

2 Flutes HMGCOAT for Hard Materials



Size **R0.05~R3**

HGB

Super
MG

HMG
COAT

30°

R
±0.002

R
±0.003

R
±0.005

Shank Dia
0/-0.004

R0.05~R0.075 R0.1~R2 R2.5~R3

Material Applications (★ Highly Recommended ● Recommended ○ Suggested)

Work Material																	
Carbon Steels S45C S55C	Alloy Steels SK / SCM SUS	Prehardened Steels NAK HPM	Hardened Steels					Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
			~50HRC	~55HRC	~60HRC	~65HRC	~70HRC										
		○	●	●	●	★	★										

Features

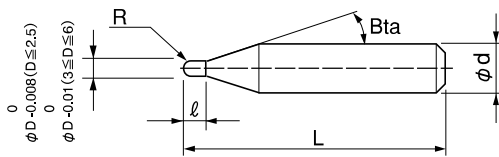
Newly developed "HMGCOAT", carbide grade and tool shape offer higher wear/chipping resistance as compared to conventional tools.

Achieves longer tool life and highly precise milling on hard materials.

High Precision Diameter Tolerance / Radius Accuracy / Shank Diameter Tolerance

Radius of Ball Nose	Diameter Tolerance	Ball Radius Accuracy	Shank Diameter Tolerance
R0.05 ~ R0.075	0/-0.008	±0.002	0/-0.004 (h4)
R0.1 ~ R1.25		±0.003	
R1.5 ~ R2	0/-0.01	±0.005	
R2.5 ~ R3			

Shank diameter tolerance h4!



The shank taper angle shown is not an exact value and to avoid contact with the workpiece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

Ball series for Steels

(★ Highly Recommended ● Recommended ○ Suggested)

Number of Flutes	Model Number	Features	Ball tip design	Copper	Carbon Steels	Pre hardened Steels	HARDENED STEELS					Alloy Steels	Aluminum Alloys	Plastics	Titanium Heat Resistant Alloys	Page
							~ 50 HRC	~ 55 HRC	~ 60 HRC	~ 65 HRC	~ 70 HRC					
2 Flutes	HGB	Best suited for Hard Materials	Super Negative			○	●	●	●	★	★					422
	HSB	For Hard Materials	Negative	○	○	●	●	●	○			○			○	424 428
	HSB-S															
	HBL	Multi-purpose	Positive	●	○	●	●	○				○			○	430
	CSEB	Multi-purpose Excellent surface quality	Standard	●	●	●	●					●	●		○	432
3 Flutes	CFB	Multi-purpose Excellent surface quality	Positive	●	●	●	●					●	●	○	●	442
4 Flutes	HFB	For Hard Materials	Negative				●	●	●	●	●					452 453
	HFB-S															

Total 20 models

Unit (mm)

Model Number	Radius of Ball Nose R	Length of Cut ℓ	Shank Taper Angle $B\alpha$	Overall Length L	Shank Diameter ϕd	Suggested Retail Price ¥
HGB 2001-0010	R0.05	0.1	16°	50	4	12,960
HGB 20015-0015	R0.075	0.15	16°	50	4	12,600
HGB 2002-0030	R0.1	0.3	16°	50	4	9,120
HGB 2003-0030	R0.15	0.3	16°	50	4	7,440
HGB 2003-0045		0.45		50	4	7,440
HGB 2004-0040	R0.2	0.4	16°	50	4	5,040
HGB 2004-0060		0.6		50	4	5,040
HGB 2005-0050	R0.25	0.5	16°	50	4	4,680
HGB 2005-0075		0.75		50	4	4,680
HGB 2006-0060	R0.3	0.6	16°	50	4	4,560
HGB 2006-0090		0.9		50	4	4,560
HGB 2008-0120	R0.4	1.2	16°	50	4	4,560
HGB 2010-0150	R0.5	1.5	16°	50	4	4,150
HGB 2015-0225	R0.75	2.25	16°	50	4	5,040
HGB 2020-0300	R1	3	16°	50	4	3,720
HGB 2025-0375	R1.25	3.75	16°	50	4	6,370
HGB 2030-0450	R1.5	4.5	16°	50	6	4,560
HGB 2040-0600	R2	6	16°	50	6	5,160
HGB 2050-0750	R2.5	7.5	16°	50	6	6,240
HGB 2060-0900	R3	9	—	50	6	6,480

$\phi 3$ mm Shank V Series

UDC-PCD Series

CBN Series

Square

Long Neck Square

Radius

Long Neck Radius

Taper Neck Radius

Ball / Long Shank Ball

Long Neck Ball

Taper Neck Ball

Taper

Barrel

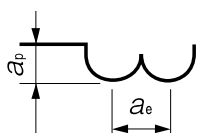
Spiral V Cutter

Drill

Technical Data

Milling Conditions for HGB

WORK MATERIAL			PREHARDENED STEELS HARDENED STEELS NAK / STAVAX (~55HRC)				HARDENED STEELS SKD11 (55~62HRC)				HARDENED STEELS HAP10 (62~66HRC)				HARDENED STEELS HAP72 (66~70HRC)			
Model Number	Radius of Ball Nose (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
2001-0010	R0.05	0.1	48,000	200	0.005	0.01	48,000	200	0.005	0.01	48,000	150	0.003	0.006	40,000	120	0.002	0.004
20015-0015	R0.075	0.15	48,000	230	0.007	0.014	48,000	230	0.007	0.014	48,000	170	0.005	0.01	40,000	135	0.003	0.006
2002-0030	R0.1	0.3	44,000	250	0.01	0.03	42,000	250	0.01	0.03	40,000	200	0.008	0.024	36,000	150	0.006	0.018
2003-0030	R0.15	0.3	44,000	400	0.01	0.03	42,000	350	0.01	0.03	40,000	300	0.01	0.03	36,000	250	0.008	0.024
2003-0045		0.45	44,000	400	0.01	0.03	42,000	350	0.01	0.03	40,000	300	0.01	0.03	36,000	250	0.008	0.024
2004-0040	R0.2	0.4	44,000	600	0.015	0.045	42,000	550	0.015	0.045	40,000	500	0.013	0.036	36,000	350	0.01	0.027
2004-0060		0.6	44,000	600	0.015	0.045	42,000	550	0.015	0.045	40,000	500	0.013	0.036	36,000	350	0.01	0.027
2005-0050	R0.25	0.5	44,000	900	0.02	0.065	40,000	800	0.015	0.05	36,000	600	0.015	0.05	30,000	400	0.015	0.03
2005-0075		0.75	44,000	900	0.02	0.065	40,000	800	0.015	0.05	36,000	600	0.015	0.05	30,000	400	0.015	0.03
2006-0060	R0.3	0.6	40,000	1,400	0.045	0.15	36,000	1,200	0.025	0.13	32,000	1,000	0.02	0.1	25,000	600	0.02	0.1
2006-0090		0.9	40,000	1,400	0.045	0.15	36,000	1,200	0.025	0.13	32,000	1,000	0.02	0.1	25,000	600	0.02	0.1
2008-0120	R0.4	1.2	35,000	1,600	0.06	0.21	30,000	1,600	0.04	0.17	26,000	1,350	0.04	0.15	20,000	700	0.02	0.12
2010-0150	R0.5	1.5	30,000	1,750	0.2	0.4	24,000	2,000	0.1	0.3	21,000	1,750	0.05	0.2	16,000	875	0.05	0.2
2015-0225	R0.75	2.25	30,000	2,450	0.25	0.55	17,000	2,000	0.12	0.4	15,000	1,750	0.06	0.29	11,250	875	0.06	0.29
2020-0300	R1	3	28,000	2,900	0.3	0.7	14,000	2,100	0.15	0.5	14,700	2,160	0.1	0.35	11,040	1,080	0.08	0.35
2025-0375	R1.25	3.75	24,500	2,950	0.35	0.85	12,250	2,150	0.17	0.6	12,840	2,220	0.12	0.45	9,660	1,110	0.1	0.45
2030-0450	R1.5	4.5	21,000	3,000	0.4	1	10,500	2,200	0.2	0.7	11,040	2,280	0.15	0.55	8,280	1,140	0.12	0.55
2040-0600	R2	6	18,000	3,200	0.5	1.3	9,000	2,300	0.25	0.95	9,480	2,400	0.18	0.75	7,080	1,200	0.15	0.75
2050-0750	R2.5	7.5	15,600	3,500	0.5	1.5	7,800	2,500	0.25	1.05	8,160	2,520	0.2	0.85	6,120	1,260	0.15	0.85
2060-0900	R3	9	13,000	3,500	0.6	1.8	6,500	2,500	0.3	1.3	6,840	2,640	0.25	1	5,000	1,500	0.2	1



Note:

- Decrease the feed rate more than 50% from the milling parameters when slot milling.
- Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machines maximum speed, or when the tool is chattering and heats up to a red color.
- Every coolant offers stable milling.