

# SUMIBORON / SUMIDIA Indexable Inserts & Tools

# M



M1 ~ M34



SUMIBORON / SUMIDIA Insert  
C / 80° Diamond

D / 55° Diamond

R / Round  
S / Square

T / Triangle

V / 35° Diamond

W / Polygon  
Special

<b>CC</b> _ 7° pos. Type .....	M2
<b>CN</b> _ neg. Type .....	M4
<b>CP</b> _ 11° pos. Type .....	M5
<b>DC</b> _ 7° pos. Type .....	M6
<b>DN</b> _ neg. Type .....	M8
<b>RN</b> _ neg. Type .....	M9
<b>SC</b> _ 7° pos. Type .....	M9
<b>SN</b> _ neg. Type .....	M10
<b>TB</b> _ 5° pos. Type .....	M11
<b>TC</b> _ 7° pos. Type .....	M12
<b>TN</b> _ neg. Type .....	M13
<b>TP</b> _ 11° pos. Type (Without Hole).....	M14
<b>TP</b> _ 11° pos. Type (With Hole).....	M15
<b>VB</b> _ 5° pos. Type .....	M16
<b>VC</b> _ 7° pos. Type .....	M16
<b>VN</b> _ neg. Type .....	M17
<b>WN</b> _ neg. Type .....	M18
<b>ZNEX</b> neg.-pos. Type .....	M18

SUMIBORON / SUMIDIA Precision Tools

SUMIBORON

SUMIDIA

SUMIBORON "BN Finish Mill"  
"Helical Master"  
"Mould Finish Master"  
SUMIDIA

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80° Diamond Type 7° Relief  
With Insert Hole

Dimensions (mm)				
CC--	ℓ	ød (IC)	s	d <sub>1</sub>
0602--	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4
1204--	12,9	12,7	4,76	5,5


**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## CCMT


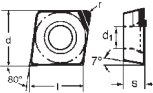
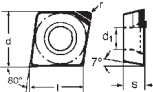

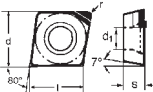

● M-Class SumiDia (PCD, Regrindable Type)

Shape	ISO Cat. No.	r	Material															
			Coated		Uncoated										PCD			
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200	
	CCMT 060202	0,2															●	
	CCMT 060204	0,4															●	
	CCMT 09T302	0,2															●	

● M-Class SumiDia (PCD, NF Type)

Shape	ISO Cat. No.	r	Material															
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200	
	CCMT 060201 NF	0,1															●	
	CCMT 060202 NF	0,2															●	
	CCMT 060204 NF	0,4															●	
	CCMT 09T301 NF	0,1															●	
	CCMT 09T302 NF	0,2															●	
	CCMT 09T304 NF	0,4															●	

● M-Class SumiDia (PCD, One-Use "Break Master" Type)

Break Master - DM	Shape	ISO Cat. No.	r	Material															
				BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200	
		CCMT 060202 L-DM NU	0,2														●		
		CCMT 060204 L-DM NU	0,4															●	
		CCMT 09T302 L-DM NU	0,2															●	
		CCMT 09T304 L-DM NU	0,4															●	
		CCMT 060202 R-DM NU	0,2														●		
		CCMT 060204 R-DM NU	0,4															●	
		CCMT 09T302 R-DM NU	0,2															●	
		CCMT 09T304 R-DM NU	0,4															●	

● = Euro stock

Packing unit and ordering example; 1 pce CCMT 060202, DA150

# SUMIBORON / SUMIDIA Indexable Inserts

CN-- Type neg. Inserts

80° Diamond Type




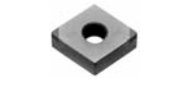
0° Relief

Dimensions (mm)				
CN--	ℓ	ød (IC)	s	d <sub>1</sub>
0903--	9,7	9,525	3,18	4,4
1204--	12,9	12,7	4,76	5,5

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

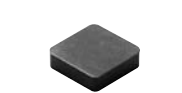
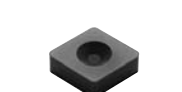

## CNGA / CNGG

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			BNC100	BNC160	BNC200	CBN								PCD		
			BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
 Standard - Normal cut geometry with 4 CBN cutting edges	CNGA 120404 NC-4 CNGA 120408 NC-4 CNGA 120412 NC-4	0,4 0,8 1,2	●	●	●	●										
	CNGA 120404 NC-W-4 CNGA 120408 NC-W-4	0,4 0,8	●	●	●											
 LS - Type Light cut geometry with 2 CBN cutting edges	CNGA 120404 LS-NC2 CNGA 120408 LS-NC2 CNGA 120412 LS-NC2	0,4 0,8 1,2	●	●	●											
	CNGA 120404 HS-NC2 CNGA 120408 HS-NC2 CNGA 120412 HS-NC2	0,4 0,8 1,2		●	●	●										
 SV - Type with chipbreaker with 4 CBN cutting edges	CNGG 120404 N-SV NC4 CNGG 120408 N-SV NC4 CNGG 120412 N-SV NC4	0,4 0,8 1,2			●											
	CNGA 120404 NS-2 CNGA 120408 NS-2 CNGA 120412 NS-2	0,4 0,8 1,2								●						
 with 2 CBN cutting edges	CNGA 120404 NU-2 CNGA 120408 NU-2 CNGA 120412 NU-2	0,4 0,8 1,2							●	●						
									●	●	●					

## CNGN / CNGX

● G-Class SumiBoron (Solid CBN Type)

Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			BNC100	BNC160	BNC200	CBN								PCD		
			BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
 CNGN 090308 CNGN 090312		0,8														
		1,2											●			
 CNGN 120412 CNGN 120416		1,2											●			
		1,6											●			
 CNGX 120412 CNGX 120416		1,2 1,6											●			

● G-Class SumiBoron (Solid CBN, "Dimple" Type)

● = Euro stock

Packing unit and ordering example; 1 pce CNGA 120404 NC-4, BNC100


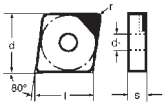
80° Diamond Type 0° & 11°  
With Insert Hole

Dimensions (mm)				
CN/CP--	ℓ	ød (IC)	s	d <sub>1</sub>
06	6,45	6,35	2,38	2,8
09T3--	9,7	9,525	3,97	4,4
12	12,9	12,7	4,76	5,5


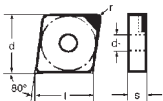

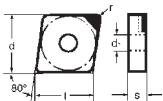


**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## CNMA

● M-Class SumiBoron (CBN, Regrindable Type)


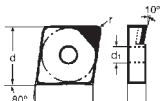
Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			CBN											PCD		
BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
 	<b>CNMA 120404</b> <b>CNMA 120408</b> <b>CNMA 120412</b>	0,4														
		0,8					●									
		1,2					●			●			●			

● M-Class SumiBoron (CBN, One-use Type)

Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			CBN											PCD		
BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
 	<b>CNMA 120404 NS</b> <b>CNMA 120408 NS</b> <b>CNMA 120412 NS</b>	0,4														
		0,8						●								
		1,2					●			●			●			
 	<b>CNMA 120404 NU</b> <b>CNMA 120408 NU</b> <b>CNMA 120412 NU</b>	0,4														
		0,8					●	●								
		1,2					●	●		●	●		●	●		
  (Wiper Type)	<b>CNMA 120404 NU-W</b> <b>CNMA 120408 NU-W</b> <b>CNMA 120412 NU-W</b>	0,4														
		0,8					●	●								
		1,2														


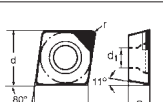
## CNMX

● M-Class SumiDIA (PCD, NF Type)

Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			CBN											PCD		
BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
 	<b>CNMX 120402 NF</b> <b>CNMX 120404 NF</b> <b>CNMX 120408 NF</b> <b>CNMX 120412 NF</b>	0,2														
		0,4													●	●
		0,8													●	●
		1,2													●	●

## CPMW

● M-Class SumiDIA (PCD, NF Type)

Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			CBN											PCD		
BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
 	<b>CPMW 060202 NF</b> <b>CPMW 060204 NF</b> <b>CPMW 060208 NF</b>	0,2														
		0,4													●	●
		0,8													●	●

● = Euro stock

Packing unit and ordering example; 1 pce CNMA 120404, BNX20

# SUMIBORON / SUMIDIA Indexable Inserts

DC-- Type 7° pos. Inserts

55° Diamond Type

7° Relief  
With Insert Hole

Dimensions (mm)				
DC--	ℓ	ød (IC)	s	d <sub>1</sub>
0702--	7,75	6,35	2,38	2,8
11T3--	11,6	9,525	3,97	4,4

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## DCGW

● G-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	Material															
			Coated			Uncoated								PCD				
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA200	
	DCGW 11T304 NS DCGW 11T308 NS	0,4 0,8																
	DCGW 070202 NU DCGW 070204 NU DCGW 070208 NU	0,2 0,4 0,8					●	●		●	●			●				
	DCGW 11T302 NU DCGW 11T304 NU DCGW 11T308 NU	0,2 0,4 0,8					●	●		●	●		●	●				

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

<p>Standard - Normal cut geometry</p>	<p>with 2 CBN cutting edges</p>	DCGW 070202 NC-2 DCGW 070204 NC-2 DCGW 070208 NC-2	0,2 0,4 0,8	●	●	●													
		DCGW 11T302 NC-2 DCGW 11T304 NC-2 DCGW 11T308 NC-2	0,2 0,4 0,8	●	●	●													
		DCGW 070202 LS-NC2 DCGW 070204 LS-NC2	0,2 0,4	●	●	●													
<p>LS - Type Light cut geometry</p>	<p>with 2 CBN cutting edges</p>	DCGW 11T304 LS-NC2 DCGW 11T308 LS-NC2	0,4 0,8	●	●	●													
		DCGW 11T304 HS-NC2 DCGW 11T308 HS-NC2	0,4 0,8			●	●												
	<p>with 2 CBN cutting edges</p>	DCGW 070204 NU-2 DCGW 070208 NU-2	0,4 0,8					●	●		●	●							
		DCGW 11T304 NU-2 DCGW 11T308 NU-2	0,4 0,8					●	●		●	●		●	●				

SumiBoron / SumiDia  
Inserts

M6

● = Euro stock

Packing unit and ordering example; 1 pce DCGW 11T304 NS, BNX25

55° Diamond Type 7° Relief  
With Insert Hole

Dimensions (mm)				
DC--	ℓ	∅d (IC)	s	d <sub>1</sub>
0702--	7,75	6,35	2,38	2,8
11T3--	11,6	9,525	3,97	4,4

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## DCMT

● M-Class SumiDia (PCD, Regrindable Type)

Shape	ISO Cat. No.	r	Material															
			Coated		Uncoated										PCD			
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200	
 	DCMT 070202 DCMT 070204	0,2 0,4															●	
	DCMT 11T302 DCMT 11T304 DCMT 11T308	0,2 0,4 0,8															●	

● G-Class SumiDia (PCD, NF Type)

 	DCMT 070201 NF DCMT 070202 NF DCMT 070204 NF DCMT 070208 NF	0,1 0,2 0,4 0,8															●	
	DCMT 11T301 NF DCMT 11T302 NF DCMT 11T304 NF DCMT 11T308 NF	0,1 0,2 0,4 0,8															●	

● M-Class SumiDIA (PCD, One-Use "Break Master" Type)

<b>Break Master-DM</b>  	DCMT 070202 L-DM NU DCMT 070204 L-DM NU	0,2 0,4																
	DCMT 11T302 L-DM NU DCMT 11T304 L-DM NU	0,2 0,4															●	
<b>Break Master-DM</b>  	DCMT 070202 R-DM NU DCMT 070204 R-DM NU	0,2 0,4															●	
	DCMT 11T302 R-DM NU DCMT 11T304 R-DM NU	0,2 0,4															●	

● = Euro stock

Packing unit and ordering example; 1 pce DCMT 070202, DA150

# SUMIBORON / SUMIDIA Indexable Inserts

DN-- Type neg. Inserts

55° Diamond Type

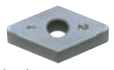



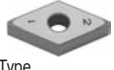
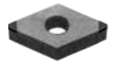
0° Relief  
With Insert Hole

Dimensions (mm)				
DN--	ℓ	ød (IC)	s	d <sub>1</sub>
1104--	11,6	9,525	4,76	3,81
1504--	15,5	12,7	4,76	5,16
1506--	15,5	12,7	6,35	5,16

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal


## DNGA / DNGG

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)



Shape	ISO Cat. No.	r	Material											
			Coated			Uncoated						PCD		
			BNC100	BNC160	BNC200	CBN			PCD					
 Standard - Normal cut geometry with 2 CBN cutting edges	DNGA 110404 NC-2	0,4												
	DNGA 110408 NC-2	0,8			●									
	DNGA 110412 NC-2	1,2			●									
 Standard - Normal cut geometry with 4 CBN cutting edges	DNGA 150604 NC-4	0,4	●	●	●	●								
	DNGA 150608 NC-4	0,8	●	●	●	●								
	DNGA 150612 NC-4	1,2	●	●	●	●								
 LS - Type Light cut geometry with 2 CBN cutting edges	DNGA 150604 LS-NC2	0,4	●	●	●									
	DNGA 150608 LS-NC2	0,8	●	●	●									
	DNGA 150612 LS-NC2	1,2	●	●	●									
 HS - Type Tough cut geometry with 2 CBN cutting edges	DNGA 150604 HS-NC2	0,4		●	●	●								
	DNGA 150608 HS-NC2	0,8		●	●	●								
	DNGA 150612 HS-NC2	1,2		●	●	●								
 Break Master-SV SV - Type with chipbreaker with 4 CBN cutting edges	DNGG 150604 N-SV NC4	0,4												
	DNGG 150608 N-SV NC4	0,8			●									
	DNGG 150612 N-SV NC4	1,2			●									
 DNGA 150604 NU-2 DNGA 150608 NU-2 DNGA 150612 NU-2 with 2 CBN cutting edges	DNGA 150604 NU-2	0,4							●	●				
	DNGA 150608 NU-2	0,8							●	●				
	DNGA 150612 NU-2	1,2							●	●				

## DNMA

● M-Class SumiBoron (CBN, Regrindable Type)

Shape	ISO Cat. No.	r	Material											
			Coated			Uncoated						PCD		
			BNC100	BNC160	BNC200	CBN			PCD					
 DNMA 150604 DNMA 150608 DNMA 150612	DNMA 150604	0,4												
	DNMA 150608	0,8							●	●				
	DNMA 150612	1,2							●	●				

● M-Class SumiBoron (CBN, One-Use Type)

 DNMA 150604 NS DNMA 150608 NS	DNMA 150604 NS	0,4												
	DNMA 150608 NS	0,8							●	●				
	DNMA 150612 NS	1,2							●	●				
 DNMA 150604 NU DNMA 150608 NU DNMA 150612 NU	DNMA 150604 NU	0,4							●	●				
	DNMA 150608 NU	0,8							●	●				
	DNMA 150612 NU	1,2							●	●				

● = Euro stock

Packing unit and ordering example; 1 pce

DNGA 110404 NC-2, BNC200

**Round Type** 0° Relief  
Without Insert Hole


Dimensions (mm)

RN--	ℓ	ød (IC)	s	d <sub>1</sub>
0603--	6,35	6,35	3,18	–
0903--	9,525	9,525	3,18	–
1203--	12,7	12,7	3,18	–
1204--	12,7	12,7	4,76	–


**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## RNGN

● G-Class SumiBoron (Solid CBN Type)

Shape	ISO Cat. No.	r	Material															
			Coated			Uncoated												
			CBN											PCD				
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200	
 Solid CBN	RNGN 090300 RNGN 120300 RNGN 120400	– – –														●		

● G-Class SumiBoron (CBN, Full Top Type)

Shape	ISO Cat. No.	r	Material															
			Coated			Uncoated												
			CBN											PCD				
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200	
	RNGN 060300 B RNGN 090300 B RNGN 120300 B RNGN 120400 B	– – – –			●	●												

**Square Type** 7° Relief  
With Insert Hole


Dimensions (mm)

SC--	ℓ	ød (IC)	s	d <sub>1</sub>
09T3--	9,525	9,525	3,97	4,4
12	12,7	12,7	4,76	5,5

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## SCGW

● G-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated											
			CBN											PCD			
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200
	SCGW 09T304 NU SCGW 09T308 NU	0,4 0,8						●							●		

● = Euro stock

Packing unit and ordering example; 1 pce RNGN 090300, BNS800

# SUMIBORON / SUMIDIA Indexable Inserts

SN-- Type neg. Inserts

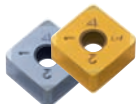
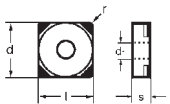

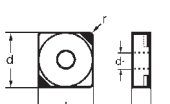
**Square Type**      0° Relief  
With Insert Hole

Dimensions (mm)				
SN--	ℓ	ød (IC)	s	d <sub>1</sub>
1204--	12,7	12,7	4,76	5,16

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## SNGA

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape	ISO Cat. No.	r	Material														
			Coated		Uncoated										PCD		
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200
 Standard - Normal cut geometry  with 4 CBN cutting edges	<b>SNGA 120408 NC-4</b> <b>SNGA 120412 NC-4</b>	0,8 1,2			●	●											
 HS - Type Tough cut geometry  with 2 CBN cutting edges	<b>SNGA 120408 HS-NC2</b> <b>SNGA 120412 HS-NC2</b>	0,8 1,2			●	●											


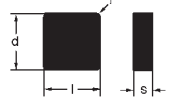

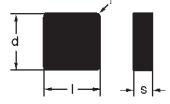
**Square Type**      0° Relief  
Without Insert Hole

Dimensions (mm)				
SN--	ℓ	ød (IC)	s	d <sub>1</sub>
0903--	9,525	9,525	3,18	—
1204--	12,7	12,7	4,76	—



**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## SNGN / SNGX

● G-Class SumiBoron (Solid CBN Type)

Shape	ISO Cat. No.	r	Material														
			Coated		Uncoated										PCD		
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200
 	<b>SNGN 090308</b> <b>SNGN 090312</b>	0,8 1,2															
 	<b>SNGN 120412</b> <b>SNGN 120416</b>	1,2 1,6															

● G-Class SumiBoron (Solid CBN, "Dimple" Type)

 	<b>SNGX 120412</b> <b>SNGX 120416</b>	1,2 1,6															
--	--	------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

● = Euro stock

Packing unit and ordering example; 1 pce SNGA 120408 NC-4, BNC200



# SUMIBORON / SUMIDIA Indexable Inserts

TC-- Type 7° pos. Inserts

60° Triangle Type

7° Relief  
With Insert Hole

Dimensions (mm)				
TC--	ℓ	ød (IC)	s	d <sub>1</sub>
0902--	9,62	5,56	2,38	2,5
1102--	11,0	6,35	2,38	2,8
16T3--	16,5	9,525	3,97	4,3

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## TCGW

● G-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			BNC100	BNC160	BNC200	CBN								PCD		
			BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
	TCGW 090204 NC TCGW 090208 NC	0,4 0,8			●											
	TCGW 110202 NC TCGW 110204 NC TCGW 110208 NC	0,2 0,4 0,8			●											
	TCGW 16T304 NC-3 TCGW 16T308 NC-3	0,4 0,8			●											
	TCGW 090204 NU TCGW 090208 NU	0,4 0,8											●	●		
	TCGW 110202 NU TCGW 110204 NU TCGW 110208 NU	0,2 0,4 0,8				●	●		●		●	●	●	●		
	TCGW 16T304 NU TCGW 16T308 NU	0,4 0,8				●	●				●	●				

## TCMT

● M-Class SumiDia (PCD, NF Type)

Shape	ISO Cat. No.	r	Material													
			Coated			Uncoated										
			BNC100	BNC160	BNC200	CBN								PCD		
			BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200		
	TCMT 090201 NF TCMT 090202 NF TCMT 090204 NF	0,1 0,2 0,4														
	TCMT 110201 NF TCMT 110202 NF TCMT 110204 NF	0,1 0,2 0,4												●	●	●





60° Triangle Type 0° Relief  
With Insert Hole

Dimensions (mm)				
TN...	ℓ	ød (IC)	s	d <sub>1</sub>
1604--	16,5	9,525	4,76	3,81

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal


## TNGA / TNGG

● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)


Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated								PCD			
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200
 Standard - Normal cut geometry with 6 CBN cutting edges	TNGA 160404 NC-6 TNGA 160408 NC-6 TNGA 160412 NC-6	0,4 0,8 1,2	●	●	●	●											
 LS - Type Light cut geometry with 3 CBN cutting edges	TNGA 160404 LS-NC3 TNGA 160408 LS-NC3 TNGA 160412 LS-NC3	0,4 0,8 1,2	●	●	●												
 HS - Type Tough cut geometry with 3 CBN cutting edges	TNGA 160404 HS-NC3 TNGA 160408 HS-NC3 TNGA 160412 HS-NC3	0,4 0,8 1,2		●	●	●											
 SV - Type with chipbreaker with 6 CBN cutting edges	TNGG 160404 N-SV NC6 TNGG 160408 N-SV NC6 TNGG 160412 N-SV NC6	0,4 0,8 1,2			●												

## TNMA

● M-Class SumiBoron (CBN, Regrindable Type)

Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated								PCD			
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200
 TNMA 160404 TNMA 160408		0,4 0,8															

● M-Class SumiBoron (CBN, One-Use Type)

 TNMA 160404 NU TNMA 160408 NU TNMA 160412 NU		0,4 0,8 1,2															
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● = Euro stock

Packing unit and ordering example; 1 pce TNGA 160404 NC-6, BNC160





# SUMIBORON / SUMIDIA Indexable Inserts

VB-- Type 5° and VC-- Type 7° pos. Inserts

35° Diamond Type 5° & 7° Relief  
With Insert Hole

Dimensions (mm)				
VB--	ℓ	ød (IC)	s	d <sub>1</sub>
1102--	11,0	6,35	2,38	2,8
1103--			3,18	
1604--	16,6	9,525	4,76	4,4

**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## VBGW

### ● G-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated											
			BNC100	BNC160	BNC200	CBN								PCD			
			BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200			
Standard - Normal cut geometry	VBGW 110202 NC VBGW 110204 NC VBGW 110208 NC	0,2 0,4 0,8			●												
	VBGW 110202 NU VBGW 110204 NU VBGW 110208 NU	0,2 0,4 0,8															
	VBGW 160402 NU VBGW 160404 NU VBGW 160408 NU	0,2 0,4 0,8															

### ● G-Class SumiBoron (CBN, One-Use Multi-Corner Type)

Shape	ISO Cat. No.	r	Material														
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200
Standard - Normal cut geometry	VBGW 160404 NC-2 VBGW 160408 NC-2	0,4 0,8	●	●	●	●											
<b>New</b> LS - Type Light cut geometry	VBGW 160404 LS-NC2 VBGW 160408 LS-NC2	0,4 0,8	●	●	●												
<b>New</b> HS - Type Tough cut geometry	VBGW 160404 HS-NC2 VBGW 160408 HS-NC2	0,4 0,8			●	●											
	VBGW 160404 NU-2 VBGW 160408 NU-2	0,4 0,8															

## VCMT

### ● M-Class SumiDia (PCD, NF Type)

Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated											
			BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200
	VCMT 110301 NF VCMT 110302 NF VCMT 110304 NF	0,1 0,2 0,4															
	VCMT 160404 NF VCMT 160408 NF VCMT 160412 NF	0,4 0,8 1,2															

● = Euro stock

Packing unit and ordering example; 1 pce VBGW 110202 NC, BNC200

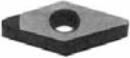
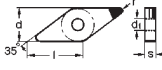
35° Diamond Type 0° Relief  
With Insert Hole

Dimensions (mm)				
VN_	ℓ	ød (IC)	s	d <sub>1</sub>
1604--	16,6	9,925	4,76	3,81

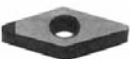
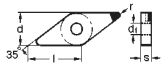
**H** Hardened Steel  
**K** Cast Iron  
**N** Non-Ferrous Metal

## VNMA ○○○○○

● M-Class SumiBoron (CBN, Regrindable Type)


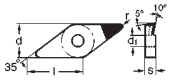
Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated											
			CBN											PCD			
BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200			
 	VNMA 160404 VNMA 160408 VNMA 160412	0,4															
		0,8					●										
		1,2					●			●							

● M-Class SumiBoron (CBN, One-Use Type)

Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated											
			CBN											PCD			
BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200			
 	VNMA 160404 NU VNMA 160408 NU VNMA 160412 NU	0,4															
		0,8					●	●									
		1,2					●	●		●	●						

## VNMX ○○○○○

● M-Class SumiDia (PCD, Regrindable Type)

Shape	ISO Cat. No.	r	Material														
			Coated			Uncoated											
			CBN											PCD			
BNC100	BNC160	BNC200	BNC300	BNX10	BNX20	BNX25	BN250	BN300	BN500	BN600	BN700	BNS800	DA150	DA2200			
 	VNMX 160404 NF VNMX 160408 NF	0,4															
		0,8															●



SumiBoron / SumiDia  
Inserts

● = Euro stock

Packing unit and ordering example; 1 pce VNMA 160404, BNX20

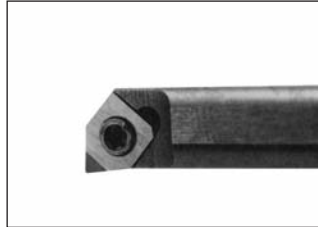




## BNBB

### Small hole boring tools

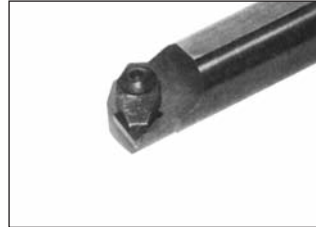
- CBN cutting edge is brazed on to a solid carbide shank.
- Small hole boring for hardened steels.
- Min. boring dia. is  $\varnothing$  3,5 mm.



## 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

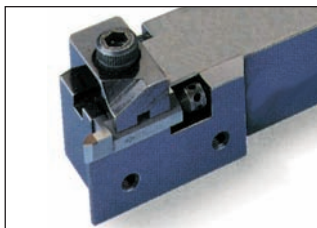
- Solid carbide boring bars with economical CBN and PCD insert.
- Min. boring dia. is  $\varnothing$  10,0 mm.



## GWB

### CBN Grooving System for Hardened Steels

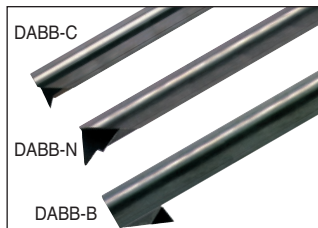
- Tangential Inserts – Double clamp holder
- Groove Widths from 1,5 – 6,0mm
- New CBN grade for interrupted grooving



## 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

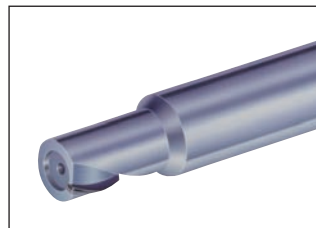
- Small diameter cutter for small machines
- High speed roughing and finishing with SumiDia DA2200
- High speed capability of rpm = 20.000
- Economical PCD insert NF type



## 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

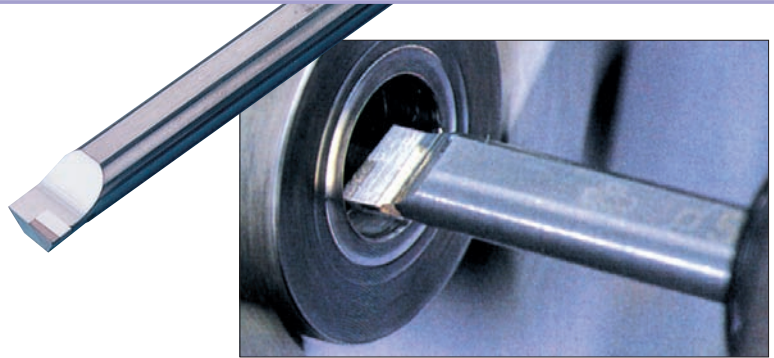
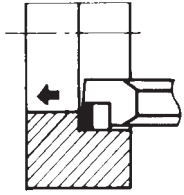
### "Mould Finish Master" Micro Ball Nose Endmills

- 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

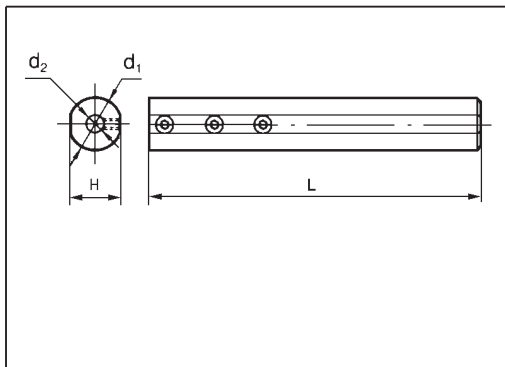
BNBB type small hole boring tools for hardened work pieces up to diameter 3,5 mm



## ■ "Sumiboron" Brazed Boring Tools for Small Hole Boring

	Cat. No.	Stock	Dimensions (mm)					Applicable holder	Grade of brazed cutting edge
			D <sub>min</sub>	d	l <sub>1</sub>	h	r		
<b>BNBB (Carbide shank)</b> 	BNBB 03 R	●	3,5	3	60	2,4	0,2	HBB 316	<b>SUMIBORON (CBN) BN250</b>
	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 <sub>1</sub>	L	d <sub>2</sub>	H
HBB 316	●	16	100	3	15
HBB 416	●			4	
HBB 516	●			5	
HBB 616	●			6	
HBB 816	●			8	

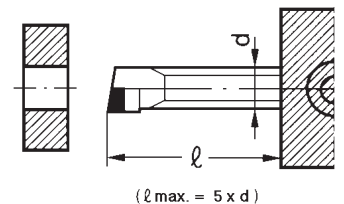
## ■ Spare Parts

Screw	Wrench
BT 0404	TH 020

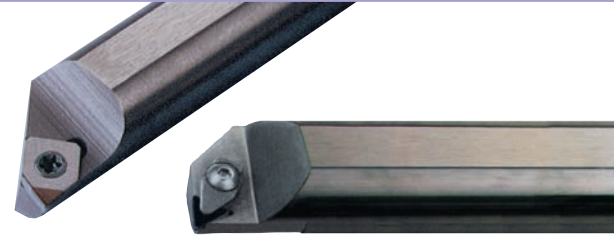
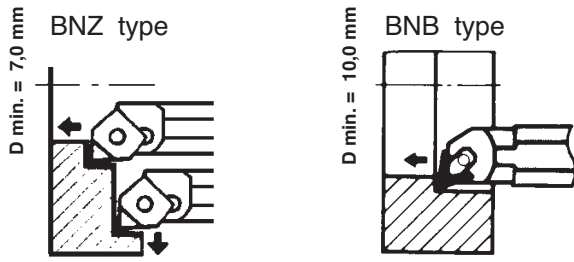
## ■ Recommended Cutting Conditions

Work material	SUMIBORON BN250		Notes
<b>Hardened steels</b> (H <sub>RC</sub> 45~68)	Cutting speed (v <sub>c</sub> )	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 <sub>oc</sub> )	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 <sub>min</sub>	d	l <sub>1</sub>	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		

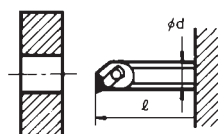
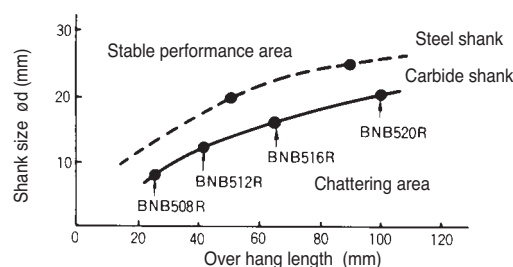
## ■ Spare Parts for BNB

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

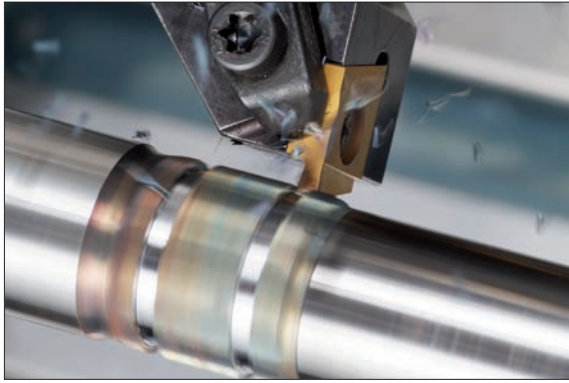
Cutting speed	80 ~ 120 m/min
Feed rate	0,03 ~ 0,1 mm/rev
Depth of cut	0,03 ~ 0,2 mm

## ■ Holders Performance Area



Work material: Alloy steel (H<sub>R</sub>C 60)  
Cutting conditions: v<sub>c</sub> = 100 m/min  
f = 0,1 mm/rev  
d<sub>oc</sub> = 0,2 mm

# SUMIBORON Grooving Tool Holder GWB Type



**New CBN Grooving System for Hardened Steels**

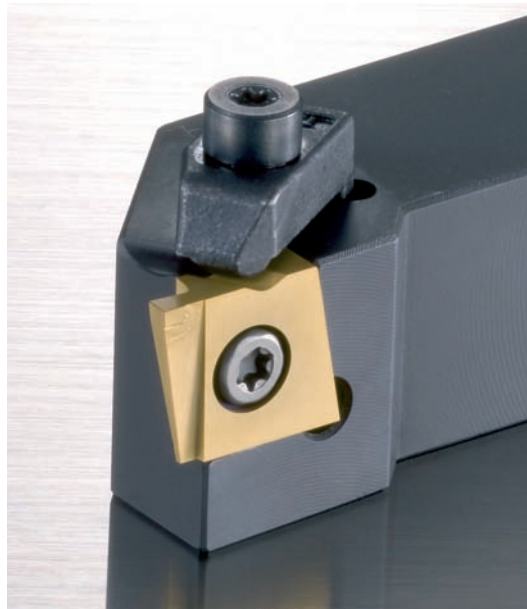
## ■ Features

### Tangential insert

80 degree tangentially mounted insert improves rigidity

### New coated CBN grade BNC30G

Tough new coated CBN grade for interrupted hard grooving



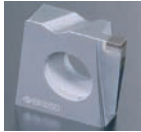
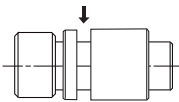

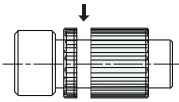
### Double clamping system

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


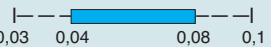
### Wide insert range 1,5 – 6,0mm

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
<b>BNC30G</b> 	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

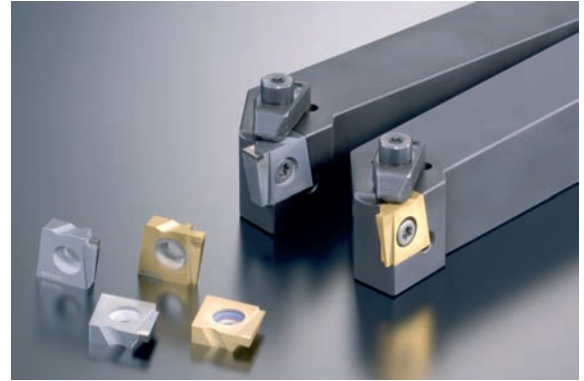
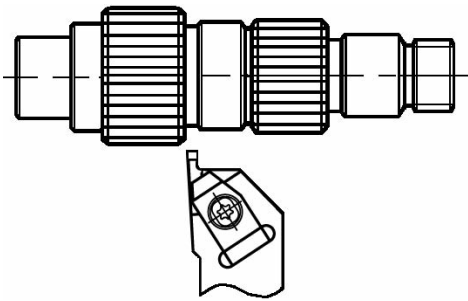
### Coolant:

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 <sub>1</sub>	b	f	l <sub>1</sub>	t <sup>(*)</sup>		ℓ	
	<b>GWB R/L 2020 - 45</b>	○	○	20	25	20	30	150	1,5 < t ≤ 2,0	3,5	CGA R/L 1504 ○○○	
									2,0 < t ≤ 3,0	4,0		
	<b>GWB R/L 2525 - 45</b>	●	●	25	25	25	30	150	1,5 < t ≤ 2,0	3,5		
									2,0 < t ≤ 3,0	4,0		
	<b>GWB R/L 2525 - 60</b>	●	●	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

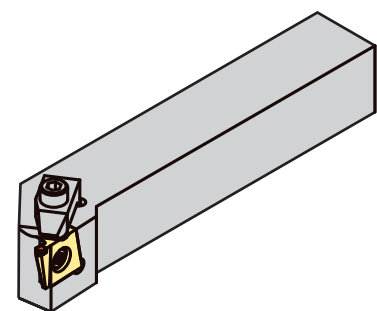
	Cat. No.	Stock				Dimensions (mm)					Applicable Holder
		BN250		BNC30G		t <sup>(*)</sup>	ℓ	r	I.C.	T	
		R	L	R	L						
	<b>CGA R/L 1504 150</b>	●	●	●	●	1,5	3,5	0,2	15,875	4,76	GWB R/L 2020 - 45 GWB R/L 2525 - 45
	<b>CGA R/L 1504 200</b>	●	●	●	●	2,0					
	<b>CGA R/L 1504 250</b>	●	●	●	●	2,5					
	<b>CGA R/L 1504 300</b>	●	●	●	●	3,0					
	<b>CGA R/L 1504 350</b>	●	●	●	●	3,5					
	<b>CGA R/L 1504 400</b>	●	●	●	●	4,0					
	<b>CGA R/L 1504 450</b>	●	●	●	●	4,5					
	<b>CGA R/L 1506 500</b>	●	●	●	●	5,0					
	<b>CGA R/L 1506 550</b>	●	●	●	●	5,5					
	<b>CGA R/L 1506 600</b>	●	●	●	●	6,0	6,35			GWB R/L 2525 - 60	

\* Special widths available on request

● = Euro stock

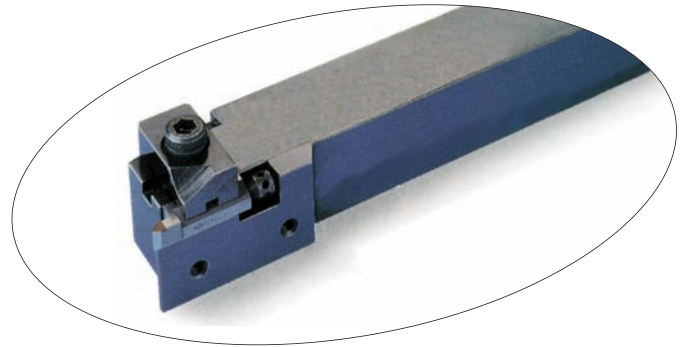
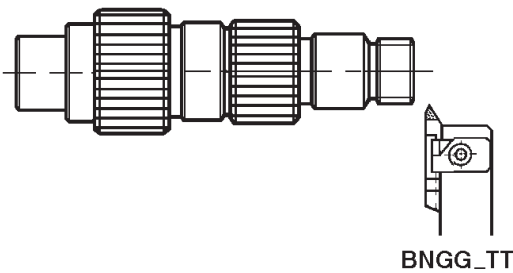
## ■ Spare Parts

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



# SUMIBORON Threading Tool Holder BNGG Type

For Hardened Steel



## ■ "Sumiboron" Holders

	Cat. No.	Stock		Dimensions (mm)			Applicable Insert
		R	L	f	l <sub>2</sub>	l <sub>1</sub>	
	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 <sub>1</sub>	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

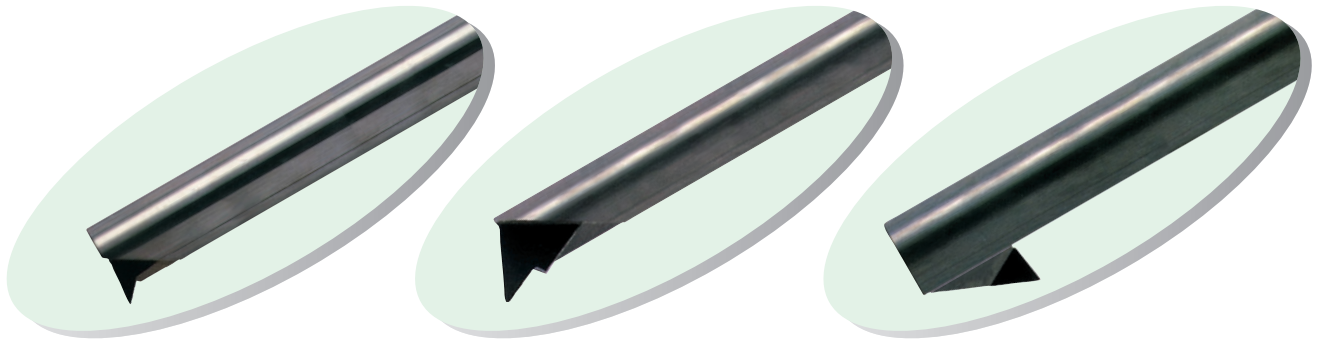
## ■ Spare Parts

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

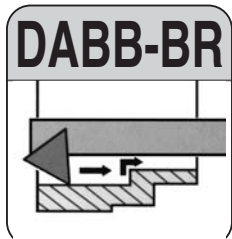
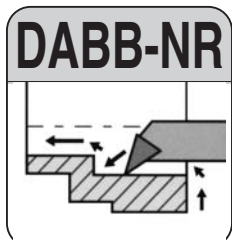
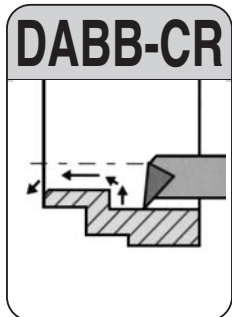
## ■ Recommended Cutting Conditions

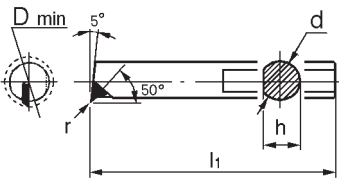
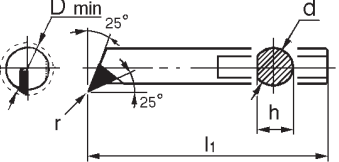
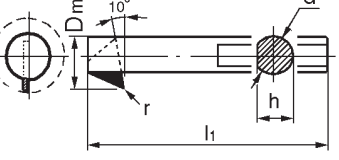
### ● Threading

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



## ■ "Sumidia" Brazed Boring Tools for Small Hole Boring

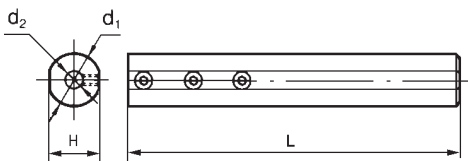


DABB (Solid carbide shank)	Cat. No.	Stock	Dimensions (mm)					Applicable Holder
		DA2200	D <sub>min</sub>	d	l <sub>1</sub>	h	r	
For small boring 	DABB 025 CR	●	3,0	2,5	60	2,2	0,1	HBB 2516
	DABB 035 CR	○	4,0	3,5	60	3,2	0,1	HBB 3516
	DABB 045 CR	●	5,0	4,5	80	4,1	0,1	HBB 4516
	DABB 060 CR		7,0	6,0	80	5,2	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

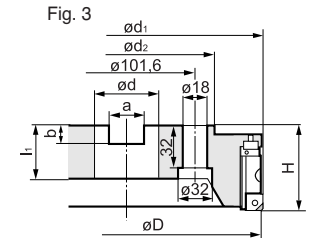
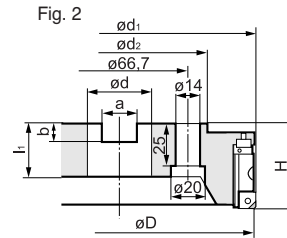
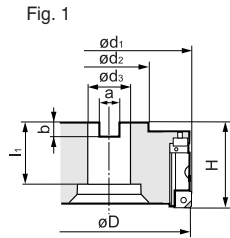
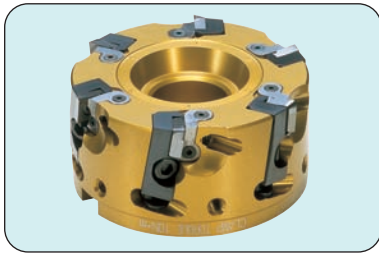
	Cat. No.	Stock	Dimensions (mm)			
			d <sub>1</sub>	L	d <sub>2</sub>	H
	HBB 2516	●	16	100	2,5	15
	HBB 3516	●			3,5	
	HBB 4516	●			4,5	
	HBB 616	●			6,0	

## ■ Spare Parts

Screw	Wrench
 BT 0404	 TH 020

# SUMIDIA Face Mill RF Type

## High Speed Finishing of Aluminium Alloy



### Body

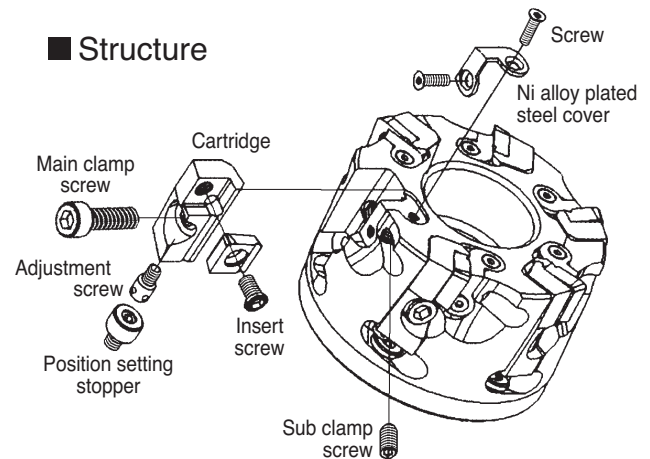
Type	Cat. No.	Stock	Dimensions (mm)				Mounting				Number of teeth	max. depth of cut	Weight (Kg)	Fig.
			$\varnothing D$	$\varnothing d_1$	$\varnothing d_2$	H	$\varnothing d_3$	a	b	$l_1$				
RF 4000	RF 4080 R-S	●	80	82	60	50	27	12,4	7,0	29	6	3,0	0,7	1.
	RF 4100 R-S	●	100	102	75	50	32	14,4	8,5	29	6		1,0	
	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 <b>SDET 1204 ZDFR</b>	H1	●
	PCD insert <b>SNEW 1204 ADFR-NF</b>	DA2200	●
	PCD insert wiper type <b>SNEW 1204 ADFR-W-NF</b>	DA2200	●

### Structure



### "Sumidia" Blade

PCD grade DA2200	Cat. No.	Stock
Standard type	<b>RFB</b>	○
Wiper type	<b>RFBW</b>	○

### Cartridge

Shape	Cat. No.	Stock
For carbide insert	<b>RFR</b>	●
For Sumidia insert	<b>RFF</b>	●

● = 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

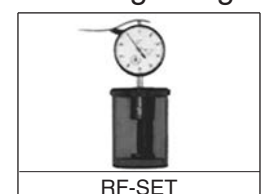
### Dummy Blade

Shape	Cat. No.	Stock
	<b>RFD</b>	○

### 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	BT0510	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

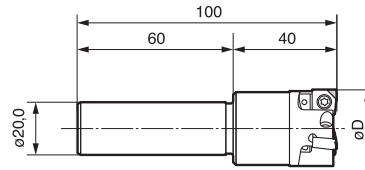
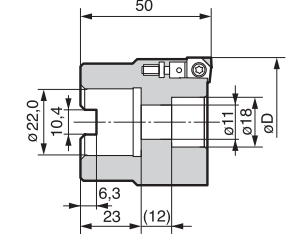


Fig. 2

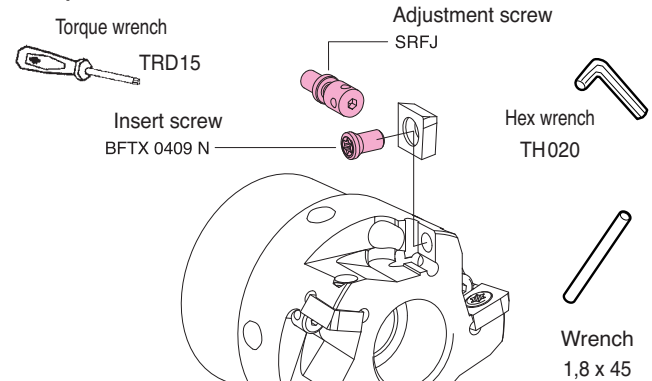


### Body

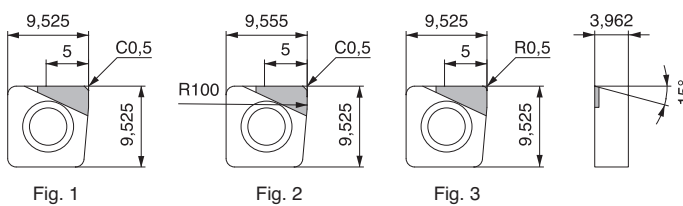
Cat. No.	Stock	$\phi D$ (mm)	No. of teeth	Shape	Weight (Kg)
<b>SRF 30 R-ST</b>	○	30	3	Obr. 1	0,34
<b>SRF 40 R-ST</b>	○	40	4	Obr. 1	0,50
<b>SRF 50 RS</b>	○	50	5	Obr. 2	0,59
<b>SRF 63 RS</b>	○	63	6	Obr. 2	0,67

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.

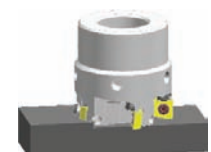
Cat. No.	Cutting Edge	SUMIDIA	Shape
		DA2200	
<b>SNEW 09T3 ADTR-NF</b>	Standard	○	Fig. 1
<b>SNEW 09T3 ADTR-U-NF</b>	Wiper	○	Fig. 2
<b>SNEW 09T3 ADTR-R-NF</b>	Nose Radius	○	Fig. 3

○ = 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

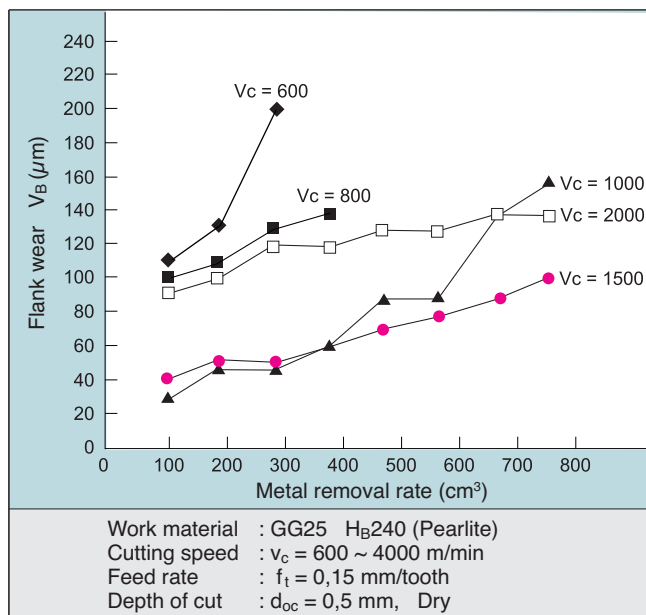
### ■ Recommended Cutting Conditions

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

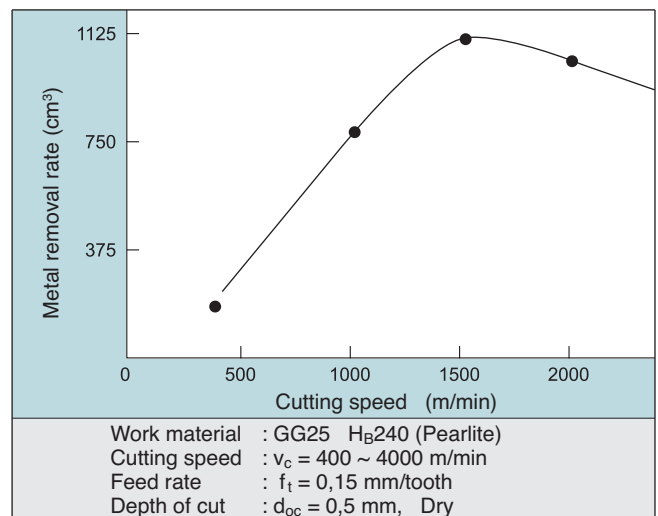


### ■ Performance

#### ● Tool Life Diagram



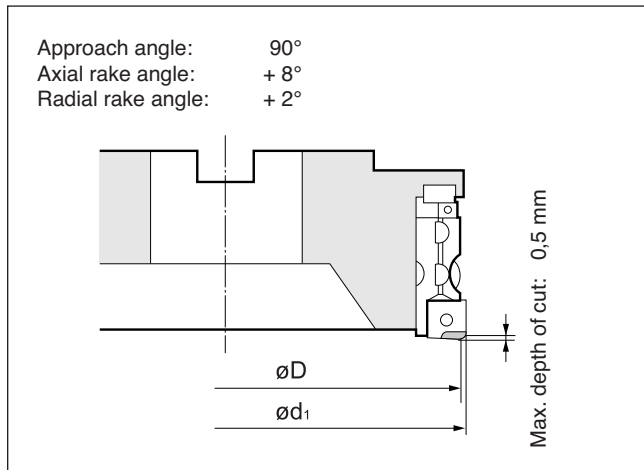
#### ● Estimated Tool Life



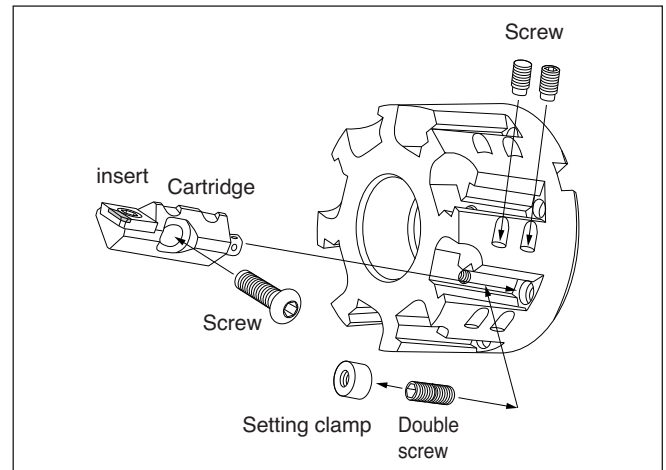
- Milling of ductile cast iron and alloy steel casting do not produce the best results.
- Dry cutting is recommended. Wet cutting will result in chipping of cutting edges in the early stages due to thermal cracking.

# SUMIBORON "BN Finish Mill" FMU Type

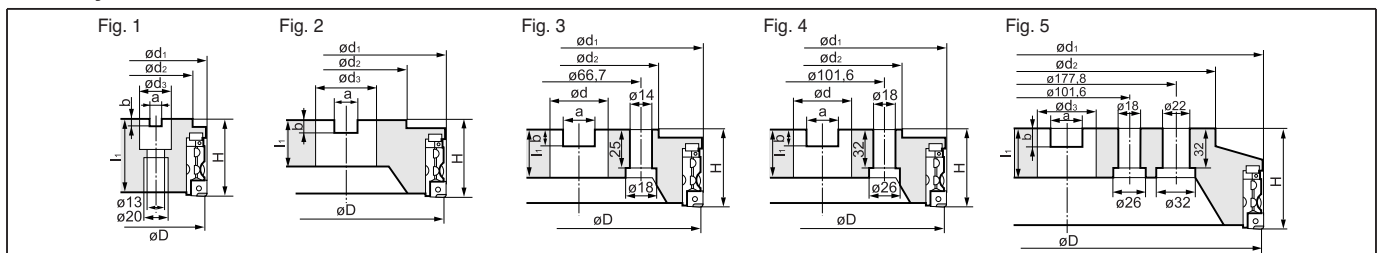
## Specifications



## Structure



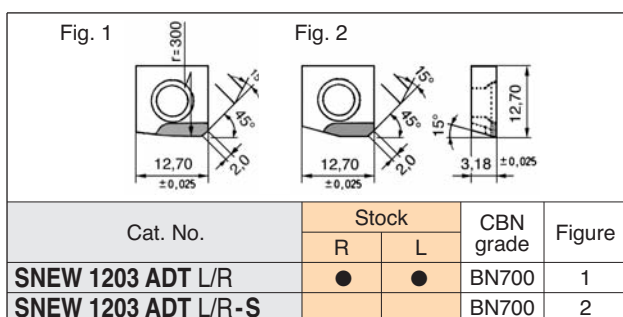
## Body



Type	Cat. No.	Stock		Dimensions (mm)				Mounting				Number of teeth	max. depth of cut	Weight (Kg)	Fig.	
		R	L	ø D	ø d <sub>1</sub>	ø d <sub>2</sub>	H	ø d <sub>3</sub>	a	b	l <sub>1</sub>					
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.		

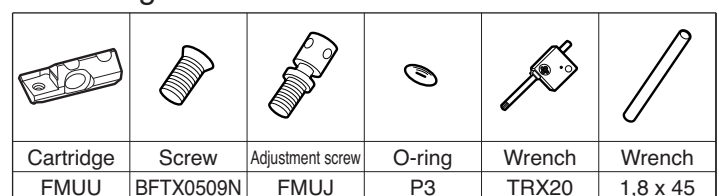
● = Euro stock  
○ = Delivery on request

## Insert

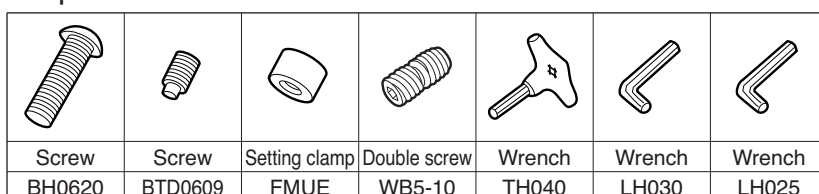


● = Euro stock

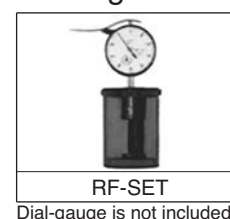
## Cartridge



## Spare Parts

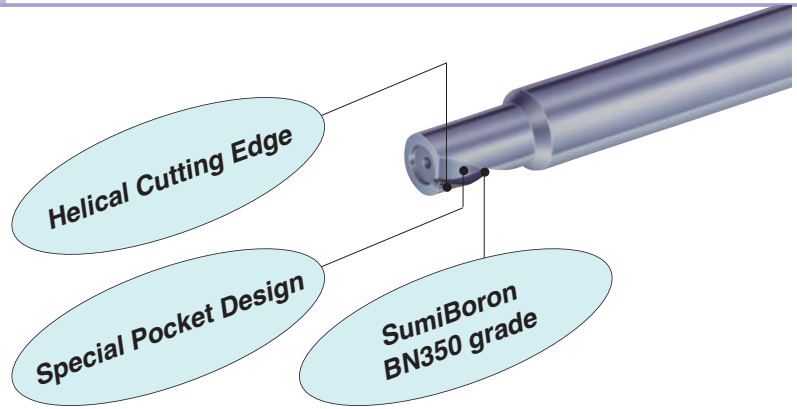


## Gauge



# SUMIBORON "Helical Master" BNES Type

Spiral CBN Endmill for Hardened Steel



## Endmills BNES Type with 1 Spiral Flute

	Cat. No.	Stock	Dimensions (mm)				
		BN350	$\phi D$	$\phi d$	$l_1$	$l_2$	L
	<b>BNES 1060</b>	○	6,0	10	7,0	11	60
	<b>BNES 1080</b>	○	8,0	10	10,0	14	70
	<b>BNES 1100</b>	○	10,0	12	12,0	17	75
	<b>BNES 1120</b>	○	12,0	12	14,0	20	80
	<b>BNES 1140</b>	○	14,0	16	16,0	21,5	80
	<b>BNES 1160</b>	○	16,0	16	18,0	24	80

○ = Delivery on request

## Recommended Cutting Conditions

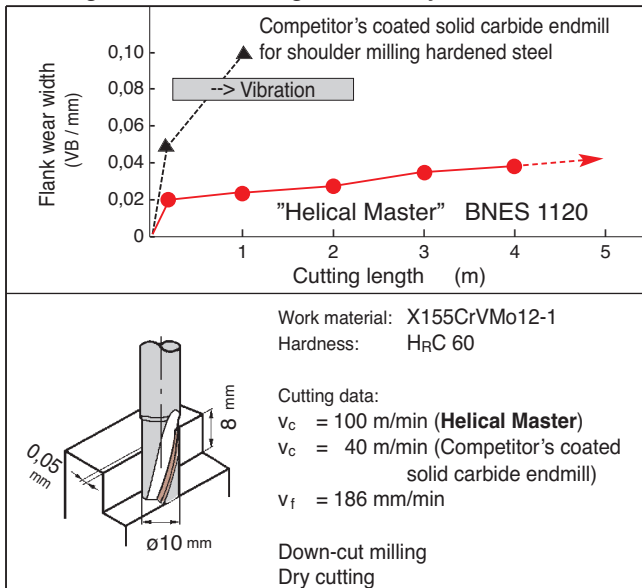
Cutting speed:  $v_c$  (m/min), Spindle revolutions:  $n$  (rpm), Feed per tooth:  $f_t$  (mm/tooth), Feed speed:  $v_f$  (mm/min)

Tooling example	$\phi D$	Hardened steel (H <sub>R</sub> C 50 ~ 57)			Hardened steel (H <sub>R</sub> C 58 ~ 65)		
		$v_c = 100 \sim 170$ m/min			$v_c = 80 \sim 150$ m/min		
<p>Depth of cut : <math>d_{oc} \leq D</math></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

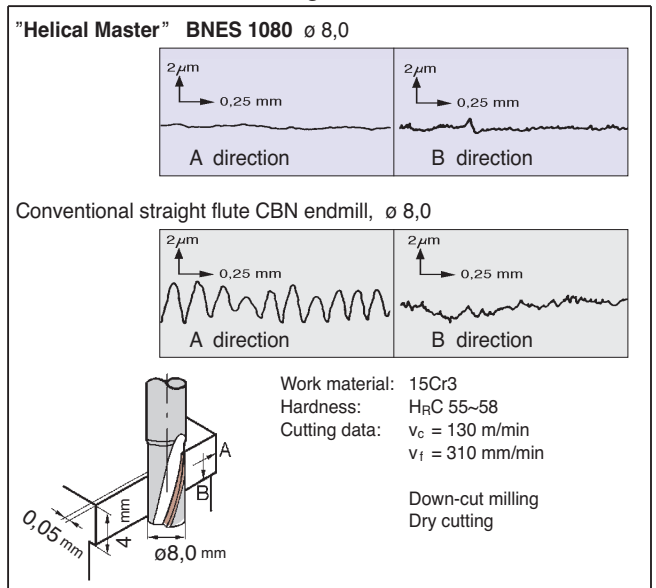
Recommendation: Dry cutting (Air coolant)  
Down-cut milling  
Minimise the overhang  
Use a rigid machine

## Performance

### Long Tool Life and High Efficiency



### Excellent Surface Roughness





### Characteristics / Application

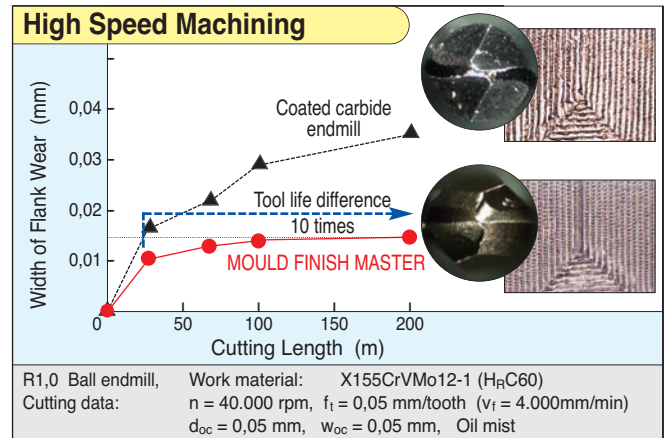
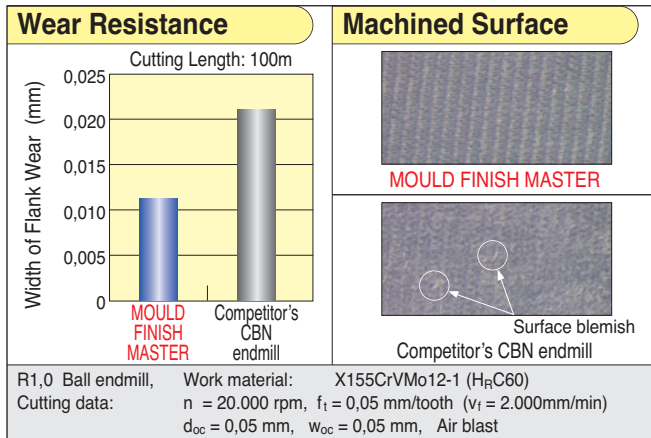
- High precision machining of hardened steels < HRC70 with long tool life
- Super tough grade SUMIBORON BN350 prevents chipping of the cutting edge
- R accuracy :  $\pm 0,005\text{mm}$

### Endmills

Cat. No.	Stock	Dimensions (mm)							
		R	$\phi D$	L	$\phi d_1$	$\phi d$	$l_1$	$l_2$	
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<sub>t</sub> (mm/tooth), Depth of cut: d<sub>oc</sub> (mm), Wide of cut: w<sub>oc</sub> (mm)

Material Cutting data	Pre-hardened steel, Die steel (~ HRC52)				Die steel (~ HRC62)				High speed tool steel (~ HRC70)			
	n (rpm)	f <sub>t</sub> (mm/tooth)	d <sub>oc</sub> (mm)	w <sub>oc</sub> (mm)	n (rpm)	f <sub>t</sub> (mm/tooth)	d <sub>oc</sub> (mm)	w <sub>oc</sub> (mm)	n (rpm)	f <sub>t</sub> (mm/tooth)	d <sub>oc</sub> (mm)	w <sub>oc</sub> (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

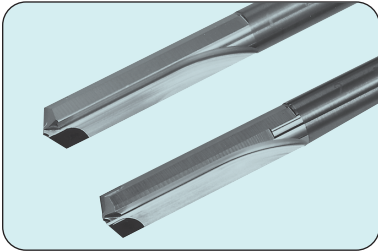
### Important Notes

- (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.



Sumiboron / Sumidra Tools

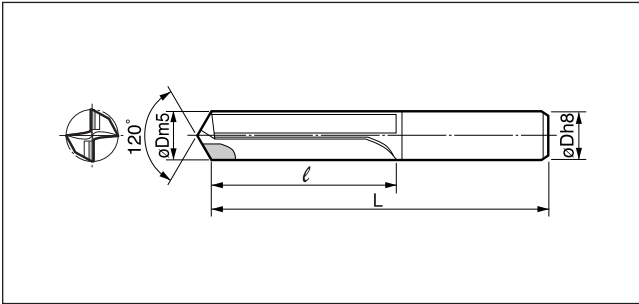
# SUMIDIA Drills DAL/DDL/DML Type



## From general to High Precision Drilling of Aluminum Alloys!

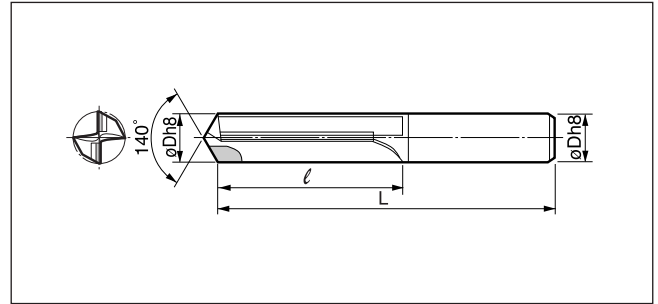
- High precision DAL type is able to produce holes of IT Class of 7~8.
- General DDL type is able to produce holes of IT class of 11~12, mainly for drilling of pre-tap holes.
- DML type is DDL type with a chamfer edge, incorporating 2 processes in one operation.

### ■ DAL Type



Cat. No.	Stock	$\phi D$	L	$\ell$
	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	$\phi D$	L	$\ell$
	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

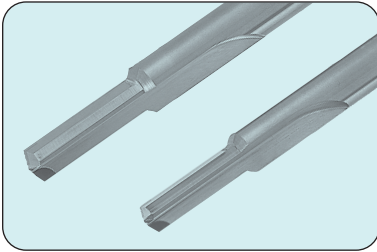
- Select a high rigidity machine and high precision tool holder.
- Enough coolant to drilled hole.

### ■ Application Examples (DAL Type)

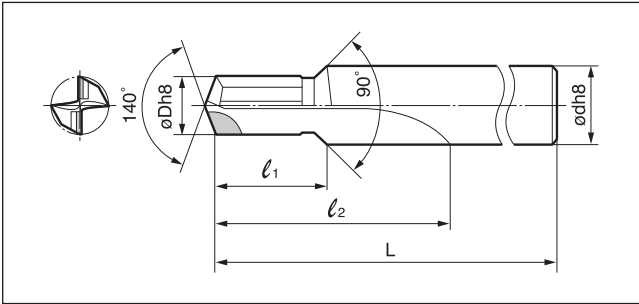
Work Shape	Work	Conditions	Results
	A390 High silicon Aluminum	$V_c=100\text{m/min}$ $f=0,1\text{mm/rev}$	<ul style="list-style-type: none"> <li>• Holes by carbide drill was out of specifications after 2.000 holes/reg.</li> <li>• SumiDia drill could drill up to 30.000 holes/reg.</li> <li>• 15 times tool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

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



## ■ DML Type

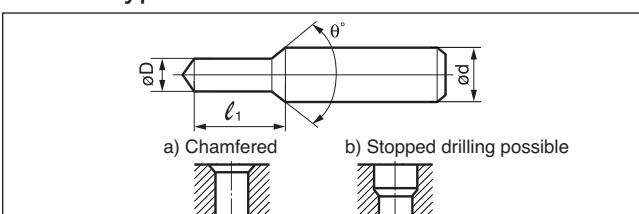


Applicable Tap Size	Cat. No.	Stock	$\phi D$	$\phi d$	L	$l_1$	$l_2$
		DA2200					
M6	<b>DML 050V</b>		5	8	90	18	36
M8	<b>DML 068V</b>		6,8	10	104	24	48
M10	<b>DML 085V</b>		8,5	12	122	30	60
M12	<b>DML 103V</b>		10,3	14	136	36	72

## ■ 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"> <li>• Regrind after 150.000 holes</li> <li>• Tool life for carbide drill is 500 holes.</li> <li>• 30 times tool life that of carbide drills</li> </ul>
	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"> <li>• 100.000 holes/reg (2.000m) and still running.</li> <li>• Drilling and chamfering in the same process</li> </ul>
	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"> <li>• 80.000 holes/reg (1.840m) and still running.</li> <li>• Drilling and chamfering in the same process</li> </ul>

## ■ DML Type Possible Profiles



- (1) Tolerance for dimension L is more than 0,2mm.
- (2)  $\theta^\circ$  is less than  $180^\circ$ .

