

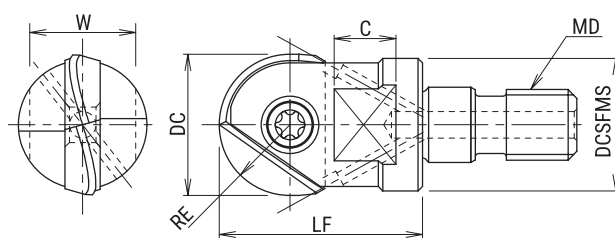
MBX
TYPE**Modular Type**Through
coolant
hole

Slotting

Copy Milling

Pocket Milling

- Ball radius accuracy (with holder): **below ± 0.010 mm.**
Insert ball radius accuracy: **below ± 0.006 mm.**
- O.D. runout (with MSN carbide shank holder): below 0.015 mm.



Cat.No.	Stock	Dimensions (mm)							Parts		Inserts
		DC	RE	LF	DCSFMS	MD	C	W	Screws	Wrench	
MBX-100-M6	●	10	5	18	9.7	M6	6.5	8	FSW-3007H	A-08	BNM-100
MBX-120-M6	●	12	6	20	11.5	M6	6.5	8	KSW-3509	A-15	BNM-120
MBX-160-M8	●	16	8	23	15	M8	8	12	FSW-4013H	A-15	BNM-160
MBX-200-M10	●	20	10	30	19	M10	8	14	FSW-5016H	A-20W	BNM-200
MBX-250-M12	●	25	12.5	35	24	M12	10	17	FSW-6020	A-30	BNM-250
MBX-300-M16	●	30	15	43	29	M16	12.5	22	KSW-8025	A-30	BNM-300/320

Screw	Torque(N.m)
FSW-3007H	1.2
KSW-3509	3.0
FSW-4013H	3.0
FSW-5016H	4.0
FSW-6020	6.0
KSW-8025	6.0

■ Spanner

	Cat.No.	MD	Torque	width across flat	Thickness	Length
	DS-08	M6	8.0 N.m	8	4	85
	DS-12	M8	16 N.m	12	4	93

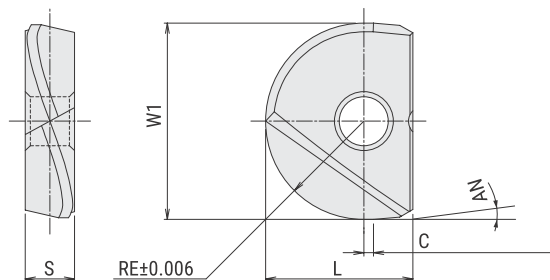
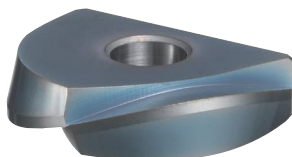
MIRROR BALL

BNM Type

BNM-TG
TYPE

Helical geometry

good for finishing hard material/weld up to 60 HRC

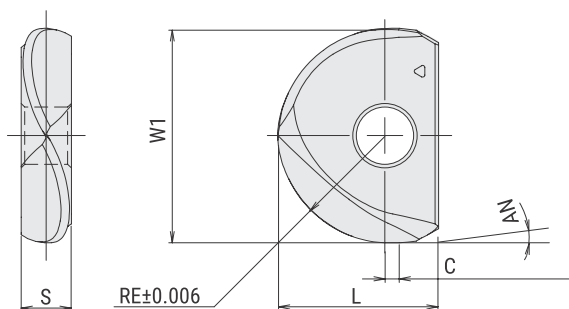
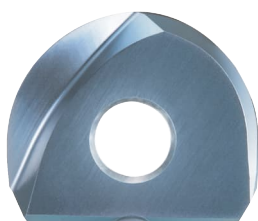
Radius accuracy
 ± 0.006 mm

Cat.No.	PVD Coating	Dimensions(mm)					
	DH102	RE	L	W1	S	C	AN
BNM-060-TG	●	3	5	6	2	—	10°
BNM-080-TG	●	4	7	8	2.4	0.5	5°
BNM-100-TG	●	5	8.5	10	2.6	1	5°
BNM-120-TG	●	6	10	12	3	1.5	5°
BNM-160-TG	●	8	12	16	4	1.5	5°
BNM-200-TG	●	10	15	20	5	2	5°
BNM-250-TG	●	12.5	18.5	25	6	2	5°
BNM-300-TG	○	15	22.5	30	7	2	5°
BNM-320-TG	●	16	32	32	7	2	5°

BNM-TS
TYPE

High Helix geometry

good for semi-finishing & finishing hard materials up to 60HRC

Radius accuracy
 ± 0.006 mm

Cat.No.	PVD Coating	Dimensions(mm)					
	DH102	RE	W1	L	S	C	AN
BNM-060-TS	●	3	6	5	2	—	10°
BNM-080-TS	●	4	8	7	2.4	0.5	5°
BNM-100-TS	●	5	10	8.5	2.6	1	5°
BNM-120-TS	●	6	12	10	3	1.5	5°
BNM-160-TS	●	8	16	12	4	1.5	5°
BNM-200-TS	●	10	20	15	5	2	5°
BNM-250-TS	●	12.5	25	18.5	6	2	5°
BNM-300-TS	○	15	30	22.5	7	2	5°
BNM-320-TS	●	16	32	23.5	7	2	5°

BNM-SS
TYPE**Sharp Helical geometry**

good for finishing and semi finishing general steel , mold steel & stainless steel

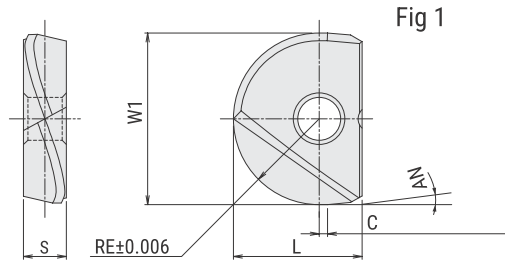
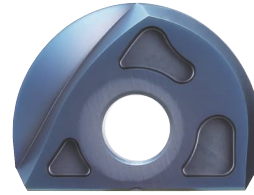
Radius accuracy
 ± 0.006 mm

Fig 1

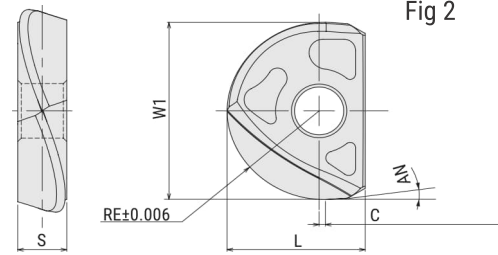


Fig 2

Cat.No.	PVD Coating		Dimensions(mm)						Fig.
	DH108	DS108	RE	L	W1	S	C	AN	
BNM-060-SS	●	●	3	5	6	2	—	10°	1
BNM-080-SS	●	●	4	7	8	2.4	0.5	5°	1
BNM-100-SS	●	●	5	8.5	10	2.6	1	5°	1
BNM-120-SS	●	●	6	10	12	3	1	5°	1
BNM-160-SS	●	●	8	12	16	4	1	5°	1
BNM-200-SS	●	●	10	15	20	5	1	5°	2
BNM-250-SS	●	●	12.5	18.5	25	6	1	5°	2
BNM-300-SS	○	○	15	22.5	30	7	1	5°	2
BNM-320-SS	●	●	16	23.5	32	7	1	5°	2

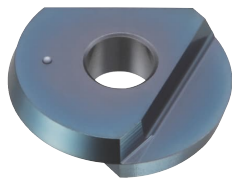
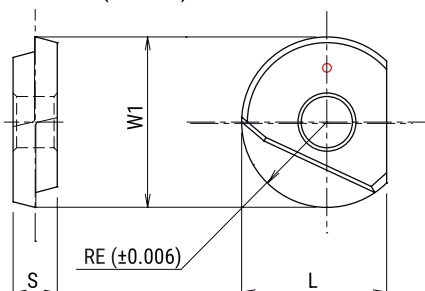
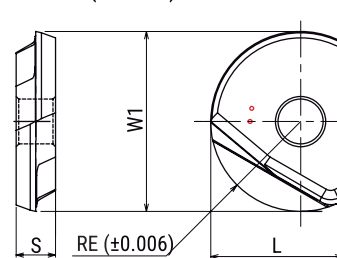
MIRROR BALL

BNM Type

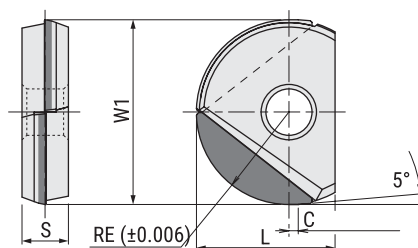
BNM
TYPE

Neutral style geometry

strictly for finishing applications

Radius accuracy
 ± 0.006 mm● DH111 ($W1 \leq 10$)● DH111 ($W1 \geq 12$)

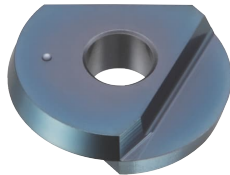
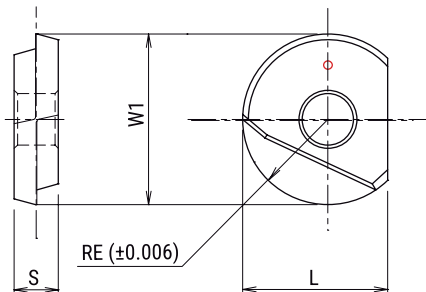
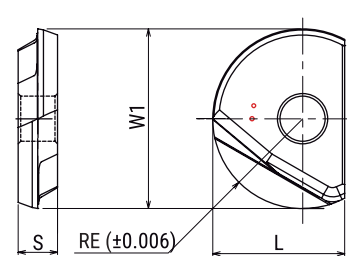
● CBN



Cat.No.	PVD Coating	CBN	Dimensions(mm)				
	DH111	JBN245	RE	W1	L	C	S
BNM-060	●		3	6	5	—	2
BNM-080	●		4	8	7	—	2.4
BNM-100	●		5	10	8.5	—	2.6
BNM-120	●		6	12	10	—	3
BNM-160	●	○	8	16	12	0.8	4
BNM-200	●	○	10	20	15	1	5
BNM-250	●	○	12.5	25	18.5	1	6
BNM-300	○	○	15	30	22.5	1	7
BNM-320	●		16	32	23.5	—	7

BNM
TYPE**Neutral style geometry**

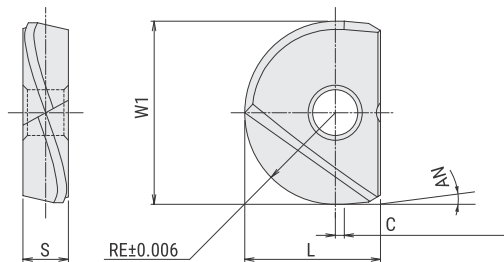
good for semi-finishing & finishing non-ferrous metals such as aluminium, copper

Radius accuracy
 ± 0.006 mm $W1 \leq 10$  $W1 \geq 12$ 

Cat.No.	Diamond Coating	Uncoated	Dimensions(mm)				
	JC10000	KT9	RE	W1	L	C	S
BNM-060	○	●	3	6	5	—	2
BNM-080	○	●	4	8	7	—	2.4
BNM-100	○	●	5	10	8.5	—	2.6
BNM-120	○	●	6	12	10	—	3
BNM-160	○	●	8	16	12	0.8	4
BNM-200	○	●	10	20	15	1	5

BNM-S
TYPE**Sharp Helical geometry**

good for semi-finishing & finishing non-ferrous metals such as aluminium, copper

Radius accuracy
 ± 0.006 mm

Cat.No.	Uncoated	DLC Coating	Dimensions (mm)					
	FZ05	JC20003	RE	L	W1	S	C	AN
BNM-060-S	●	○	3	5	6	2	—	10°
BNM-080-S	●	○	4	7	8	2.4	0.5	5°
BNM-100-S	●	○	5	8.5	10	2.6	1	5°
BNM-120-S	●	○	6	10	12	3	1	5°
BNM-160-S	●	○	8	12	16	4	1	5°
BNM-200-S	●	○	10	15	20	5	1	5°
BNM-250-S	○	○	12.5	18.5	25	6	1	5°
BNM-300-S	○	○	15	22.5	30	7	1	5°

■ Controlled Torque Wrenches (with replaceable blade)

Wrenches are pre-set to protect screws and bodies against damage during both the tightening and loosening process



● Controlled Torque Wrenches (with replaceable blade)

Cat. No.	Torque(N.m)	crew torque	Replacement blade	Applicable inserts
TQC-06	T6	0.5Nm	B-06	BNM-060... HRM-060..., FRM-060...
TQC-07	T7	0.9Nm	B-07	BNM-080... RNM-080..., HRM-080/090..., FRM-080...
TQC-08	T8	1.2Nm	B-08	BNM-100... RNM-100..., HRM-100/110..., FRM-100...
TQC-10	T10	2.0Nm	B-10	BNM-120... RNM-120..., HRM-120/130..., FRM-120/130...

Insert Mounting Information

1. Make sure the insert seat on body is carefully cleaned.
2. Make sure insert itself is clean, especially hole and face location.
3. Change insert screw when threads start to wear. (approximately every 10-15 inserts)
4. Do not over tighten screw, see table for torque specifications.

■ Grade Selection Guide

Material	BNM				BNM-S		BNM-SS		BNM-TG	BNM-TS
	DH111	JC10000	KT9	JBN245	FZ05	JC20003	DH108	DS108	DH102	DH102
Carbon steel below 250HB	◎☆						◎			
Tool & Die steel below 255HB	◎☆						◎			
Mold steel 30 - 36HRC	○						◎			
Mold steel 38 - 43HRC	○						◎			
Hardened die steel 42 - 52HRC	○						◎		○	○
Hardened die steel 55 - 62HRC							○		◎	◎
HSS 63 - 70HRC									◎	◎
Grey cast iron 160 - 260HB	○			★			○		◎	◎
Nodular cast iron 170 - 300HB	○			★			○		◎	◎
Austenitic stainless steel (304,316,317) 17Cr	◎☆						◎			
Ferritic & martensitic stainless steel (403,420J2,430) 13Cr	◎☆						◎			
Aluminium alloy (A5052)			◎		◎	◎				
Aluminium alloy (A7075)			◎		◎	◎				
Aluminium alloy Si below 13%			◎		◎	◎				
Copper alloy (C1100)			◎		◎	◎				
Graphite		○				◎				
Titanium alloy (Ti-6Al-4V) 35 - 43HRC	◎☆						◎	◎		
Heat resistant alloy (INCO718) 35 - 43HRC	◎☆						◎			

◎ : First choice ○ : Second choice ☆ : Wet cutting ★ : High speed machining

■ Recommended Cutting Conditions | BNM / BNM-SS / BNM-TS / BNM-TG type

Material	Grade		Tool dia. (mm)								
			6	8	10	12	16	20	25	30	32
Carbon steel below 250HB	BNM (DH111) BNM-SS (DH108)	<i>n</i> (min ⁻¹)	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
		<i>Vf</i> (mm/min)	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
		<i>ap</i> (mm)	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		<i>ae</i> (mm)	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Tool & Die steel below 255HB	BNM (DH111) BNM-SS (DH108)	<i>n</i> (min ⁻¹)	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
		<i>Vf</i> (mm/min)	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
		<i>ap</i> (mm)	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		<i>ae</i> (mm)	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Mold steel 30 - 36HRC	BNM (DH111) BNM-SS (DH108)	<i>n</i> (min ⁻¹)	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
		<i>Vf</i> (mm/min)	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
		<i>ap</i> (mm)	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		<i>ae</i> (mm)	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Mold steel 38 - 43HRC	BNM (DH111) BNM-SS (DH108)	<i>n</i> (min ⁻¹)	15,920	11,940	11,140	9,280	7,960	6,370	5,730	4,770	4,480
		<i>Vf</i> (mm/min)	3,180	2,390	3,340	2,780	3,980	3,820	3,440	2,860	2,690
		<i>ap</i> (mm)	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		<i>ae</i> (mm)	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Hardened die steel 42 - 52HRC	BNM (DH111) BNM-SS (DH108)	<i>n</i> (min ⁻¹)	13,260	9,950	9,550	7,960	6,960	5,570	5,090	4,240	3,980
		<i>Vf</i> (mm/min)	2,650	1,990	2,870	2,390	3,480	3,340	3,050	2,540	2,390
		<i>ap</i> (mm)	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		<i>ae</i> (mm)	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Hardened die steel 55 - 62HRC	BNM-TG (DH102) BNM-TS (DH102)	<i>n</i> (min ⁻¹)	10,610	7,960	7,960	6,630	5,970	4,770	4,460	3,710	3,480
		<i>Vf</i> (mm/min)	2,120	1,590	2,390	1,990	2,990	2,860	2,680	2,230	2,090
		<i>ap</i> (mm)	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		<i>ae</i> (mm)	0.1	0.15	0.15	0.2	0.25	0.3	0.4	0.5	0.5
HSS 63 - 70HRC	BNM-TG (DH102) BNM-TS (DH102)	<i>n</i> (min ⁻¹)	7,960	5,970	6,370	5,310	4,970	3,980	3,820	3,180	2,980
		<i>Vf</i> (mm/min)	1,590	1,190	1,270	1,060	1,490	1,190	1,530	1,270	1,190
		<i>ap</i> (mm)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
		<i>ae</i> (mm)	0.05	0.1	0.1	0.1	0.1	0.15	0.2	0.3	0.3
Grey & Nodular cast iron below 300 HB	BNM (DH111) BNM-TG BNM-TS (DH102)	<i>n</i> (min ⁻¹)	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
		<i>Vf</i> (mm/min)	7,430	5,570	6,370	5,310	6,270	5,730	5,100	4,250	3,980
		<i>ap</i> (mm)	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		<i>ae</i> (mm)	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Stainless steel	BNM (DH111) BNM-SS (DH108)	<i>n</i> (min ⁻¹)	18,570	13,930	12,730	10,610	8,950	7,160	6,370	5,310	4,970
		<i>Vf</i> (mm/min)	5,570	4,180	5,090	4,240	5,370	5,010	4,460	3,720	3,480
		<i>ap</i> (mm)	0.1	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		<i>ae</i> (mm)	0.1	0.15	0.2	0.2	0.25	0.3	0.4	0.5	0.5
Titanium alloy (Ti-6Al-4V)	BNM (DH111) BNM-SS (DS108)	<i>n</i> (min ⁻¹)	10,610	7,960	9,550	7,960	5,970	4,770	4,460	3,710	3,480
		<i>Vf</i> (mm/min)	3,180	2,390	3,820	3,180	2,990	2,860	2,680	2,230	2,090
		<i>ap</i> (mm)	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		<i>ae</i> (mm)	0.1	0.15	0.15	0.2	0.25	0.3	0.4	0.5	0.5
Heat resistant alloy (INCO718)	BNM (DH111) BNM-SS (DS108)	<i>n</i> (min ⁻¹)	7,960	5,970	6,370	5,310	4,970	3,980	3,820	3,180	2,980
		<i>Vf</i> (mm/min)	1,590	1,190	1,910	1,590	1,990	1,590	1,530	1,270	1,190
		<i>ap</i> (mm)	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		<i>ae</i> (mm)	0.1	0.1	0.1	0.1	0.1	0.15	0.2	0.3	0.3

Note) 1. Please adjust cutting conditions according to machine rigidity or work rigidity.
 2. These cutting conditions represent stable machining at length 3 x Dc.
 Please adjust cutting conditions according to overhang length.
 3. In case of chatter occurring, recommended to reduce ap or feed.
 4. Use air blow.

Overhang length	n (min ⁻¹)	Vf (mm/min)
~3Dc	100%	100%
3Dc~5Dc	70%	70%
5Dc~10Dc	50%	50%

■ Recommended Cutting Conditions | BNM (CBN) type

Material	Cat.No	Grade		Tool dia.(mm)			
				16	20	25	30
Grey cast iron 160- 260 HB	BNM	JBN245	n (min ⁻¹)	23,870	19,100	15,280	12,730
			Vf (mm/min)	11,940	11,460	9,170	8,910
			ap (mm)	0.05	0.05	0.05	0.05
			ae (mm)	0.25	0.3	0.4	0.5
Nodular cast iron 170- 300 HB	BNM	JBN245	n (min ⁻¹)	19,890	15,920	12,730	10,610
			Vf (mm/min)	7,960	7,960	6,370	6,370
			ap (mm)	0.05	0.05	0.05	0.05
			ae (mm)	0.25	0.3	0.4	0.5

Note

1. These cutting conditions represent on high speed machine.
2. These cutting conditions represent stable machining at length 3 x Dc.
Please adjust cutting conditions according to overhang length.
3. Use carbide shank holder.
4. For better surface finish , mist coolant is recommended.
5. Plunging is not recommended.
- 6 Please keep the stock uniform by pre-machining.

Overhang length	n (min ⁻¹)	Vf (mm/min)
~3Dc	100%	100%
3Dc~5Dc	70%	70%
5Dc~10Dc	50%	50%

■ Recommended Cutting Conditions | BNM / BNM-S type

Material	Cat.No	Grade		Tool dia.(mm)					
				6	8	10	12	16	20
Aluminium	BNM BNM-S	KT9 FZ05 JC20003	n (min ⁻¹)	23,870	17,900	15,920	13,260	10,940	8,750
			Vf (mm/min)	9,550	7,160	7,960	6,630	7,660	7,000
			ap (mm)	0.2	0.2	0.25	0.25	0.25	0.25
			ae (mm)	0.1	0.15	0.2	0.2	0.25	0.3
Copper alloy	BNM BNM-S	KT9 FZ05 JC20003	n (min ⁻¹)	23,870	17,900	15,920	13,260	10,940	8,750
			Vf (mm/min)	9,550	7,160	7,960	6,630	7,660	7,000
			ap (mm)	0.15	0.15	0.2	0.2	0.2	0.2
			ae (mm)	0.1	0.15	0.2	0.2	0.25	0.3
Graphite	BNM BNM-S	JC10000 JC20003	n (min ⁻¹)	23,870	17,900	15,920	13,260	10,940	8,750
			Vf (mm/min)	9,550	7,160	7,960	6,630	7,660	7,000
			ap (mm)	0.15	0.15	0.2	0.2	0.2	0.2
			ae (mm)	0.1	0.15	0.2	0.2	0.25	0.3

- Note) 1. Please adjust cutting conditions according to machine rigidity or work rigidity.
 2. These cutting conditions represent stable machining at length 3 x Dc.
 Please adjust cutting conditions according to overhang length.
 3. In case of chatter occurring, recommended to reduce ap or feed.
 4. Use air blow.

Overhang length	n (min ⁻¹)	Vf (mm/min)
~3Dc	100%	100%
3Dc~5Dc	70%	70%
5Dc~10Dc	50%	50%