	ℓ
	DA2200			
DDL 050V ~ 060V		$\phi 5 \leq D \leq \phi 6$	80	30
DDL 061V ~ 070V		$\phi 6 < D \leq \phi 7$	90	35
DDL 071V ~ 080V		$\phi 7 < D \leq \phi 8$	90	35
DDL 081V ~ 090V		$\phi 8 < D \leq \phi 9$	100	40
DDL 091V ~ 100V		$\phi 9 < D \leq \phi 10$	100	40
DDL 101V ~ 110V		$\phi 10 < D \leq \phi 11$	110	50
DDL 111V ~ 120V		$\phi 11 < D \leq \phi 12$	110	50

■ Recommended Conditions

	Cutting Speed (m/min)	Feed Rate (mm/rev)	Drilling Length L/D	Oil
$\phi D < 8$	80 ~ 250	0,05 ~ 0,2	Below 3 x D	Water soluble
$8 \leq \phi D$		0,1 ~ 0,3		

■ Important Notes

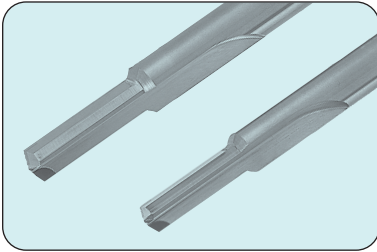
- Select a high rigidity machine and high precision tool holder.
- Enough coolant to drilled hole.

■ Application Examples (DAL Type)

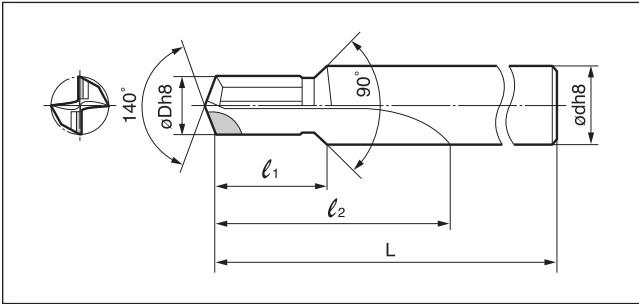
Work Shape	Work	Conditions	Results
	A390 High silicon Aluminum	$V_c=100\text{m/min}$ $f=0,1\text{mm/rev}$	<ul style="list-style-type: none"> • Holes by carbide drill was out of specifications after 2.000 holes/reg. • SumiDia drill could drill up to 30.000 holes/reg. • 15 times tool life that of carbide drills.
	A390 High silicon Aluminum (pre-cast hole of $\phi 10$)	$V_c=120\text{m/min}$ $f=0,12\text{mm/rev}$	<ul style="list-style-type: none"> • Average 40,000 holes/reg • Surface roughness $R_y = 1\mu\text{m}$
	ADC10 Aluminum Die Cast	$V_c=90\text{m/min}$ $f=0,08\text{mm/rev}$	<ul style="list-style-type: none"> • More than 50.000 holes and still running

■ Application Examples (DDL Type)

Work Shape	Work	Conditions	Results
	ADC12 Aluminum Die Cast M8 Pre-tap holes	$V_c=214\text{m/min}$ $f=0,14\text{mm/rev}$	<ul style="list-style-type: none"> • Regrind after 100.000 holes
	ADC12 Aluminum Die Cast	$V_c=200\text{m/min}$ $f=0,17\text{mm/rev}$	<ul style="list-style-type: none"> • Regrind after 74.000 holes (2.000m) (Preset tool change)
	AC2A Aluminum Casting	$V_c=234\text{m/min}$ $f=0,28\text{mm/rev}$	<ul style="list-style-type: none"> • Regrind after 80.000 holes (Preset tool change)



■ DML Type

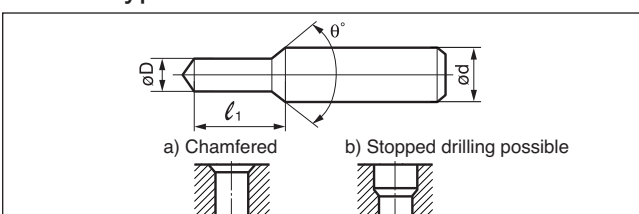


Applicable Tap Size	Cat. No.	Stock	ϕD	ϕd	L	l_1	l_2
		DA2200					
M6	DML 050V		5	8	90	18	36
M8	DML 068V		6,8	10	104	24	48
M10	DML 085V		8,5	12	122	30	60
M12	DML 103V		10,3	14	136	36	72

■ Application Examples (DML Type)

Work Shape	Work	Conditions	Results
	AC4C-T6 Aluminum Casting M6 Pre-tap holes	$V_c=100\text{m/min}$ $f=0,1\text{mm/rev}$ $m/c=6$ spindles	<ul style="list-style-type: none"> • Regrind after 150.000 holes • Tool life for carbide drill is 500 holes. • 30 times tool life that of carbide drills
	AC2C-T2 Aluminum Casting M8 Pre-tap holes	$V_c=210\text{m/min}$ $f=0,15\text{mm/rev}$	<ul style="list-style-type: none"> • 100.000 holes/reg (2.000m) and still running. • Drilling and chamfering in the same process
	AC4C-T6 Aluminum Casting M10 Pre-tap holes	$V_c=250\text{m/min}$ $f=0,2\text{mm/rev}$	<ul style="list-style-type: none"> • 80.000 holes/reg (1.840m) and still running. • Drilling and chamfering in the same process

■ DML Type Possible Profiles



- (1) Tolerance for dimension L is more than 0,2mm.
- (2) θ° is less than 180° .

