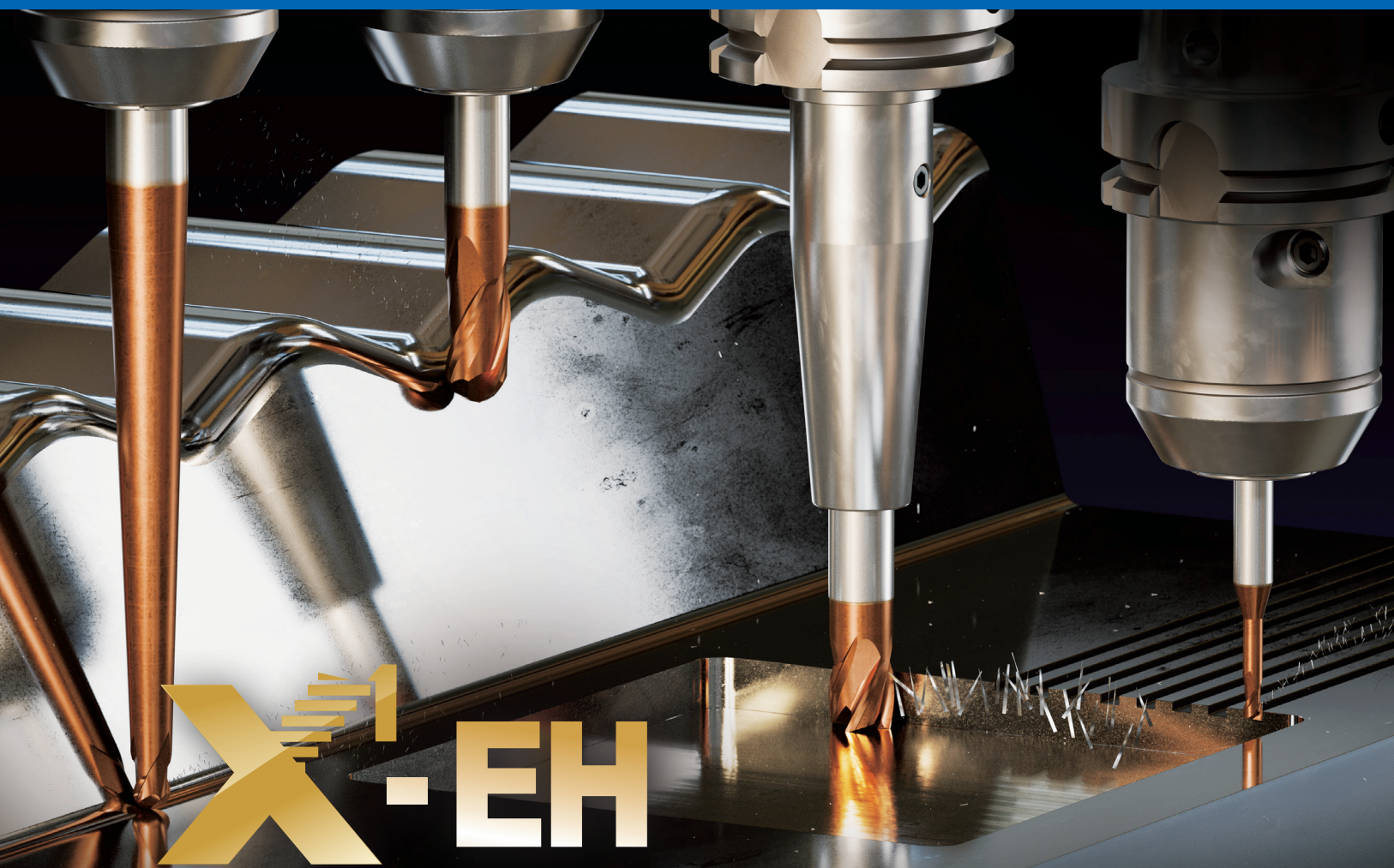
YU-X1EH25 **AMERICAS**

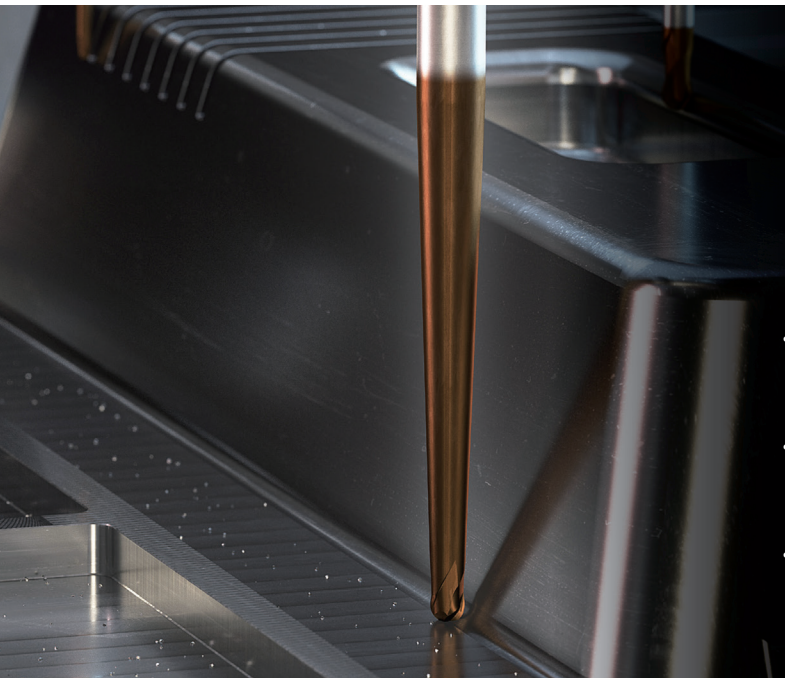
BEST VALUE IN THE WORLD OF CUTTING TOOLS



X1-EH

FINE-FINISHING SOLID CARBIDE END MILLS FOR HIGH HARDENED STEEL

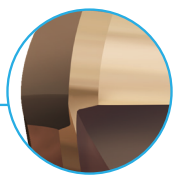
- Highest Accuracy for all Semi/Fine-Finishing application challenges
- Extensive Portfolio perfectly serving the Die&Mold Industry needs
- Latest Substrate and Coating Technology for predictive and extraordinary Tool Life



PREMIUM X1-EH

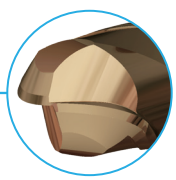
Exceptionally Accurate Nano Grain Solid Carbide End Mills For Hardened Steel

- Reducing Try-out and Re-Work time after machining due to industry leading small Tolerances with Ball Nose and Corner Radius Tools for more accurate workpieces
- Able to serve all application needs along the manufacturing sequence from roughing, semi-finishing to fine-finishing with >1.800 different tool variants
- Providing exceptional edge stability using nano grain carbide and proprietary C-Coating technology for extraordinary high tool life and respective unseen surface qualities



Ball Nose Gash Transition

▶ Optimized transition from end mill center to flute for improved chip flow.

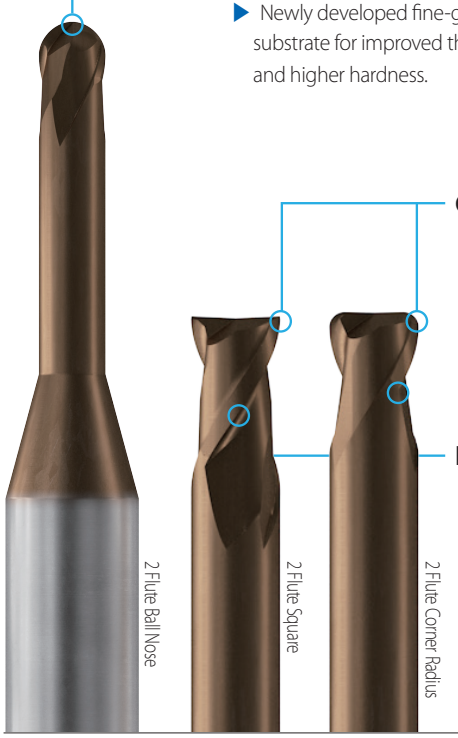


Reinforced Back Relief

▶ Strengthened cutting edge design for greater stability while not interfering with chip flow.

Raw Material

▶ Newly developed fine-grain nanostructure substrate for improved thermal shock stability and higher hardness.



Corner Geometries

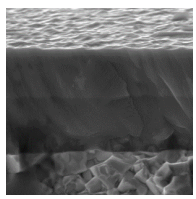
▶ YG-1's High performance corner geometries, including corner radius, for longer tool life in high-hardness machining.

Edge Preparation

▶ Optimal edge preparation applied to prevent chipping and achieve excellent surface finishes with longer tool life in high speed machining.

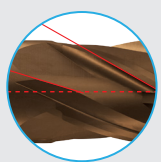
Special High Technology Coating

▶ Excellent wear and heat resistance with improved thermal shock stability. The nanolayer structure prevents the propagation of microcracks and coating elasticity promotes increased tool life.



NEW

3&4&6&8 FLUTE END MILLS

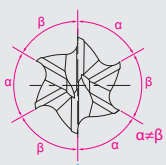


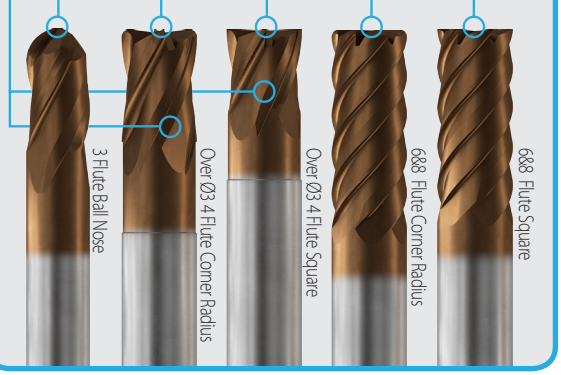
Multiple Helix

▶ Decreasing chatter to provide optimized surface qualities

Unequal Indexing

▶ Avoiding harmonics to achieve highest tool life





Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

Flutes	Series	Type	OD Range min.	OD Range max.	HRc Range 40-60	HRc Range 50-70	Accurarcy	Helix	Applications
2	HPI90 / HPK44	Ball Nose	R0.05	R10.0	○ / ●	● / ○	≤Ø6mm +1μm~-5μm; >Ø6mm +3μm~-7μm; ≤Ø1/4" +.00005"~-.00020"; >Ø1/4" +.00010"~-.00030"	30°	3D (Profiling)
	HPI91 / HPK45	Ball Nose for Rib Processing	R0.05	R6.0	○ / ●	● / ○			
	HPI92 / HPK47	Ball Nose for Rib Processing with Taper Neck	R0.05	R6.0	○ / ●	● / ○			
	HPK10 / HPK46	Ball Nose with Neck	R0.5	R12.5	○ / ●	● / ○			
	HPK24 / HPK48	Ball Nose with Neck	R1/64	R1/4	○ / ●	● / ○			
	HPI89	Corner Radius for Rib Processing	D0.2	D12.0	○	●	≤Ø6mm ±5μm; >Ø6mm ±8μm	35°	Side cutting; Sloting; Face milling
	HPK15	Corner Radius with Extended Neck-Stub Length	D0.3	D20.0	○	●			
	HPK14	Miniature Corner Radius	D0.3	D2.0	○	●	±5μm		
	HPI88	Square for Rib Processing	D0.1	D6.0	○	●	-		
	HPK19	Square with Extended Neck	D0.1	D20.0	○	●	-		
3	HPK11	Ball Nose - Center Match	R1.5	R10.0	○	●	≤Ø6mm ±5μm; >Ø6mm ±8μm	30°	3D (Profiling)
4	HPK12	Ball Nose - Center Match	R1.5	R10.0	○	●			
	HPK13	Ball Nose with Neck - Center Match	R0.5	R6.0	○	●			
	HPK16	Corner Radius for Rib Processing with Neck	D0.5	D6.0	○	●	±5μm	30° up to Ø3(1/8"); 27°/30° Over Ø3(1/8")	Side cutting; Sloting; Face milling
	HPK17	Corner Radius with Neck	D1.0	D20.0	○	●	≤Ø1/4" (6mm) ±5μm ±.0002"; ≤Ø1/4" (6mm) ±8μm ±.0003"		
	HPK26	Corner Radius with Neck	D1/16	D3/4	○	●			
	HPK20	Square for Rib Processing	D1.0	D6.0	○	●	-		
	HPK21	Square with Extended Neck	D1.0	D20.0	○	●	-		
6	HPK18	Corner Radius	D6.0	D20.0	○	●	±8μm ±.0003"	45°	
6&8	HPK27	Corner Radius	D1/4	D1"	○	●			
4&6&8	HPK23	Multi Flute Square	D1.0	D25.0	○	●	-		
4	HPK22	Corner Radius - High Feed	D2.0	D16.0	○	●	±5μm ±.0002"	0°	
	HPK25	Corner Radius - High Feed	D1/8	D1/2	○	●			

Size	Shank Dia. Tolerance
up to Ø6(1/4")	h4
over Ø6(1/4")	h5

GUIDE TO ICONS

CARBIDE — The tool is made of Nanograin carbide

2 3 4 6 4&6&8 — No. of Flutes

R +0.001 ~-0.005 — Tolerance of Ball Radius

R +0.003 ~-0.007 — Tolerance of Ball Radius

R ±0.005 — Tolerance of Corner Radius

PLAIN — Type of Shank

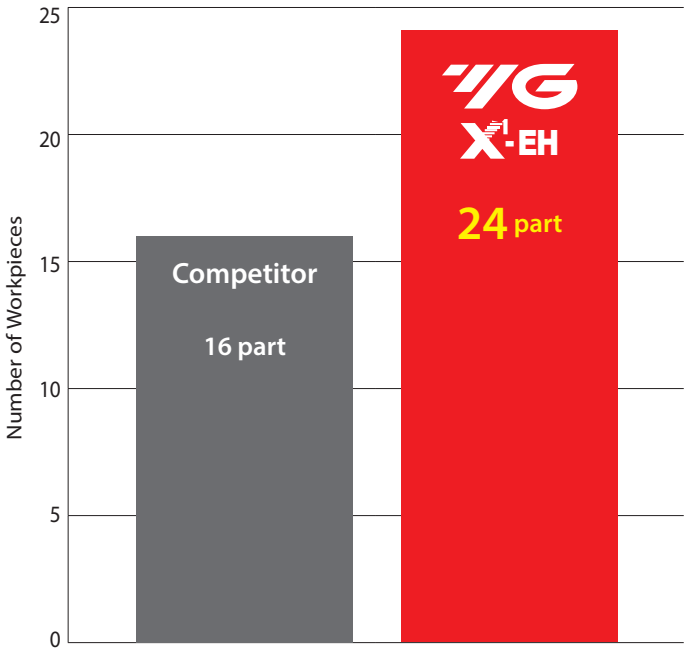
C Coating — Type of Coating

Cutting Conditions

CASE STUDY

TEST I Contouring

Ø6(R0.2) 4 Flute Corner Radius



Cutting Condition (Contour Milling)

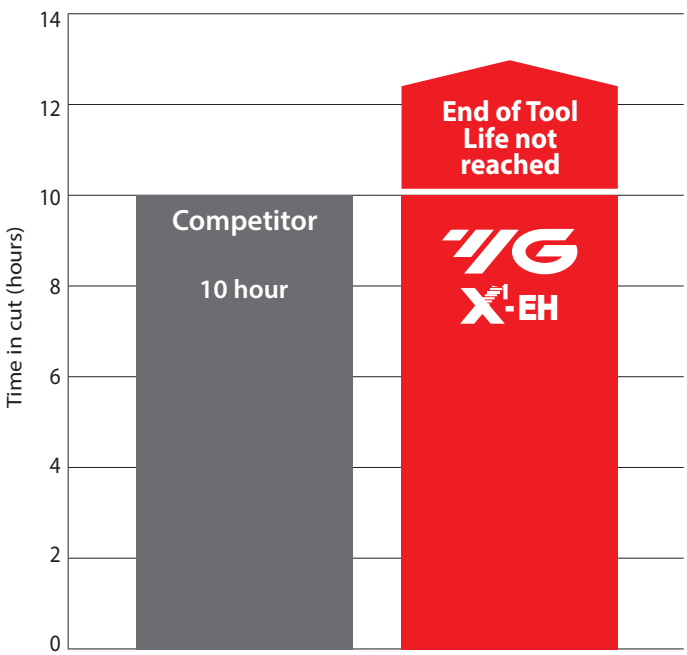
Tool	Ø6(R0.2) × Ø6 × 7(14) × 50
Work Material	- DIN : X30Cr13 (1.2083) - JIS : Stavax (HRc56) - AISI : 420
RPM	5,000 rev./min.
IPM	37 in/min.
Cutting Depth	.1575" (0.7xD) (Axial Depth) .1378" (0.6xD) (Radial Depth)
Coolant	Water Soluble
Machine	Machining Center



<Die set>

TEST II Finishing

Ø5 4 Flute Square



Cutting Condition (Finish Milling)

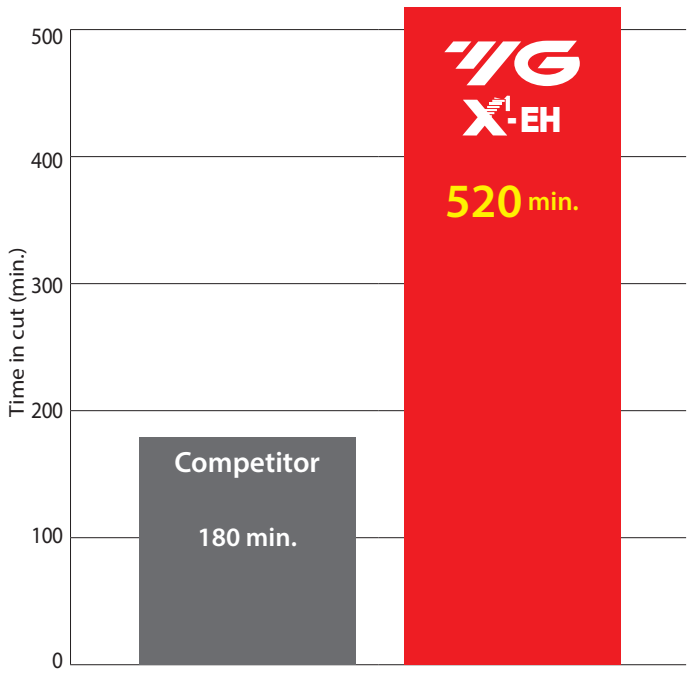
Tool	Ø5 × Ø6 × 5(13) × 55
Work Material	Steel HRc 52 - 54
RPM	7,450 rev./min.
IPM	76 in/min.
Cutting Depth	.020" (0.1xD) (Axial Depth) .098" (0.5xD) (Radial Depth)
Coolant	Dry Machining
Machine	Machining Center



<Die set>

TEST Ⅲ Shoulder Milling

Ø12(R1) 4 Flute Corner Radius

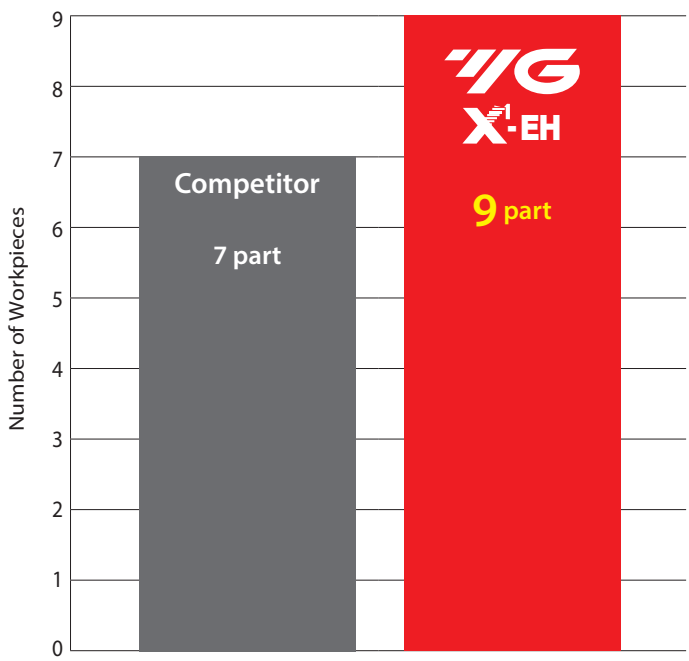


Cutting Condition (Shoulder Milling)

Tool	Ø12(R1) × Ø12 × 16 × 73
Work Material	- DIN : X210Cr12 (1.2080) - JIS : SKD1 (HRc60) - AISI : D3
RPM	1,800 rev./min.
IPM	8.5 in/min.
Cutting Depth	.3937" (0.8xD) (Axial Depth) .020" (0.04xD) (Radial Depth)
Coolant	Dry Machining
Machine	Machining Center

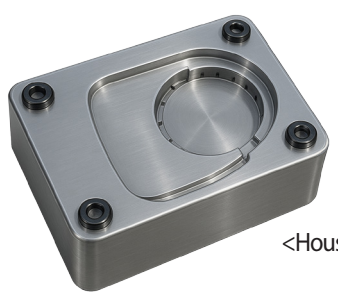
TEST Ⅳ Contouring

Ø6(R0.5) 4 Flute Corner Radius



Cutting Condition (Contour Milling)

Tool	Ø6(R0.5) × Ø6 × 7(20) × 60
Work Material	Tool Steel HRc 52
RPM	4,000 rev./min.
IPM	31.5 in/min.
Cutting Depth	.024" (0.1xD) (Axial Depth) .098" (0.4xD) (Radial Depth)
Coolant	Water Soluble
Machine	Machining Center

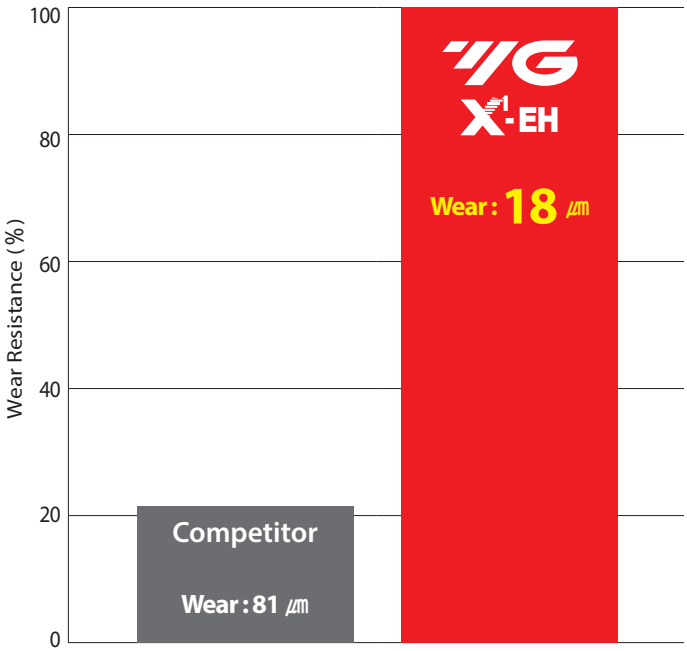


<Housing>

CASE STUDY

TEST V Profiling

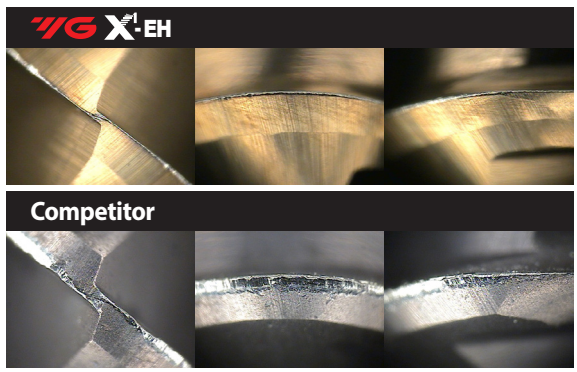
Ø3(R1.5) 2 Flute Ball Nose



Cutting Condition (Profiling)

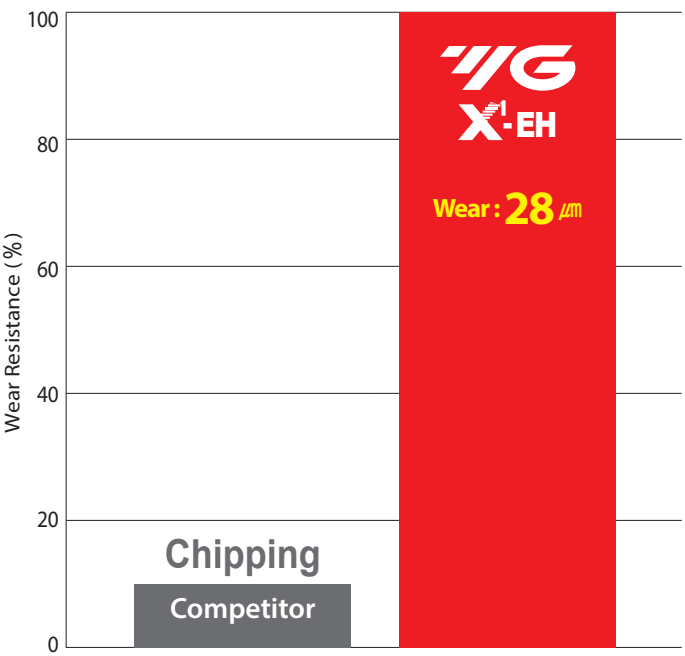
Tool	Ø3(R1.5) × Ø6 × 2.5(6) × 60
Work Material	- DIN : 1.2379 - JIS : SKD11(HRc63) - AISI : D2
RPM	21,000 rev./min.
IPM	110 in/min.
Cutting Depth	.0024" (0.02xD) (Axial Depth) .0060" (0.05xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

Total Milling Length : 813.6ft



TEST VI Side Cutting

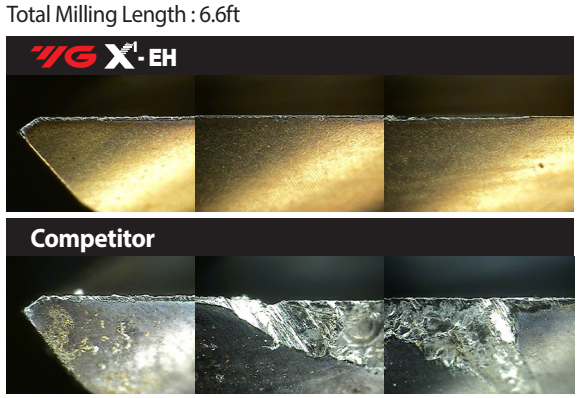
Ø6 2 Flute Square



Cutting Condition (Side Cutting)

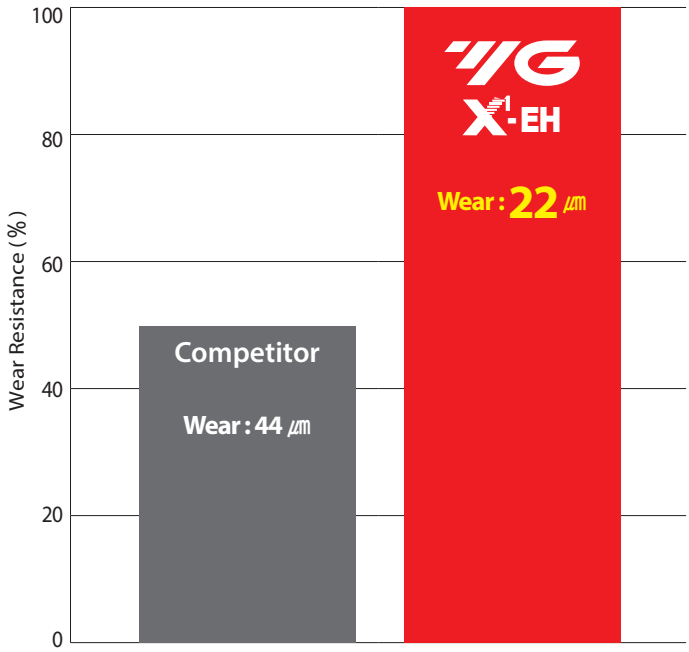
Tool	Ø6 × Ø6 × 15 × 50
Work Material	- DIN : 1.2379 - JIS : SKD11(HRc63) - AISI : D2
RPM	4,200 rev./min.
IPM	10 in/min.
Cutting Depth	.2362" (1.0xD) (Axial Depth) .0070" (0.03xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

Total Milling Length : 6.6ft



TEST VII Profiling

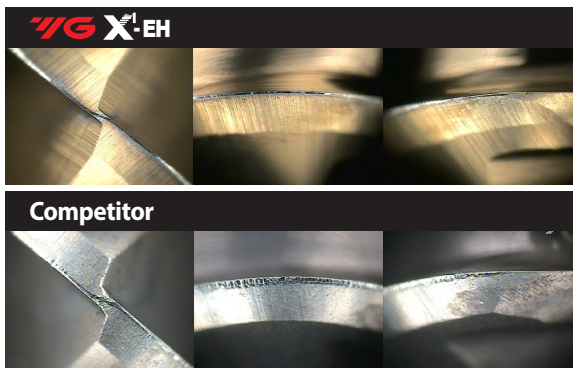
Ø3(R1.5) 2 Flute Ball Nose



Cutting Condition (Profiling)

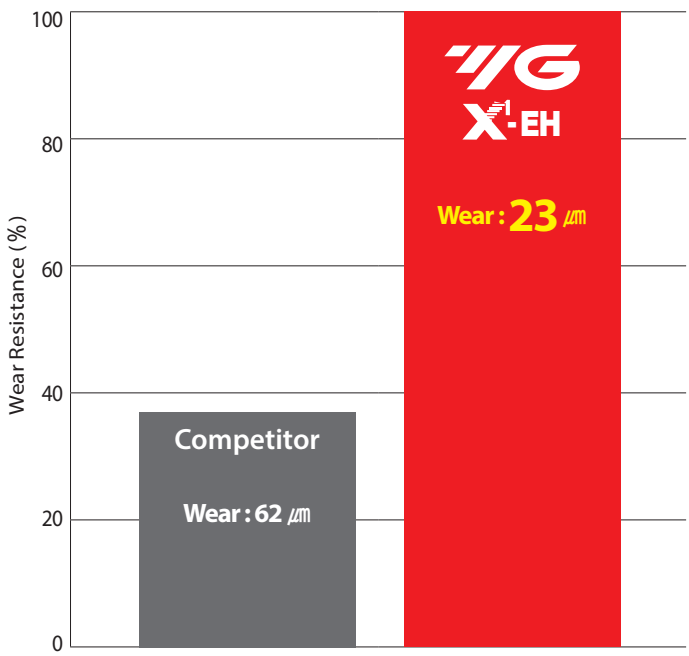
Tool	Ø3(R1.5) × Ø6 × 2.5(6) × 60
Work Material	- DIN : X30Cr13 - JIS : STAVAX(HRc52) - AISI : 420
RPM	26,500 rev./min.
IPM	157 in/min.
Cutting Depth	.0024" (0.02xD) (Axial Depth) .0060" (0.05xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

Total Milling Length : 2,034ft



TEST VIII Face Milling

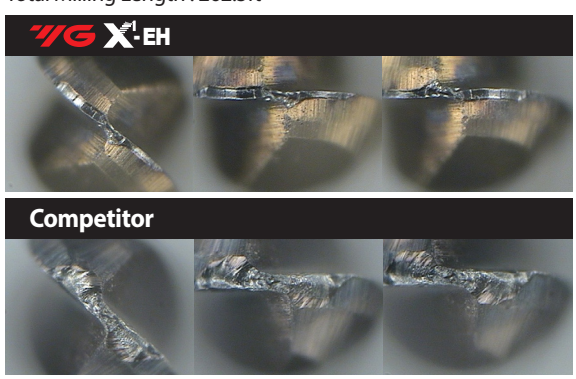
Ø0.6(R0.3) 2 Flute Ball Nose



Cutting Condition (Face Milling)

Tool	Ø0.6(R0.3) × Ø4 × 0.45(1) × 45
Work Material	- DIN : X30Cr13 - JIS : STAVAX(HRc52) - AISI : 420
RPM	40,000 rev./min.
IPM	55 in/min.
Cutting Depth	.0020" (0.08xD) (Axial Depth) .0039" (0.16xD) (Radial Depth)
Coolant	Oil Mist
Machine	Machining Center

Total Milling Length : 262.5ft



SELECTION GUIDE

C-COATED SOLID CARBIDE

X1-EH END MILLS

Please visit globalyg1.com/mat for material search

Recommended cutting conditions : P. 94 - 152

◎ : Excellent ○ : Good

SERIES	HPI91	HPI92	HPK24	HPK10
FLUTE	2	2	2	2
HELIX ANGLE	30°	30°	30°	30°
CUTTING EDGE SHAPE	BALL NOSE	BALL NOSE	BALL NOSE	BALL NOSE
SIZE MIN	R0.05	R0.05	R1/64	R0.5
SIZE MAX	R6.0	R6.0	R1/4	R12.5
PAGE	12	22	31	32
	RIB PROCESSING	TAPER NECK	NECK	NECK
	C-Coating	C-Coating	C-Coating	C-Coating
	 Additional Sizes		 NEW	 NEW

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment		HB	HRc				
P	1	Non-alloy steel	About 0.15% C	Annealed	125					
	2		About 0.45% C	Annealed	190	13				
	3		About 0.45% C	Quenched & tempered	250	25				
	4		About 0.75% C	Annealed	270	28				
	5		About 0.75% C	Quenched & tempered	300	32	○	○	○	○
	6	Low alloy steel		Annealed	180	10				
	7			Quenched & tempered	275	29				
	8			Quenched & tempered	300	32	○	○	○	○
	9			Quenched & tempered	350	38	○	○	○	○
	10	High alloyed steel, and tool steel		Annealed	200	15				
	11.1			Quenched & Tempered	325	35	○	○	○	○
	11.2			Quenched & Tempered	409	44	○	○	○	○
M	12	Stainless steel	Ferritic / Martensitic	Annealed	200	15				
	13		Martensitic	Quenched & Tempered	240	23				
	14			Austenitic	180	10				
K	15	Grey cast iron	Pearlitic / ferritic		180	10				
	16		Pearlitic (Martensitic)		260	26				
	17	Nodular cast iron	Ferritic		160	3				
	18		Pearlitic		250	25				
	19	Malleable cast iron	Ferritic		130					
	20		Pearlitic		230	21				
N	21	Aluminum-wrought alloy	Not Curable		60					
	22		Curable	Hardened	100					
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75					
	24		≤ 12% Si, Curable	Hardened	90					
	25		> 12% Si, Not Curable		130					
	26	Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, PB>1%		110					
	27		CuZn, CuSnZn (Brass)		90					
	28		CuSn, lead-free copper and electrolytic copper		100					
	29.1	Non Metallic Materials	Duroplastic							
	29.2		GRAPHITE							
	29.3		CFRP, GFRP							
	30		Rubber, Wood, etc.							
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	15				
	32			Cured	280	30				
	33		Ni or Co Based	Annealed	250	25				
	34			Cured	350	38				
	35			Cast	320	34				
	36	Titanium Alloys	Pure Titanium		400 Rm					
	37		Alpha + Beta Alloys	Hardened	1050 Rm					
H	38.1	Hardened steel		Hardened	421-469	45-49	◎	◎	◎	◎
	38.2			Hardened	481-560	50-55	◎	◎	◎	◎
	39.1			Hardened	577-654	56-60	◎	◎	◎	◎
	39.2			Hardened	670-739	61-65	◎	◎	◎	◎
	39.3			Hardened		66-70	◎	◎	◎	◎
	40	Chilled Cast Iron		Cast	400	42	○	○	○	○
	41	Hardened Cast Iron		Hardened	550	55	◎	◎	◎	◎

HPI90	HPK45	HPK47	HPK48	HPK46	HPK44	HPK11	HPK12	HPK13		
2	2	2	2	2	2	3	4	4		
30°	30°	30°	30°	30°	30°	30°	30°	30°		
BALL NOSE	BALL NOSE	BALL NOSE	BALL NOSE	BALL NOSE	BALL NOSE	BALL NOSE CENTER MATCH	BALL NOSE CENTER MATCH	BALL NOSE CENTER MATCH		
R0.05	R0.05	R0.05	R1/64	R0.5	R0.05	R1.5	R1.5	R0.5		
R10.0	R6.0	R6.0	R1/4	R12.5	R10.0	R10.0	R10.0	R6.0		
33	34	44	53	54	55	56	57	58		
-	RIB PROCESSING	TAPER NECK	NECK	NECK	-	-	-	NECK		
C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating		
 Additional Sizes	 NEW	 NEW	 NEW	 NEW	 NEW	 NEW	 NEW	 NEW		
									1	P
									2	
									3	
									4	
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◎						◎	◎	◎	39.1	
◎						◎	◎	◎	39.2	
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○	◎	◎	◎	◎	◎	○	○	○	40	
◎	◎	◎	◎	◎	◎	◎	◎	◎	41	

SELECTION GUIDE

C-COATED SOLID CARBIDE

X1-EH END MILLS

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Recommended cutting conditions : P. 94 - 152

◎ : Excellent ○ : Good

							HPI89	HPK15	HPK14	HPK16	HPK26
SERIES							HPI89	HPK15	HPK14	HPK16	HPK26
FLUTE							2	2	2	4	4
HELIX ANGLE							35°	35°	35°	27°/30° (up to Ø3: 30°)	27°/30° (up to Ø1/8: 30°)
CUTTING EDGE SHAPE							CORNER RADIUS	CORNER RADIUS	CORNER RADIUS	CORNER RADIUS	CORNER RADIUS
SIZE MIN							D0.2	D0.3	D0.3	D0.5	D1/16
SIZE MAX							D12.0	D20.0	D2.0	D6.0	D3/4
PAGE							59	69	71	72	77
							RIB PROCESSING	EXTENDED NECK	MINIATURE	RIB PROCESSING	NECK
							C-Coating	C-Coating	C-Coating	C-Coating	C-Coating
							 Additional Sizes	 NEW	 NEW	 NEW	 NEW
ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment		HB	HRc					
P	1	Non-alloy steel	About 0.15% C	Annealed	125						
	2		About 0.45% C	Annealed	190	13					
	3		About 0.45% C	Quenched & tempered	250	25					
	4		About 0.75% C	Annealed	270	28					
	5		About 0.75% C	Quenched & tempered	300	32	○	○	○	○	○
	6	Low alloy steel		Annealed	180	10					
	7			Quenched & tempered	275	29					
	8			Quenched & tempered	300	32	○	○	○	○	○
	9			Quenched & tempered	350	38	○	○	○	○	○
	10	High alloyed steel, and tool steel		Annealed	200	15					
	11.1			Quenched & Tempered	325	35	○	○	○	○	○
	11.2			Quenched & Tempered	409	44	○	○	○	○	○
M	12	Stainless steel	Ferritic / Martensitic	Annealed	200	15					
	13		Martensitic	Quenched & Tempered	240	23					
	14			Austenitic	180	10					
K	15	Grey cast iron	Pearlitic / ferritic		180	10					
	16		Pearlitic (Martensitic)		260	26					
	17	Nodular cast iron	Ferritic		160	3					
	18		Pearlitic		250	25					
	19	Malleable cast iron	Ferritic		130						
	20		Pearlitic		230	21					
N	21	Aluminum-wrought alloy	Not Curable		60						
	22		Curable	Hardened	100						
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75						
	24		≤ 12% Si, Curable	Hardened	90						
	25		> 12% Si, Not Curable		130						
	26	Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, PB>1%		110						
	27		CuZn, CuSnZn (Brass)		90						
	28		CuSn, lead-free copper and electrolytic copper		100						
	29.1	Non Metallic Materials	Duroplastic								
	29.2		GRAPHITE								
	29.3		CFRP, GFRP								
	30		Rubber, Wood, etc.								
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	15					
	32			Cured	280	30					
	33		Ni or Co Based	Annealed	250	25					
	34			Cured	350	38					
	35			Cast	320	34					
	36	Titanium Alloys	Pure Titanium		400 Rm						
	37		Alpha + Beta Alloys	Hardened	1050 Rm						
H	38.1	Hardened steel		Hardened	421-469	45-49	◎	◎	◎	◎	◎
	38.2			Hardened	481-560	50-55	◎	◎	◎	◎	◎
	39.1			Hardened	577-654	56-60	◎	◎	◎	◎	◎
	39.2			Hardened	670-739	61-65	◎	◎	◎	◎	◎
	39.3			Hardened		66-70	◎	◎	◎	◎	◎
	40	Chilled Cast Iron		Cast	400	42	○	○	○	○	○
	41	Hardened Cast Iron		Hardened	550	55	◎	◎	◎	◎	◎

HPK17	HPK27	HPK18	HPI88	HPK19	HPK20	HPK21	HPK23	HPK25	HPK22	
4	6&8	6	2	2	4	4	4&6&8	4	4	
27°/30° (up to Ø3: 30°)	45°	45°	35°	35°	27°/30° (up to Ø3: 30°)	27°/30° (up to Ø3: 30°)	45°	0°	0°	
CORNER RADIUS	CORNER RADIUS	CORNER RADIUS	SQUARE	SQUARE	SQUARE	SQUARE	SQUARE	CORNER RADIUS	CORNER RADIUS	
D1.0	D1/4	D6.0	D0.1	D0.1	D1.0	D1.0	D1.0	D1/8	D2.0	
D20.0	D1"	D20.0	D6.0	D20.0	D6.0	D20.0	D25.0	D1/2	D16.0	
78	**80**	**81**	**82**	**88**	**89**	**90**	**91**	**92**	**93**	
NECK	-	-	RIB PROCESSING	EXTENDED NECK	RIB PROCESSING	EXTENDED NECK	-	HIGH FEED	HIGH FEED	
C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	C-Coating	
										
										1
										2
										3
										4
○	○	○	○	○	○	○	○	○	○	5
										6
										7
○	○	○	○	○	○	○	○	○	○	8
○	○	○	○	○	○	○	○	○	○	9
										10
○	○	○	○	○	○	○	○	○	○	11.1
○	○	○	○	○	○	○	○	○	○	11.2
										12
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										27
										28
										29.1
										29.2
										29.3
										30
										31
										32
										33
										34
										35
										36
										37
◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	38.1
◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	38.2
◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	39.1
◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	39.2
◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	39.3
○	○	○	○	○	○	○	○	○	○	40
◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	41

P M K N S H

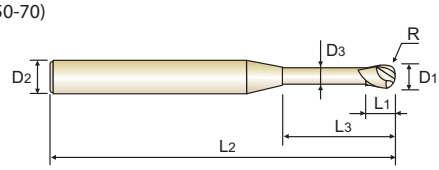
C-COATED SOLID CARBIDE END MILLS

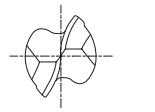
2 FLUTE BALL NOSE for RIB PROCESSING

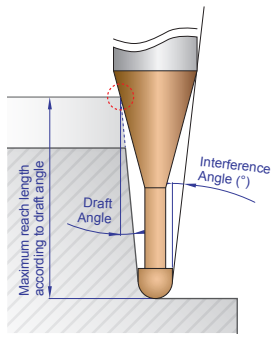
SERIES **HPI91**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91001	R0.05	**0.1**	4	0.07	0.2	45	0.085	14.66	0.25	0.26	0.28	0.29	0.32
HPI91901	R0.05	**0.1**	4	0.07	0.3	45	0.085	14.47	0.36	0.37	0.39	0.41	0.47
HPI91902	R0.05	**0.1**	4	0.07	0.5	45	0.085	14.11	0.57	0.60	0.63	0.66	0.75
HPI910015	R0.075	**0.15**	4	0.1	0.3	45	0.135	14.51	0.36	0.37	0.39	0.41	0.46
HPI91903	R0.075	**0.15**	4	0.1	0.5	45	0.135	14.15	0.57	0.59	0.62	0.66	0.74
HPI91904	R0.075	**0.15**	4	0.1	1	45	0.135	13.31	1.09	1.15	1.21	1.28	1.45
HPI91002	R0.1	**0.2**	4	0.15	0.3	45	0.17	14.50	0.40	0.42	0.43	0.46	0.51
HPI91905	R0.1	**0.2**	4	0.15	0.5	45	0.17	14.13	0.61	0.64	0.67	0.70	0.79
HPI91906	R0.1	**0.2**	4	0.15	0.75	45	0.17	13.70	0.87	0.92	0.96	1.02	1.15
HPI91907	R0.1	**0.2**	4	0.15	1	45	0.17	13.29	1.14	1.19	1.26	1.33	1.50
HPI91908	R0.1	**0.2**	4	0.15	1	50	0.17	13.29	1.14	1.19	1.26	1.33	1.50
HPI91909	R0.1	**0.2**	4	0.15	1.25	45	0.17	12.90	1.40	1.47	1.55	1.64	1.86
HPI91910	R0.1	**0.2**	4	0.15	1.5	45	0.17	12.53	1.66	1.75	1.84	1.95	2.21
HPI91911	R0.1	**0.2**	4	0.15	1.75	45	0.17	12.19	1.93	2.03	2.14	2.26	2.57
HPI91912	R0.1	**0.2**	4	0.15	2	45	0.17	11.86	2.19	2.30	2.43	2.58	2.92
HPI91913	R0.1	**0.2**	4	0.15	2.5	45	0.17	11.26	2.71	2.86	3.02	3.20	3.64
HPI91914	R0.1	**0.2**	4	0.15	3	45	0.17	10.71	3.24	3.41	3.61	3.82	4.35
HPI91915	R0.1	**0.2**	4	0.2	0.5	35	0.17	14.13	0.61	0.64	0.67	0.70	0.79
HPI91916	R0.1	**0.2**	4	0.2	0.5	50	0.17	14.13	0.61	0.64	0.67	0.70	0.79
HPI91917	R0.1	**0.2**	6	0.2	0.5	50	0.17	14.42	0.61	0.64	0.67	0.70	0.79
HPI91003	R0.15	**0.3**	4	0.2	0.5	45	0.27	14.20	0.61	0.63	0.66	0.69	0.77
HPI91918	R0.15	**0.3**	4	0.2	0.6	45	0.27	14.02	0.71	0.74	0.78	0.82	0.91
HPI91919	R0.15	**0.3**	4	0.2	0.75	45	0.27	13.75	0.87	0.91	0.95	1.00	1.12
HPI91920	R0.15	**0.3**	4	0.2	1	45	0.27	13.33	1.13	1.19	1.25	1.32	1.48
HPI91921	R0.15	**0.3**	4	0.2	1.25	45	0.27	12.93	1.40	1.47	1.54	1.63	1.84
HPI91922	R0.15	**0.3**	4	0.2	1.5	45	0.27	12.55	1.66	1.74	1.84	1.94	2.19

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

C-COATED SOLID CARBIDE END MILLS

2 FLUTE BALL NOSE for RIB PROCESSING

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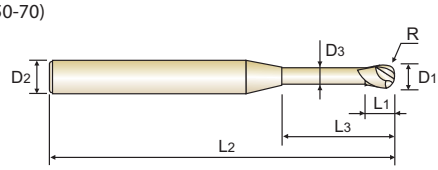
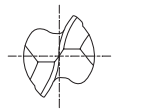
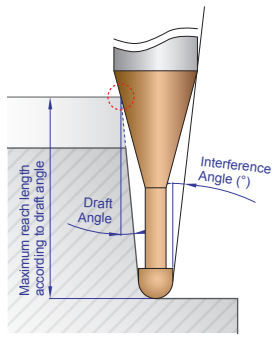
- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D1	D2	L1	L3	L2	D3		0.5°	1°	1.5°	2°	3°
HPI91923	R0.15	**0.3**	4	0.2	1.75	45	0.27	12.19	1.92	2.02	2.13	2.25	2.55
HPI91924	R0.15	**0.3**	4	0.2	2	45	0.27	11.86	2.19	2.30	2.42	2.56	2.90
HPI91925	R0.15	**0.3**	4	0.2	2.25	45	0.27	11.54	2.45	2.58	2.72	2.87	3.26
HPI91926	R0.15	**0.3**	4	0.2	2.5	45	0.27	11.24	2.71	2.85	3.01	3.19	3.61
HPI91927	R0.15	**0.3**	4	0.2	3	45	0.27	10.68	3.24	3.41	3.60	3.81	4.33
HPI91928	R0.15	**0.3**	4	0.2	3.5	45	0.27	10.17	3.76	3.96	4.18	4.43	5.04
HPI91929	R0.15	**0.3**	4	0.2	4	45	0.27	9.71	4.29	4.52	4.77	5.06	5.75
HPI91930	R0.15	**0.3**	6	0.2	1.5	50	0.27	13.31	1.66	1.74	1.84	1.94	2.19
HPI91004	R0.2	**0.4**	4	0.3	0.5	45	0.37	14.28	0.61	0.63	0.65	0.68	0.75
HPI91931	R0.2	**0.4**	4	0.3	0.8	45	0.37	13.72	0.92	0.96	1.00	1.05	1.17
HPI91932	R0.2	**0.4**	4	0.3	1	45	0.37	13.37	1.13	1.18	1.24	1.30	1.46
HPI91933	R0.2	**0.4**	4	0.3	1.5	45	0.37	12.57	1.66	1.74	1.83	1.93	2.17
HPI91934	R0.2	**0.4**	4	0.3	2	45	0.37	11.86	2.18	2.29	2.41	2.55	2.88
HPI91935	R0.2	**0.4**	4	0.3	2.5	45	0.37	11.22	2.71	2.85	3.00	3.17	3.59
HPI91936	R0.2	**0.4**	4	0.3	3	45	0.37	10.65	3.24	3.40	3.59	3.80	4.31
HPI91937	R0.2	**0.4**	4	0.3	3.5	45	0.37	10.13	3.76	3.96	4.18	4.42	5.02
HPI91938	R0.2	**0.4**	4	0.3	4	45	0.37	9.66	4.29	4.51	4.76	5.04	5.73
HPI91939	R0.2	**0.4**	4	0.3	4.5	45	0.37	9.23	4.81	5.07	5.35	5.67	6.44
HPI91940	R0.2	**0.4**	4	0.3	5	45	0.37	8.84	5.34	5.62	5.94	6.29	7.15
HPI91941	R0.2	**0.4**	4	0.3	6	45	0.37	8.15	6.39	6.73	7.11	7.54	8.57
HPI91942	R0.2	**0.4**	4	0.4	1	35	0.37	13.37	1.13	1.18	1.24	1.30	1.46
HPI91943	R0.2	**0.4**	4	0.4	1	50	0.37	13.37	1.13	1.18	1.24	1.30	1.46
HPI91944	R0.2	**0.4**	6	0.3	1	50	0.37	13.91	1.13	1.18	1.24	1.30	1.46
HPI91945	R0.2	**0.4**	6	0.3	2	50	0.37	12.82	2.18	2.29	2.41	2.55	2.88
HPI91946	R0.2	**0.4**	6	0.4	1	50	0.37	13.91	1.13	1.18	1.24	1.30	1.46
HPI91005	R0.25	**0.5**	4	0.35	1	45	0.45	13.35	1.19	1.24	1.30	1.36	1.52

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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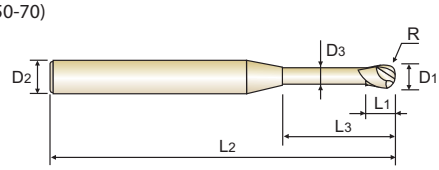
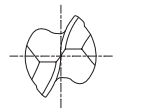
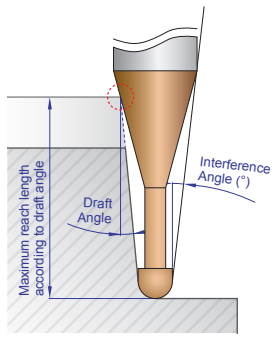
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91947	R0.25	**0.5**	4	0.35	1.5	45	0.45	12.53	1.71	1.79	1.88	1.99	2.23
HPI91948	R0.25	**0.5**	4	0.35	2	45	0.45	11.80	2.24	2.35	2.47	2.61	2.94
HPI91949	R0.25	**0.5**	4	0.35	2.5	45	0.45	11.16	2.77	2.90	3.06	3.23	3.65
HPI91950	R0.25	**0.5**	4	0.35	3	45	0.45	10.57	3.29	3.46	3.65	3.86	4.36
HPI91951	R0.25	**0.5**	4	0.35	3.5	45	0.45	10.05	3.82	4.01	4.23	4.48	5.08
HPI91952	R0.25	**0.5**	4	0.35	4	45	0.45	9.57	4.34	4.57	4.82	5.10	5.79
HPI91953	R0.25	**0.5**	4	0.35	4.5	45	0.45	9.14	4.87	5.12	5.41	5.73	6.50
HPI91954	R0.25	**0.5**	4	0.35	5	45	0.45	8.75	5.40	5.68	5.99	6.35	7.21
HPI91955	R0.25	**0.5**	4	0.35	5.5	45	0.45	8.38	5.92	6.23	6.58	6.97	7.92
HPI91956	R0.25	**0.5**	4	0.35	6	45	0.45	8.05	6.45	6.79	7.17	7.60	8.63
HPI91957	R0.25	**0.5**	4	0.35	8	45	0.45	6.94	8.55	9.01	9.52	10.09	11.43
HPI91958	R0.25	**0.5**	4	0.35	10	45	0.45	6.10	10.66	11.23	11.87	12.58	13.76
HPI91959	R0.25	**0.5**	4	0.5	1.25	50	0.45	12.93	1.45	1.52	1.59	1.67	1.87
HPI91960	R0.25	**0.5**	6	0.5	1.25	50	0.45	13.61	1.45	1.52	1.59	1.67	1.87
HPI91006	R0.3	**0.6**	4	0.45	1	45	0.55	13.40	1.19	1.23	1.29	1.35	1.50
HPI91961	R0.3	**0.6**	4	0.45	1.5	45	0.55	12.55	1.71	1.79	1.88	1.97	2.21
HPI91962	R0.3	**0.6**	4	0.45	2	45	0.55	11.80	2.24	2.34	2.46	2.60	2.92
HPI91963	R0.3	**0.6**	4	0.45	2.5	45	0.55	11.13	2.76	2.90	3.05	3.22	3.63
HPI91964	R0.3	**0.6**	4	0.45	3	45	0.55	10.54	3.29	3.45	3.64	3.84	4.34
HPI91965	R0.3	**0.6**	4	0.45	3.5	45	0.55	10.00	3.82	4.01	4.22	4.47	5.06
HPI91966	R0.3	**0.6**	4	0.45	4	45	0.55	9.52	4.34	4.56	4.81	5.09	5.77
HPI91967	R0.3	**0.6**	4	0.45	4.5	45	0.55	9.08	4.87	5.12	5.40	5.71	6.48
HPI91968	R0.3	**0.6**	4	0.45	5	45	0.55	8.68	5.39	5.67	5.99	6.34	7.19
HPI91969	R0.3	**0.6**	4	0.45	5.5	45	0.55	8.31	5.92	6.23	6.57	6.96	7.90
HPI91970	R0.3	**0.6**	4	0.45	6	45	0.55	7.97	6.45	6.78	7.16	7.58	8.61
HPI91971	R0.3	**0.6**	4	0.45	7	45	0.55	7.37	7.50	7.89	8.34	8.83	10.04

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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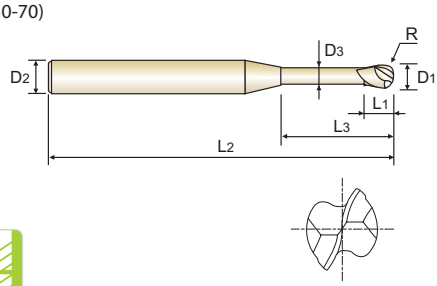
C-COATED SOLID CARBIDE END MILLS

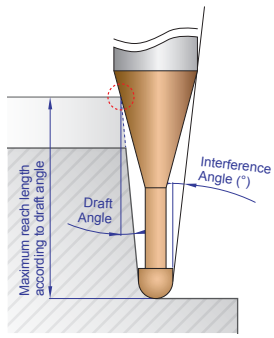
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPI91**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91972	R0.3	**0.6**	4	0.45	8	45	0.55	6.86	8.55	9.00	9.51	10.08	11.36
HPI91973	R0.3	**0.6**	4	0.45	9	45	0.55	6.41	9.60	10.11	10.68	11.33	12.53
HPI91974	R0.3	**0.6**	4	0.45	10	45	0.55	6.01	10.65	11.22	11.86	12.57	13.70
HPI91975	R0.3	**0.6**	4	0.45	12	45	0.55	5.35	12.76	13.44	14.21	15.07	16.03
HPI91976	R0.3	**0.6**	4	0.6	1.5	35	0.55	12.55	1.71	1.79	1.88	1.97	2.21
HPI91977	R0.3	**0.6**	4	0.6	1.5	50	0.55	12.55	1.71	1.79	1.88	1.97	2.21
HPI91978	R0.3	**0.6**	6	0.45	2	50	0.55	12.81	2.24	2.34	2.46	2.60	2.92
HPI91979	R0.3	**0.6**	6	0.45	3	50	0.55	11.85	3.29	3.45	3.64	3.84	4.34
HPI91980	R0.3	**0.6**	6	0.45	4	50	0.55	11.02	4.34	4.56	4.81	5.09	5.77
HPI91981	R0.3	**0.6**	6	0.6	1.5	50	0.55	13.36	1.71	1.79	1.88	1.97	2.21
HPI91007	R0.35	**0.7**	4	0.5	2	45	0.65	11.80	2.24	2.34	2.45	2.58	2.90
HPI91982	R0.35	**0.7**	4	0.5	4	45	0.65	9.46	4.34	4.56	4.80	5.08	5.75
HPI91983	R0.35	**0.7**	4	0.5	6	45	0.65	7.89	6.44	6.78	7.15	7.57	8.59
HPI91984	R0.35	**0.7**	4	0.5	8	45	0.65	6.77	8.55	9.00	9.50	10.07	11.29
HPI91008	R0.4	**0.8**	4	0.6	2	45	0.75	11.79	2.23	2.33	2.45	2.57	2.88
HPI91985	R0.4	**0.8**	4	0.6	3	45	0.75	10.46	3.28	3.44	3.62	3.82	4.30
HPI91986	R0.4	**0.8**	4	0.6	4	45	0.75	9.40	4.34	4.55	4.79	5.07	5.72
HPI91987	R0.4	**0.8**	4	0.6	5	45	0.75	8.53	5.39	5.66	5.97	6.31	7.15
HPI91988	R0.4	**0.8**	4	0.6	6	45	0.75	7.81	6.44	6.77	7.14	7.56	8.57
HPI91989	R0.4	**0.8**	4	0.6	7	45	0.75	7.20	7.49	7.88	8.32	8.81	9.99
HPI91990	R0.4	**0.8**	4	0.6	8	45	0.75	6.68	8.54	8.99	9.49	10.05	11.23
HPI91991	R0.4	**0.8**	4	0.6	10	45	0.75	5.83	10.65	11.21	11.84	12.55	13.56
HPI91992	R0.4	**0.8**	4	0.6	12	45	0.75	5.18	12.75	13.43	14.19	15.04	15.90
HPI91993	R0.4	**0.8**	4	0.8	2	35	0.75	11.79	2.23	2.33	2.45	2.57	2.88
HPI91994	R0.4	**0.8**	4	0.8	2	50	0.75	11.79	2.23	2.33	2.45	2.57	2.88
HPI91995	R0.4	**0.8**	6	0.6	2	50	0.75	12.85	2.23	2.33	2.45	2.57	2.88

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

C-COATED SOLID CARBIDE END MILLS

2 FLUTE BALL NOSE for RIB PROCESSING

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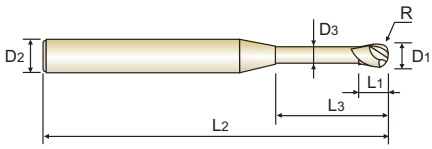
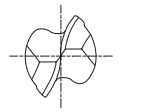
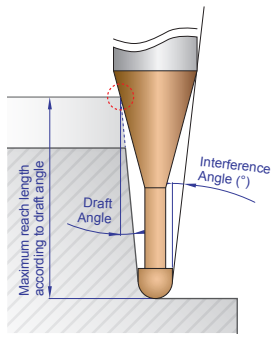
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91996	R0.4	**0.8**	6	0.8	2	50	0.75	12.85	2.23	2.33	2.45	2.57	2.88
HPI91009	R0.45	**0.9**	4	0.65	2	45	0.85	11.79	2.23	2.33	2.44	2.56	2.86
HPI91997	R0.45	**0.9**	4	0.65	4	45	0.85	9.34	4.33	4.55	4.79	5.05	5.70
HPI91998	R0.45	**0.9**	4	0.65	6	45	0.85	7.72	6.44	6.77	7.13	7.55	8.55
HPI91999	R0.45	**0.9**	4	0.65	8	45	0.85	6.58	8.54	8.99	9.48	10.04	11.16
HPI91010	R0.5	**1.0**	4	0.75	2	45	0.95	11.78	2.23	2.32	2.43	2.55	2.84
HPI91801	R0.5	**1.0**	4	0.75	2.5	45	0.95	11.04	2.75	2.88	3.02	3.17	3.55
HPI91802	R0.5	**1.0**	4	0.75	3	45	0.95	10.38	3.28	3.43	3.60	3.79	4.26
HPI91803	R0.5	**1.0**	4	0.75	4	45	0.95	9.27	4.33	4.54	4.78	5.04	5.68
HPI91804	R0.5	**1.0**	4	0.75	5	45	0.95	8.37	5.38	5.65	5.95	6.29	7.10
HPI91805	R0.5	**1.0**	4	0.75	6	45	0.95	7.63	6.44	6.76	7.13	7.54	8.53
HPI91806	R0.5	**1.0**	4	0.75	7	45	0.95	7.01	7.49	7.87	8.30	8.78	9.93
HPI91807	R0.5	**1.0**	4	0.75	8	45	0.95	6.49	8.54	8.98	9.47	10.03	11.10
HPI91808	R0.5	**1.0**	4	0.75	9	45	0.95	6.03	9.59	10.09	10.65	11.28	12.26
HPI91809	R0.5	**1.0**	4	0.75	10	45	0.95	5.64	10.64	11.20	11.82	12.52	13.43
HPI91810	R0.5	**1.0**	4	0.75	12	45	0.95	4.99	12.75	13.42	14.17	14.96	15.77
HPI91811	R0.5	**1.0**	4	0.75	13	45	0.95	4.71	13.80	14.53	15.35	16.06	16.94
HPI91812	R0.5	**1.0**	4	0.75	14	50	0.95	4.47	14.85	15.64	16.52	17.17	18.10
HPI91813	R0.5	**1.0**	4	0.75	16	50	0.95	4.05	16.96	17.86	18.87	19.38	20.44
HPI91814	R0.5	**1.0**	4	0.75	18	55	0.95	3.70	19.06	20.08	21.05	21.59	22.78
HPI91815	R0.5	**1.0**	4	0.75	20	55	0.95	3.41	21.16	22.30	23.20	23.81	25.11
HPI91816	R0.5	**1.0**	4	1	2.5	40	0.95	11.04	2.75	2.88	3.02	3.17	3.55
HPI91817	R0.5	**1.0**	4	1	2.5	50	0.95	11.04	2.75	2.88	3.02	3.17	3.55
HPI91818	R0.5	**1.0**	6	0.75	3	50	0.95	11.84	3.28	3.43	3.60	3.79	4.26
HPI91819	R0.5	**1.0**	6	0.75	4	50	0.95	10.95	4.33	4.54	4.78	5.04	5.68
HPI91820	R0.5	**1.0**	6	0.75	5	50	0.95	10.18	5.38	5.65	5.95	6.29	7.10

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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C-COATED SOLID CARBIDE END MILLS

2 FLUTE BALL NOSE for RIB PROCESSING

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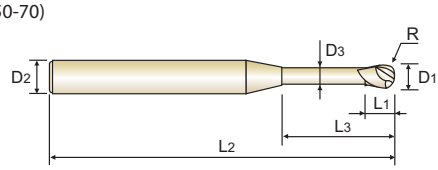
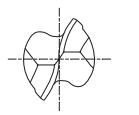
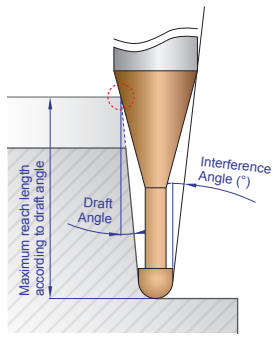
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91821	R0.5	**1.0**	6	0.75	6	50	0.95	9.51	6.44	6.76	7.13	7.54	8.53
HPI91822	R0.5	**1.0**	6	0.75	7	50	0.95	8.92	7.49	7.87	8.30	8.78	9.95
HPI91823	R0.5	**1.0**	6	0.75	8	50	0.95	8.40	8.54	8.98	9.47	10.03	11.37
HPI91824	R0.5	**1.0**	6	0.75	10	50	0.95	7.53	10.64	11.20	11.82	12.52	14.22
HPI91825	R0.5	**1.0**	6	0.75	22	60	0.95	4.62	23.27	24.52	25.92	27.11	28.60
HPI91826	R0.5	**1.0**	6	1	2.5	50	0.95	12.34	2.75	2.88	3.02	3.17	3.55
HPI91012	R0.6	**1.2**	4	0.9	2.4	45	1.15	11.13	2.56	2.63	2.70	2.78	2.95
HPI91827	R0.6	**1.2**	4	0.9	4	45	1.15	9.12	4.21	4.34	4.47	4.62	4.94
HPI91828	R0.6	**1.2**	4	0.9	6	45	1.15	7.44	6.28	6.48	6.69	6.92	7.43
HPI91829	R0.6	**1.2**	4	0.9	8	45	1.15	6.28	8.35	8.62	8.90	9.22	9.92
HPI91830	R0.6	**1.2**	4	0.9	10	45	1.15	5.43	10.41	10.75	11.12	11.52	12.40
HPI91831	R0.6	**1.2**	4	0.9	12	45	1.15	4.79	12.48	12.89	13.34	13.82	14.89
HPI91832	R0.6	**1.2**	4	0.9	14	50	1.15	4.28	14.55	15.03	15.55	16.12	17.37
HPI91833	R0.6	**1.2**	4	0.9	16	50	1.15	3.87	16.61	17.17	17.77	18.42	19.86
HPI91834	R0.6	**1.2**	4	1.2	3	40	1.15	10.28	3.18	3.27	3.36	3.47	3.70
HPI91014	R0.7	**1.4**	4	1	8	45	1.35	6.06	8.34	8.61	8.89	9.20	9.89
HPI91835	R0.7	**1.4**	4	1	12	50	1.35	4.58	12.48	12.89	13.33	13.80	14.86
HPI91836	R0.7	**1.4**	4	1	16	50	1.35	3.67	16.61	17.17	17.76	18.40	19.84
HPI91015	R0.75	**1.5**	4	1.1	3	45	1.45	10.11	3.17	3.26	3.35	3.44	3.66
HPI91837	R0.75	**1.5**	4	1.1	4	45	1.45	8.87	4.21	4.33	4.46	4.59	4.91
HPI91838	R0.75	**1.5**	4	1.1	6	45	1.45	7.12	6.27	6.47	6.67	6.89	7.39
HPI91839	R0.75	**1.5**	4	1.1	8	45	1.45	5.94	8.34	8.61	8.89	9.19	9.88
HPI91840	R0.75	**1.5**	4	1.1	10	45	1.45	5.10	10.41	10.74	11.11	11.49	12.37
HPI91841	R0.75	**1.5**	4	1.1	12	45	1.45	4.46	12.48	12.88	13.32	13.79	14.85
HPI91842	R0.75	**1.5**	4	1.1	14	50	1.45	3.97	14.54	15.02	15.54	16.09	17.34
HPI91843	R0.75	**1.5**	4	1.1	16	50	1.45	3.57	16.61	17.16	17.76	18.39	19.82

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

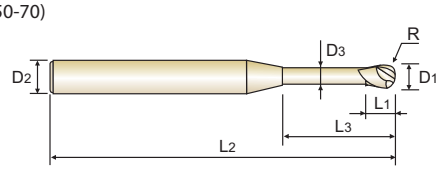
C-COATED SOLID CARBIDE END MILLS

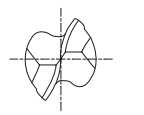
2 FLUTE BALL NOSE for RIB PROCESSING

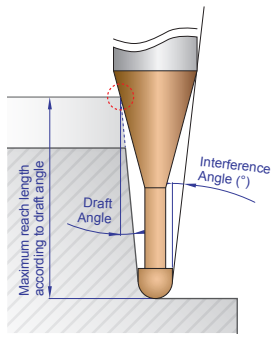
SERIES **HPI91**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91844	R0.75	**1.5**	4	1.1	18	55	1.45	3.25	18.68	19.30	19.97	20.69	22.31
HPI91845	R0.75	**1.5**	4	1.1	20	55	1.45	2.98	20.74	21.44	22.19	22.99	-
HPI91846	R0.75	**1.5**	4	1.1	22	60	1.45	2.75	22.81	23.58	24.41	25.29	-
HPI91847	R0.75	**1.5**	4	1.1	30	70	1.45	2.10	31.08	32.14	33.27	34.49	-
HPI91848	R0.75	**1.5**	4	1.5	3.8	40	1.45	9.10	4.00	4.11	4.23	4.36	4.66
HPI91849	R0.75	**1.5**	4	1.5	3.8	50	1.45	9.10	4.00	4.11	4.23	4.36	4.66
HPI91850	R0.75	**1.5**	6	1.1	6	50	1.45	9.30	6.27	6.47	6.67	6.89	7.39
HPI91851	R0.75	**1.5**	6	1.1	8	50	1.45	8.13	8.34	8.61	8.89	9.19	9.88
HPI91852	R0.75	**1.5**	6	1.5	3.8	50	1.45	11.03	4.00	4.11	4.23	4.36	4.66
HPI91016	R0.8	**1.6**	4	1.2	8	45	1.55	5.82	8.34	8.60	8.88	9.19	9.87
HPI91853	R0.8	**1.6**	4	1.2	12	45	1.55	4.35	12.47	12.88	13.32	13.79	14.84
HPI91854	R0.8	**1.6**	4	1.2	16	50	1.55	3.47	16.61	17.16	17.75	18.39	19.81
HPI91855	R0.8	**1.6**	4	1.2	20	55	1.55	2.89	20.74	21.44	22.18	22.98	-
HPI91020	R1.0	**2.0**	4	1.5	3	45	1.95	9.74	3.16	3.24	3.32	3.41	3.60
HPI91856	R1.0	**2.0**	4	1.5	4	45	1.95	8.34	4.20	4.31	4.43	4.56	4.85
HPI91857	R1.0	**2.0**	4	1.5	6	45	1.95	6.46	6.26	6.45	6.64	6.86	7.33
HPI91858	R1.0	**2.0**	4	1.5	8	45	1.95	5.28	8.33	8.59	8.86	9.16	9.82
HPI91859	R1.0	**2.0**	4	1.5	10	45	1.95	4.46	10.40	10.73	11.08	11.46	12.30
HPI91860	R1.0	**2.0**	4	1.5	12	45	1.95	3.86	12.47	12.87	13.29	13.76	14.79
HPI91861	R1.0	**2.0**	4	1.5	13	45	1.95	3.62	13.50	13.94	14.40	14.91	16.03
HPI91862	R1.0	**2.0**	4	1.5	14	50	1.95	3.40	14.53	15.01	15.51	16.06	17.28
HPI91863	R1.0	**2.0**	4	1.5	16	50	1.95	3.04	16.60	17.15	17.73	18.36	19.76
HPI91864	R1.0	**2.0**	4	1.5	18	55	1.95	2.75	18.67	19.28	19.94	20.65	-
HPI91865	R1.0	**2.0**	4	1.5	20	55	1.95	2.51	20.74	21.42	22.16	22.95	-
HPI91866	R1.0	**2.0**	4	1.5	22	60	1.95	2.31	22.80	23.56	24.38	25.25	-
HPI91867	R1.0	**2.0**	4	1.5	25	65	1.95	2.06	25.90	26.77	27.70	28.70	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

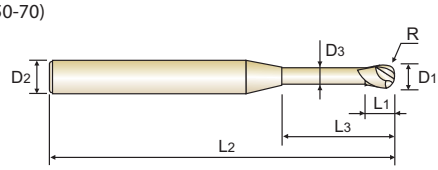
C-COATED SOLID CARBIDE END MILLS

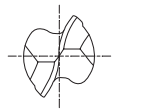
2 FLUTE BALL NOSE for RIB PROCESSING

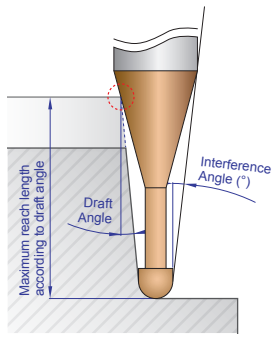
SERIES **HPI91**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91868	R1.0	**2.0**	4	1.5	30	70	1.95	1.74	31.07	32.12	33.24	-	-
HPI91869	R1.0	**2.0**	4	1.5	35	70	1.95	1.51	36.24	37.47	38.79	-	-
HPI91870	R1.0	**2.0**	4	1.5	40	90	1.95	1.34	41.41	42.82	-	-	-
HPI91871	R1.0	**2.0**	4	2	5	40	1.95	7.28	5.23	5.38	5.54	5.71	6.09
HPI91872	R1.0	**2.0**	4	2	5	50	1.95	7.28	5.23	5.38	5.54	5.71	6.09
HPI91873	R1.0	**2.0**	6	1.5	4	50	1.95	10.73	4.20	4.31	4.43	4.56	4.85
HPI91874	R1.0	**2.0**	6	1.5	6	50	1.95	9.05	6.26	6.45	6.64	6.86	7.33
HPI91875	R1.0	**2.0**	6	1.5	8	50	1.95	7.82	8.33	8.59	8.86	9.16	9.82
HPI91876	R1.0	**2.0**	6	1.5	10	50	1.95	6.89	10.40	10.73	11.08	11.46	12.30
HPI91877	R1.0	**2.0**	6	1.5	16	60	1.95	5.07	16.60	17.15	17.73	18.36	19.76
HPI91878	R1.0	**2.0**	6	1.5	25	65	1.95	3.63	25.90	26.77	27.70	28.70	30.95
HPI91879	R1.0	**2.0**	6	2	5	50	1.95	9.82	5.23	5.38	5.54	5.71	6.09
HPI91025	R1.25	**2.5**	4	2.3	6	45	2.4	5.54	6.35	6.53	6.72	6.93	7.39
HPI91880	R1.25	**2.5**	4	2.3	8	45	2.4	4.41	8.42	8.67	8.94	9.23	9.87
HPI91881	R1.25	**2.5**	4	2.3	10	45	2.4	3.66	10.49	10.81	11.15	11.53	12.36
HPI91882	R1.25	**2.5**	4	2.3	15	50	2.4	2.57	15.66	16.16	16.70	17.28	-
HPI91883	R1.25	**2.5**	4	2.3	20	55	2.4	1.98	20.82	21.51	22.24	-	-
HPI91884	R1.25	**2.5**	4	2.3	25	65	2.4	1.61	25.99	26.85	27.78	-	-
HPI91885	R1.25	**2.5**	4	2.3	30	70	2.4	1.35	31.16	32.20	-	-	-
HPI91886	R1.25	**2.5**	4	2.3	35	70	2.4	1.17	36.33	37.55	-	-	-
HPI91030	R1.5	**3.0**	4	3	8	40	2.85	3.31	8.51	8.75	9.01	9.30	9.93
HPI91887	R1.5	**3.0**	6	2.5	6	60	2.85	8.22	6.44	6.61	6.80	7.00	7.44
HPI91888	R1.5	**3.0**	6	2.5	8	60	2.85	6.91	8.51	8.75	9.01	9.30	9.93
HPI91889	R1.5	**3.0**	6	2.5	10	60	2.85	5.96	10.58	10.89	11.23	11.60	12.41
HPI91890	R1.5	**3.0**	6	2.5	12	60	2.85	5.23	12.64	13.03	13.45	13.90	14.90
HPI91891	R1.5	**3.0**	6	2.5	14	60	2.85	4.67	14.71	15.17	15.66	16.20	17.39

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
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HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

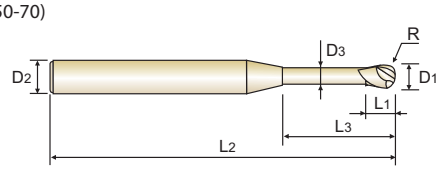
C-COATED SOLID CARBIDE END MILLS

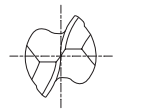
2 FLUTE BALL NOSE for RIB PROCESSING

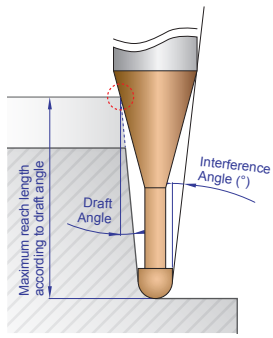
SERIES **HPI91**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91892	R1.5	**3.0**	6	2.5	16	60	2.85	4.21	16.78	17.31	17.88	18.49	19.87
HPI91893	R1.5	**3.0**	6	2.5	20	65	2.85	3.52	20.91	21.59	22.31	23.09	24.85
HPI91894	R1.5	**3.0**	6	2.5	25	65	2.85	2.92	26.08	26.94	27.86	28.84	-
HPI91895	R1.5	**3.0**	6	2.5	30	70	2.85	2.50	31.25	32.29	33.40	34.59	-
HPI91896	R1.5	**3.0**	6	2.5	35	80	2.85	2.18	36.42	37.63	38.94	40.34	-
HPI91897	R1.5	**3.0**	6	2.5	40	90	2.85	1.94	41.59	42.98	44.48	-	-
HPI91898	R1.5	**3.0**	6	3	8	60	2.85	6.91	8.51	8.75	9.01	9.30	9.93
HPI91035	R1.75	**3.5**	6	2.8	15	60	1.25	3.24	19.79	20.41	21.09	21.81	23.44
HPI91899	R1.75	**3.5**	6	2.8	20	65	3.35	3.08	20.90	21.57	22.29	23.06	24.79
HPI91701	R1.75	**3.5**	6	2.8	25	65	3.35	2.54	26.07	26.92	27.83	28.81	-
HPI91702	R1.75	**3.5**	6	2.8	30	70	3.35	2.16	31.24	32.27	33.37	34.56	-
HPI91703	R1.75	**3.5**	6	2.8	35	80	3.35	1.87	36.41	37.62	38.91	-	-
HPI91704	R1.75	**3.5**	6	2.8	40	90	3.35	1.66	41.58	42.96	44.45	-	-
HPI91705	R1.75	**3.5**	6	2.8	45	90	3.35	1.49	46.75	48.31	-	-	-
HPI91040	R2.0	**4.0**	4	3	8	65	3.85	0.00	-	-	-	-	-
HPI91706	R2.0	**4.0**	6	3	8	65	3.85	5.70	8.49	8.72	8.96	9.22	9.81
HPI91707	R2.0	**4.0**	6	3	10	65	3.85	4.76	10.56	10.86	11.18	11.52	12.29
HPI91708	R2.0	**4.0**	6	3	12	65	3.85	4.08	12.63	13.00	13.39	13.82	14.78
HPI91709	R2.0	**4.0**	6	3	14	65	3.85	3.57	14.69	15.14	15.61	16.12	17.27
HPI91710	R2.0	**4.0**	6	3	15	65	3.85	3.36	15.73	16.21	16.72	17.27	18.51
HPI91711	R2.0	**4.0**	6	3	20	65	3.85	2.60	20.90	21.55	22.26	23.02	-
HPI91712	R2.0	**4.0**	6	3	25	70	3.85	2.12	26.06	26.90	27.80	28.77	-
HPI91713	R2.0	**4.0**	6	3	30	70	3.85	1.79	31.23	32.25	33.34	-	-
HPI91714	R2.0	**4.0**	6	3	35	80	3.85	1.55	36.40	37.60	38.88	-	-
HPI91715	R2.0	**4.0**	6	3	40	85	3.85	1.36	41.57	42.95	-	-	-
HPI91716	R2.0	**4.0**	6	3	45	90	3.85	1.22	46.74	48.30	-	-	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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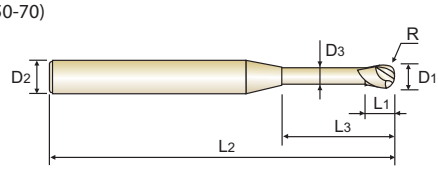
C-COATED SOLID CARBIDE END MILLS

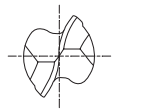
2 FLUTE BALL NOSE for RIB PROCESSING

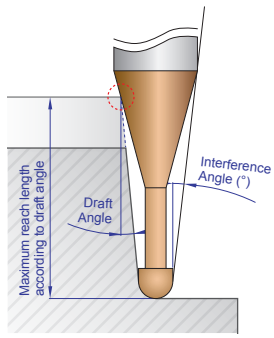
SERIES **HPI91**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

P. 94 -105

R0.05~R3 R3.5~R6

✻ NEW SIZE Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI91717	R2.0	**4.0**	6	3	50	100	3.85	1.10	51.91	53.64	-	-	-
HPI91718	R2.0	**4.0**	6	4	10	40	3.85	4.76	10.56	10.86	11.18	11.52	12.29
HPI91719	R2.0	**4.0**	6	4	10	60	3.85	4.76	10.56	10.86	11.18	11.52	12.29
HPI91050	R2.5	**5.0**	6	3.5	10	70	4.85	2.97	10.54	10.82	11.12	11.45	-
HPI91720	R2.5	**5.0**	6	3.5	15	70	4.85	1.96	15.71	16.17	16.66	-	-
HPI91721	R2.5	**5.0**	6	3.5	20	70	4.85	1.46	20.88	21.52	-	-	-
HPI91722	R2.5	**5.0**	6	3.5	25	70	4.85	1.16	26.05	26.87	-	-	-
HPI91723	R2.5	**5.0**	6	3.5	30	80	4.85	0.97	31.22	-	-	-	-
HPI91724	R2.5	**5.0**	6	3.5	40	90	4.85	0.72	41.55	-	-	-	-
HPI91725	R2.5	**5.0**	6	5	12	45	4.85	2.46	12.61	12.96	13.34	13.75	-
HPI91726	R2.5	**5.0**	6	5	12	60	4.85	2.46	12.61	12.96	13.34	13.75	-
HPI91060	R3.0	**6.0**	6	6	10	70	5.85	0.00	-	-	-	-	-
HPI91727	R3.0	**6.0**	6	6	15	45	5.85	0.00	-	-	-	-	-
HPI91728	R3.0	**6.0**	6	6	15	60	5.85	0.00	-	-	-	-	-
HPI91729	R3.0	**6.0**	6	6	15	70	5.85	0.00	-	-	-	-	-
HPI91730	R3.0	**6.0**	6	6	20	70	5.85	0.00	-	-	-	-	-
HPI91731	R3.0	**6.0**	6	6	25	70	5.85	0.00	-	-	-	-	-
HPI91732	R3.0	**6.0**	6	6	30	80	5.85	0.00	-	-	-	-	-
HPI91733	R3.0	**6.0**	6	6	35	85	5.85	0.00	-	-	-	-	-
HPI91734	R3.0	**6.0**	6	6	40	90	5.85	0.00	-	-	-	-	-
HPI91735	R3.0	**6.0**	6	6	50	120	5.85	0.00	-	-	-	-	-
HPI91736	R3.0	**6.0**	6	6	60	120	5.85	0.00	-	-	-	-	-
✻ **HPI91080**	R4.0	**8.0**	8	12	24	100	7.7	0.00	-	-	-	-	-
✻ **HPI91100**	R5.0	**10.0**	10	15	30	100	9.7	0.00	-	-	-	-	-
✻ **HPI91120**	R6.0	**12.0**	12	18	36	110	11.7	0.00	-	-	-	-	-

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

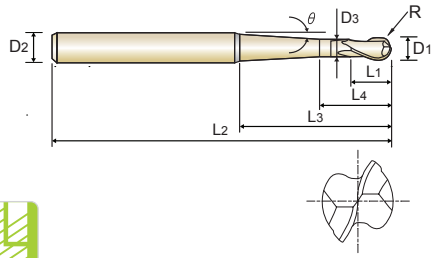
C-COATED SOLID CARBIDE END MILLS

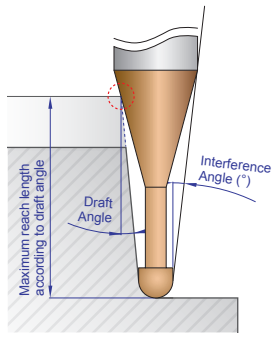
SERIES **HPI92**

2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92001	R0.05	**0.1**	4	0.07	0.5	50	0.085	**3°**	0.17	14.23	0.37	0.44	0.51	0.53	0.56
HPI92901	R0.05	**0.1**	4	0.07	0.75	50	0.085	**3°**	0.17	13.88	0.37	0.44	0.58	0.76	0.81
HPI920015	R0.075	**0.15**	4	0.1	1	50	0.135	**3°**	0.25	13.55	0.46	0.55	0.71	1.00	1.08
HPI92902	R0.075	**0.15**	4	0.1	1.5	50	0.135	**3°**	0.25	12.92	0.46	0.55	0.71	1.03	1.58
HPI92002	R0.1	**0.2**	4	0.15	1.5	50	0.17	**0.5°**	0.35	12.59	1.57	1.62	1.67	1.73	1.86
HPI92903	R0.1	**0.2**	4	0.15	1.5	50	0.17	**1°**	0.35	12.64	1.53	1.58	1.63	1.69	1.82
HPI92904	R0.1	**0.2**	4	0.15	1.5	50	0.17	**1.5°**	0.35	12.69	1.33	1.54	1.59	1.64	1.77
HPI92905	R0.1	**0.2**	4	0.15	1.5	50	0.17	**2°**	0.35	12.75	1.01	1.46	1.55	1.60	1.72
HPI92906	R0.1	**0.2**	4	0.15	2	50	0.17	**0.5°**	0.35	11.93	2.07	2.13	2.21	2.29	2.46
HPI92907	R0.1	**0.2**	4	0.15	2	50	0.17	**1°**	0.35	12.00	2.01	2.08	2.15	2.23	2.40
HPI92908	R0.1	**0.2**	4	0.15	2	50	0.17	**1.5°**	0.35	12.07	1.33	2.02	2.09	2.16	2.33
HPI92909	R0.1	**0.2**	4	0.15	2	50	0.17	**2°**	0.35	12.14	1.01	1.46	2.03	2.10	2.26
HPI92910	R0.1	**0.2**	4	0.15	3	50	0.17	**3°**	0.35	11.28	0.74	0.90	1.17	1.71	3.13
HPI92911	R0.1	**0.2**	4	0.15	3	50	0.17	**5°**	0.35	11.69	0.57	0.63	0.70	0.80	1.15
HPI92912	R0.1	**0.2**	4	0.15	5	50	0.17	**3°**	0.35	9.68	0.74	0.90	1.17	1.71	5.13
HPI92913	R0.1	**0.2**	4	0.15	5	50	0.17	**5°**	0.35	10.23	0.57	0.63	0.70	0.80	1.15
HPI92003	R0.15	**0.3**	4	0.2	2	50	0.27	**0.5°**	0.5	11.92	2.07	2.14	2.21	2.29	2.46
HPI92914	R0.15	**0.3**	4	0.2	2	50	0.27	**1°**	0.5	11.99	2.02	2.08	2.15	2.23	2.40
HPI92915	R0.15	**0.3**	4	0.2	2	50	0.27	**1.5°**	0.5	12.05	1.53	2.03	2.10	2.17	2.34
HPI92916	R0.15	**0.3**	4	0.2	2	50	0.27	**2°**	0.5	12.12	1.19	1.71	2.05	2.12	2.28
HPI92917	R0.15	**0.3**	4	0.2	2	50	0.27	**3°**	0.5	12.26	0.91	1.10	1.42	2.00	2.15
HPI92918	R0.15	**0.3**	4	0.2	3	50	0.27	**0.5°**	0.5	10.77	3.07	3.17	3.28	3.40	3.66
HPI92919	R0.15	**0.3**	4	0.2	3	50	0.27	**1°**	0.5	10.86	2.57	3.08	3.19	3.30	3.56
HPI92920	R0.15	**0.3**	4	0.2	3	50	0.27	**1.5°**	0.5	10.95	1.53	2.92	3.10	3.21	3.46
HPI92921	R0.15	**0.3**	4	0.2	3	50	0.27	**2°**	0.5	11.04	1.19	1.71	3.01	3.12	3.36
HPI92922	R0.15	**0.3**	4	0.2	3	50	0.27	**3°**	0.5	11.23	0.91	1.10	1.42	2.06	3.15

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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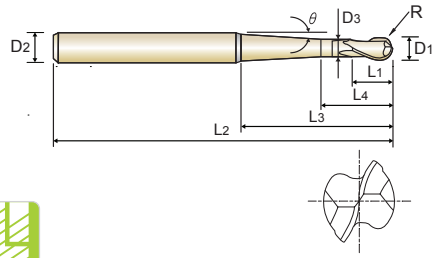
C-COATED SOLID CARBIDE END MILLS

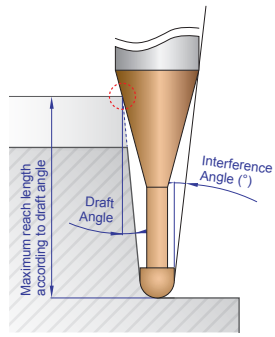
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPI92**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.05~R3) | R +0.003 ~-0.007 (R3.5~R6) | PLAIN | C Coating

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92923	R0.15	**0.3**	4	0.2	3	50	0.27	**5°**	0.5	11.62	0.73	0.80	0.89	1.02	1.45
HPI92924	R0.15	**0.3**	4	0.2	5	50	0.27	**3°**	0.5	9.61	0.91	1.10	1.42	2.06	5.15
HPI92925	R0.15	**0.3**	4	0.2	5	50	0.27	**5°**	0.5	10.14	0.73	0.80	0.89	1.02	1.45
HPI92926	R0.15	**0.3**	4	0.2	7	50	0.27	**3°**	0.5	8.39	0.91	1.10	1.42	2.06	7.15
HPI92927	R0.15	**0.3**	4	0.2	7	50	0.27	**5°**	0.5	8.99	0.73	0.80	0.89	1.02	1.45
HPI92004	R0.2	**0.4**	4	0.3	3	50	0.37	**0.5°**	0.7	10.73	3.07	3.17	3.28	3.40	3.66
HPI92928	R0.2	**0.4**	4	0.3	3	50	0.37	**1°**	0.7	10.81	2.92	3.09	3.20	3.31	3.56
HPI92929	R0.2	**0.4**	4	0.3	3	50	0.37	**1.5°**	0.7	10.90	1.81	3.01	3.12	3.23	3.47
HPI92930	R0.2	**0.4**	4	0.3	3	50	0.37	**2°**	0.7	10.98	1.44	2.06	3.03	3.14	3.38
HPI92931	R0.2	**0.4**	4	0.3	4	50	0.37	**0.5°**	0.7	9.76	4.07	4.21	4.35	4.51	4.86
HPI92932	R0.2	**0.4**	4	0.3	4	50	0.37	**1°**	0.7	9.86	2.92	4.09	4.24	4.39	4.73
HPI92933	R0.2	**0.4**	4	0.3	4	50	0.37	**1.5°**	0.7	9.96	1.81	3.42	4.12	4.26	4.59
HPI92934	R0.2	**0.4**	4	0.3	4	50	0.37	**2°**	0.7	10.06	1.44	2.06	3.92	4.14	4.46
HPI92935	R0.2	**0.4**	4	0.3	5	50	0.37	**3°**	0.7	9.52	1.14	1.38	1.77	2.56	5.19
HPI92936	R0.2	**0.4**	4	0.3	5	50	0.37	**5°**	0.7	10.04	0.95	1.04	1.16	1.32	1.87
HPI92937	R0.2	**0.4**	4	0.3	6	50	0.37	**0.5°**	0.7	8.26	6.07	6.28	6.50	6.74	7.27
HPI92938	R0.2	**0.4**	4	0.3	6	50	0.37	**1°**	0.7	8.37	2.92	6.09	6.31	6.54	7.05
HPI92939	R0.2	**0.4**	4	0.3	6	50	0.37	**1.5°**	0.7	8.49	1.81	3.42	6.12	6.34	6.84
HPI92940	R0.2	**0.4**	4	0.3	6	50	0.37	**2°**	0.7	8.61	1.44	2.06	3.92	6.14	6.62
HPI92941	R0.2	**0.4**	4	0.3	7	50	0.37	**3°**	0.7	8.30	1.14	1.38	1.77	2.56	7.19
HPI92942	R0.2	**0.4**	4	0.3	7	50	0.37	**5°**	0.7	8.88	0.95	1.04	1.16	1.32	1.87
HPI92005	R0.25	**0.5**	4	0.35	4	50	0.45	**0.5°**	0.85	9.67	4.12	4.25	4.40	4.55	4.90
HPI92943	R0.25	**0.5**	4	0.35	4	50	0.45	**1°**	0.85	9.76	4.01	4.14	4.28	4.43	4.77
HPI92944	R0.25	**0.5**	4	0.35	4	50	0.45	**1.5°**	0.85	9.86	2.58	4.03	4.17	4.32	4.65
HPI92945	R0.25	**0.5**	4	0.35	4	50	0.45	**2°**	0.85	9.96	2.00	2.88	4.05	4.20	4.52
HPI92946	R0.25	**0.5**	4	0.35	5	50	0.45	**0.5°**	0.85	8.85	5.12	5.29	5.47	5.66	6.10

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

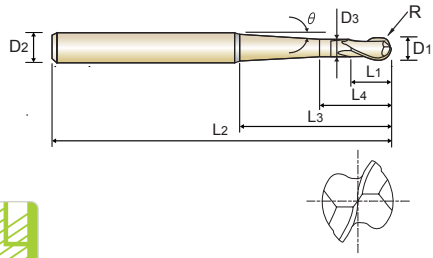
C-COATED SOLID CARBIDE END MILLS

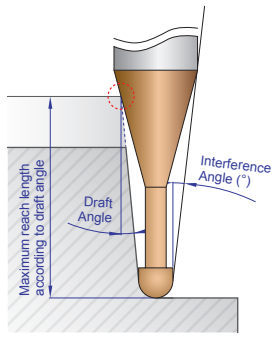
SERIES **HPI92**

2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92947	R0.25	**0.5**	4	0.35	5	50	0.45	**1°**	0.85	8.96	4.31	5.14	5.32	5.51	5.93
HPI92948	R0.25	**0.5**	4	0.35	5	50	0.45	**1.5°**	0.85	9.06	2.58	4.91	5.17	5.35	5.77
HPI92949	R0.25	**0.5**	4	0.35	5	50	0.45	**2°**	0.85	9.18	2.00	2.88	5.02	5.20	5.60
HPI92006	R0.3	**0.6**	4	0.45	4	50	0.55	**0.5°**	1.05	9.61	4.12	4.25	4.40	4.55	4.90
HPI92950	R0.3	**0.6**	4	0.45	4	50	0.55	**1°**	1.05	9.70	4.02	4.15	4.29	4.44	4.78
HPI92951	R0.3	**0.6**	4	0.45	4	50	0.55	**1.5°**	1.05	9.79	2.86	4.05	4.18	4.33	4.66
HPI92952	R0.3	**0.6**	4	0.45	4	50	0.55	**3°**	1.05	10.08	1.77	2.14	2.75	3.98	4.30
HPI92953	R0.3	**0.6**	4	0.45	5	50	0.55	**0.5°**	1.05	8.78	5.12	5.29	5.47	5.66	6.10
HPI92954	R0.3	**0.6**	4	0.45	5	50	0.55	**1°**	1.05	8.88	4.66	5.15	5.33	5.52	5.94
HPI92955	R0.3	**0.6**	4	0.45	5	50	0.55	**1.5°**	1.05	8.98	2.86	5.01	5.18	5.37	5.78
HPI92956	R0.3	**0.6**	4	0.45	5	50	0.55	**2°**	1.05	9.09	2.25	3.23	5.04	5.22	5.62
HPI92957	R0.3	**0.6**	4	0.45	5	50	0.55	**3°**	1.05	9.31	1.77	2.14	2.75	3.98	5.30
HPI92958	R0.3	**0.6**	4	0.45	5	50	0.55	**5°**	1.05	9.79	1.45	1.59	1.78	2.02	2.88
HPI92959	R0.3	**0.6**	4	0.45	6	50	0.55	**0.5°**	1.05	8.08	6.12	6.32	6.54	6.78	7.30
HPI92960	R0.3	**0.6**	4	0.45	6	50	0.55	**1°**	1.05	8.19	4.66	6.15	6.36	6.59	7.10
HPI92961	R0.3	**0.6**	4	0.45	6	50	0.55	**1.5°**	1.05	8.30	2.86	5.41	6.18	6.41	6.90
HPI92962	R0.3	**0.6**	4	0.45	6	50	0.55	**2°**	1.05	8.41	2.25	3.23	6.01	6.22	6.70
HPI92963	R0.3	**0.6**	4	0.45	7	50	0.55	**3°**	1.05	8.08	1.77	2.14	2.75	3.98	7.30
HPI92964	R0.3	**0.6**	4	0.45	7	50	0.55	**5°**	1.05	8.63	1.45	1.59	1.78	2.02	2.88
HPI92965	R0.3	**0.6**	4	0.45	8	50	0.55	**0.5°**	1.05	6.97	8.12	8.39	8.69	9.00	9.71
HPI92966	R0.3	**0.6**	4	0.45	8	50	0.55	**1°**	1.05	7.08	4.66	8.15	8.44	8.74	9.43
HPI92967	R0.3	**0.6**	4	0.45	8	50	0.55	**1.5°**	1.05	7.20	2.86	5.41	8.18	8.48	9.14
HPI92968	R0.3	**0.6**	4	0.45	8	50	0.55	**2°**	1.05	7.32	2.25	3.23	6.16	8.22	8.86
HPI92008	R0.4	**0.8**	4	0.6	8	60	0.75	**0.5°**	1.4	6.78	8.13	8.40	8.69	9.00	9.70
HPI92969	R0.4	**0.8**	4	0.6	8	60	0.75	**1°**	1.4	6.89	5.26	8.17	8.45	8.75	9.43
HPI92970	R0.4	**0.8**	4	0.6	8	60	0.75	**1.5°**	1.4	7.01	3.33	6.26	8.21	8.50	9.16

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

C-COATED SOLID CARBIDE END MILLS

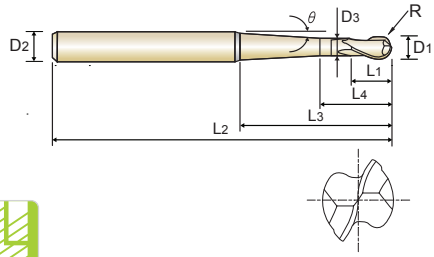
SERIES

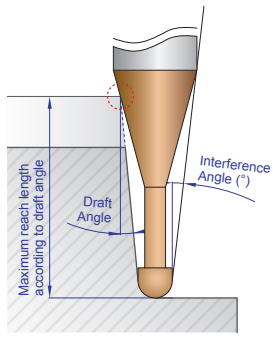
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

HPI92

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.05~R3) | R +0.003 ~-0.007 (R3.5~R6) | PLAIN | C Coating

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92971	R0.4	**0.8**	4	0.6	8	60	0.75	**2°**	1.4	7.12	2.69	3.83	7.26	8.26	8.89
HPI92972	R0.4	**0.8**	4	0.6	12	60	0.75	**0.5°**	1.4	5.28	12.13	12.54	12.98	13.45	14.51
HPI92973	R0.4	**0.8**	4	0.6	12	60	0.75	**1°**	1.4	5.38	5.26	12.17	12.59	13.05	14.08
HPI92974	R0.4	**0.8**	4	0.6	12	60	0.75	**1.5°**	1.4	5.50	3.33	6.26	12.21	12.65	13.65
HPI92975	R0.4	**0.8**	4	0.6	12	60	0.75	**2°**	1.4	5.61	2.69	3.83	7.26	12.26	13.22
HPI92010	R0.5	**1.0**	4	0.75	6	60	0.95	**0.5°**	2.75	7.71	6.17	6.37	6.58	6.81	7.32
HPI92976	R0.5	**1.0**	4	0.75	6	60	0.95	**1°**	2.75	7.78	6.06	6.26	6.46	6.69	7.19
HPI92977	R0.5	**1.0**	4	0.75	6	60	0.95	**1.5°**	2.75	7.85	5.31	6.14	6.35	6.57	7.06
HPI92978	R0.5	**1.0**	4	0.75	8	60	0.95	**0.5°**	2.75	6.57	8.17	8.44	8.73	9.03	9.73
HPI92979	R0.5	**1.0**	4	0.75	8	60	0.95	**1°**	2.75	6.66	7.86	8.26	8.54	8.84	9.51
HPI92980	R0.5	**1.0**	4	0.75	8	60	0.95	**1.5°**	2.75	6.75	5.31	8.07	8.35	8.64	9.30
HPI92981	R0.5	**1.0**	4	0.75	8	60	0.95	**2°**	2.75	6.84	4.45	6.43	8.16	8.44	9.09
HPI92982	R0.5	**1.0**	4	0.75	10	60	0.95	**0.5°**	2.75	5.73	10.17	10.51	10.87	11.26	12.13
HPI92983	R0.5	**1.0**	4	0.75	10	60	0.95	**1°**	2.75	5.82	7.86	10.26	10.61	10.99	11.84
HPI92984	R0.5	**1.0**	4	0.75	10	60	0.95	**1.5°**	2.75	5.91	5.31	10.00	10.35	10.72	11.55
HPI92985	R0.5	**1.0**	4	0.75	10	60	0.95	**2°**	2.75	6.01	4.45	6.43	10.09	10.44	11.25
HPI92986	R0.5	**1.0**	4	0.75	10	60	0.95	**3°**	2.75	6.22	3.77	4.59	5.95	8.67	10.66
HPI92987	R0.5	**1.0**	4	0.75	12	60	0.95	**0.5°**	2.75	5.08	12.17	12.58	13.02	13.48	14.54
HPI92988	R0.5	**1.0**	4	0.75	12	60	0.95	**1°**	2.75	5.17	7.86	12.26	12.68	13.14	14.16
HPI92989	R0.5	**1.0**	4	0.75	12	60	0.95	**1.5°**	2.75	5.26	5.31	10.11	12.35	12.79	13.79
HPI92990	R0.5	**1.0**	4	0.75	16	60	0.95	**0.5°**	2.75	4.13	16.17	16.72	17.30	17.93	19.35
HPI92991	R0.5	**1.0**	4	0.75	16	60	0.95	**1°**	2.75	4.22	7.86	16.26	16.83	17.44	18.81
HPI92992	R0.5	**1.0**	4	0.75	16	60	0.95	**1.5°**	2.75	4.31	5.31	10.11	16.35	16.94	18.28
HPI92993	R0.5	**1.0**	4	0.75	20	70	0.95	**0.5°**	2.75	3.49	20.17	20.86	21.59	22.38	24.16
HPI92994	R0.5	**1.0**	4	0.75	20	70	0.95	**1°**	2.75	3.57	7.86	20.26	20.97	21.74	23.46
HPI92995	R0.5	**1.0**	4	0.75	20	70	0.95	**1.5°**	2.75	3.65	5.31	10.11	20.35	21.09	22.76

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

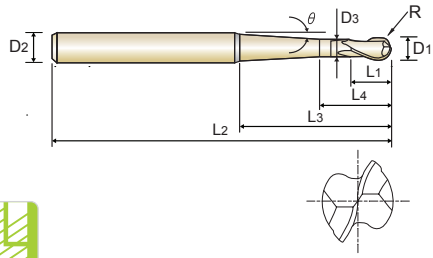
C-COATED SOLID CARBIDE END MILLS

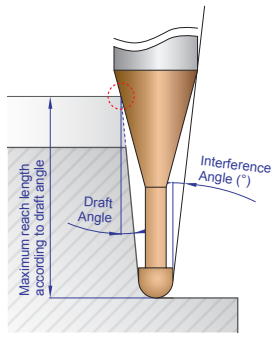
SERIES **HPI92**

2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92996	R0.5	**1.0**	4	0.75	20	70	0.95	**2°**	2.75	3.74	4.45	6.43	12.36	20.44	22.06
HPI92997	R0.5	**1.0**	4	0.75	20	70	0.95	**3°**	2.75	3.93	3.77	4.59	5.95	8.67	20.66
HPI92998	R0.5	**1.0**	4	0.75	25	70	0.95	**0.5°**	2.75	2.91	25.17	26.03	26.95	27.95	-
HPI92999	R0.5	**1.0**	4	0.75	25	70	0.95	**1°**	2.75	2.99	7.86	25.26	26.15	27.11	-
HPI92801	R0.5	**1.0**	4	0.75	25	70	0.95	**1.5°**	2.75	3.06	5.31	10.11	25.35	26.28	28.37
HPI92802	R0.5	**1.0**	4	0.75	30	70	0.95	**0.5°**	2.75	2.50	30.17	31.21	32.31	33.51	-
HPI92803	R0.5	**1.0**	4	0.75	30	70	0.95	**1°**	2.75	2.57	7.86	30.26	31.33	32.49	-
HPI92804	R0.5	**1.0**	4	0.75	30	70	0.95	**1.5°**	2.75	2.64	5.31	10.11	30.35	31.47	-
HPI92805	R0.5	**1.0**	4	0.75	30	70	0.95	**2°**	2.75	2.71	4.45	6.43	12.36	30.44	-
HPI92896	R0.5	**1.0**	6	0.75	30	70	0.95	**3°**	2.75	4.26	3.77	4.59	5.95	8.67	30.66
HPI92015	R0.75	**1.5**	4	1.1	10	60	1.45	**0.5°**	3.1	5.18	10.18	10.50	10.86	11.24	12.09
HPI92806	R0.75	**1.5**	4	1.1	10	60	1.45	**1°**	3.1	5.27	8.31	10.26	10.61	10.98	11.81
HPI92807	R0.75	**1.5**	4	1.1	10	60	1.45	**1.5°**	3.1	5.36	5.71	10.02	10.36	10.72	11.53
HPI92808	R0.75	**1.5**	4	1.1	10	60	1.45	**2°**	3.1	5.45	4.84	6.88	10.11	10.46	11.25
HPI92809	R0.75	**1.5**	4	1.1	15	60	1.45	**0.5°**	3.1	3.84	15.18	15.68	16.22	16.80	18.10
HPI92810	R0.75	**1.5**	4	1.1	15	60	1.45	**1°**	3.1	3.92	8.31	15.26	15.79	16.35	17.62
HPI92811	R0.75	**1.5**	4	1.1	15	60	1.45	**1.5°**	3.1	4.01	5.71	10.66	15.36	15.91	17.14
HPI92812	R0.75	**1.5**	4	1.1	15	60	1.45	**2°**	3.1	4.10	4.84	6.88	13.01	15.46	16.65
HPI92813	R0.75	**1.5**	4	1.1	20	70	1.45	**0.5°**	3.1	3.05	20.18	20.85	21.58	22.36	24.11
HPI92814	R0.75	**1.5**	4	1.1	20	70	1.45	**1°**	3.1	3.12	8.31	20.26	20.97	21.73	23.43
HPI92815	R0.75	**1.5**	4	1.1	20	70	1.45	**1.5°**	3.1	3.20	5.71	10.66	20.36	21.09	22.74
HPI92816	R0.75	**1.5**	4	1.1	20	70	1.45	**2°**	3.1	3.28	4.84	6.88	13.01	20.46	22.06
HPI92817	R0.75	**1.5**	4	1.1	25	70	1.45	**0.5°**	3.1	2.53	25.18	26.03	26.94	27.92	-
HPI92818	R0.75	**1.5**	4	1.1	25	70	1.45	**1°**	3.1	2.59	8.31	25.26	26.15	27.10	-
HPI92819	R0.75	**1.5**	4	1.1	30	70	1.45	**0.5°**	3.1	2.16	30.18	31.20	32.30	33.48	-
HPI92820	R0.75	**1.5**	4	1.1	30	70	1.45	**1°**	3.1	2.22	8.31	30.26	31.33	32.48	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

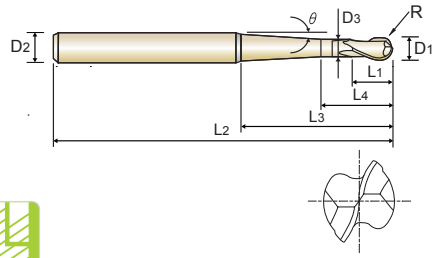
C-COATED SOLID CARBIDE END MILLS

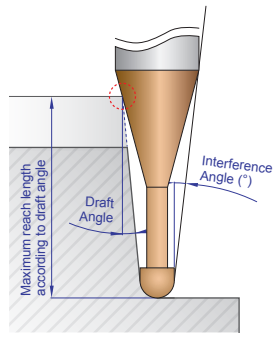
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPI92**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.05~R3) | R +0.003 ~-0.007 (R3.5~R6) | PLAIN | C Coating

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92020	R1.0	**2.0**	4	1.5	12	60	1.95	**0.5°**	3.5	3.93	12.18	12.57	12.99	13.44	14.45
HPI92821	R1.0	**2.0**	4	1.5	12	60	1.95	**1°**	3.5	4.01	8.86	12.27	12.68	13.12	14.10
HPI92822	R1.0	**2.0**	4	1.5	12	60	1.95	**1.5°**	3.5	4.09	6.18	11.36	12.37	12.80	13.76
HPI92823	R1.0	**2.0**	4	1.5	12	60	1.95	**2°**	3.5	4.17	5.29	7.43	12.07	12.48	13.41
HPI92824	R1.0	**2.0**	4	1.5	16	60	1.95	**0.5°**	3.5	3.11	16.18	16.71	17.28	17.89	19.26
HPI92825	R1.0	**2.0**	4	1.5	16	60	1.95	**1°**	3.5	3.18	8.86	16.27	16.83	17.42	18.75
HPI92826	R1.0	**2.0**	4	1.5	16	60	1.95	**1.5°**	3.5	3.25	6.18	11.36	16.37	16.95	18.24
HPI92827	R1.0	**2.0**	4	1.5	16	60	1.95	**2°**	3.5	3.33	5.29	7.43	13.86	16.48	17.74
HPI92828	R1.0	**2.0**	4	1.5	20	70	1.95	**0.5°**	3.5	2.57	20.18	20.85	21.57	22.34	-
HPI92829	R1.0	**2.0**	4	1.5	20	70	1.95	**1°**	3.5	2.63	8.86	20.27	20.97	21.72	-
HPI92830	R1.0	**2.0**	4	1.5	20	70	1.95	**1.5°**	3.5	2.70	6.18	11.36	20.37	21.10	-
HPI92831	R1.0	**2.0**	4	1.5	20	70	1.95	**2°**	3.5	2.77	5.29	7.43	13.86	20.48	-
HPI92832	R1.0	**2.0**	4	1.5	25	70	1.95	**0.5°**	3.5	2.11	25.18	26.02	26.93	27.90	-
HPI92833	R1.0	**2.0**	4	1.5	25	70	1.95	**1°**	3.5	2.17	8.86	25.27	26.15	27.09	-
HPI92834	R1.0	**2.0**	4	1.5	25	70	1.95	**1.5°**	3.5	2.23	6.18	11.36	25.37	26.29	-
HPI92835	R1.0	**2.0**	4	1.5	30	70	1.95	**0.5°**	3.5	1.79	30.18	31.20	32.29	-	-
HPI92836	R1.0	**2.0**	4	1.5	30	70	1.95	**1°**	3.5	1.84	8.86	30.27	31.33	-	-
HPI92837	R1.0	**2.0**	4	1.5	35	80	1.95	**0.5°**	3.5	1.56	35.18	36.37	37.65	-	-
HPI92838	R1.0	**2.0**	4	1.5	40	80	1.95	**0.5°**	3.5	1.38	40.18	41.55	-	-	-
HPI92839	R1.0	**2.0**	4	1.5	50	90	1.95	**0.5°**	3.5	1.12	50.18	51.89	-	-	-
HPI92840	R1.0	**2.0**	6	1.5	25	70	1.95	**2°**	3.5	3.98	5.29	7.43	13.86	25.48	27.47
HPI92841	R1.0	**2.0**	6	1.5	30	70	1.95	**1.5°**	3.5	3.37	6.18	11.36	30.37	31.48	33.95
HPI92842	R1.0	**2.0**	6	1.5	30	70	1.95	**2°**	3.5	3.46	5.29	7.43	13.86	30.48	32.87
HPI92843	R1.0	**2.0**	6	1.5	35	80	1.95	**1°**	3.5	2.90	8.86	35.27	36.51	37.84	-
HPI92844	R1.0	**2.0**	6	1.5	35	80	1.95	**1.5°**	3.5	2.98	6.18	11.36	35.37	36.66	-
HPI92845	R1.0	**2.0**	6	1.5	40	80	1.95	**1°**	3.5	2.59	8.86	40.27	41.69	43.22	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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SERIES **HPI92**

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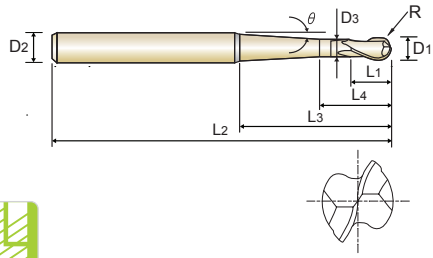

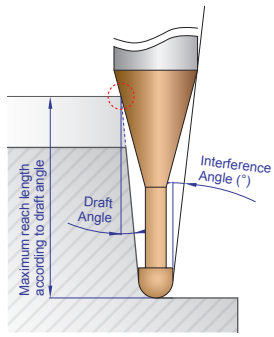

CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92846	R1.0	**2.0**	6	1.5	40	80	1.95	**1.5°**	3.5	2.66	6.18	11.36	40.37	41.85	-
HPI92847	R1.0	**2.0**	6	1.5	40	80	1.95	**2°**	3.5	2.74	5.29	7.43	13.86	40.48	-
HPI92848	R1.0	**2.0**	6	1.5	50	90	1.95	**1°**	3.5	2.14	8.86	50.27	52.05	53.97	-
HPI92849	R1.0	**2.0**	6	1.5	50	90	1.95	**1.5°**	3.5	2.20	6.18	11.36	50.37	52.22	-
HPI92850	R1.0	**2.0**	6	1.5	50	90	1.95	**2°**	3.5	2.27	5.29	7.43	13.86	50.48	-
HPI92030	R1.5	**3.0**	6	2.5	15	70	2.85	**0.5°**	4.5	4.51	15.39	15.87	16.39	16.95	18.21
HPI92851	R1.5	**3.0**	6	2.5	15	70	2.85	**1°**	4.5	4.59	15.04	15.51	16.01	16.56	17.78
HPI92852	R1.5	**3.0**	6	2.5	15	70	2.85	**1.5°**	4.5	4.67	10.30	15.14	15.64	16.17	17.35
HPI92853	R1.5	**3.0**	6	2.5	15	70	2.85	**2°**	4.5	4.76	8.36	11.79	15.26	15.77	16.93
HPI92854	R1.5	**3.0**	6	2.5	20	70	2.85	**0.5°**	4.5	3.60	20.39	21.05	21.75	22.51	24.22
HPI92855	R1.5	**3.0**	6	2.5	20	70	2.85	**1°**	4.5	3.67	16.09	20.51	21.19	21.93	23.59
HPI92856	R1.5	**3.0**	6	2.5	20	70	2.85	**1.5°**	4.5	3.75	10.30	19.09	20.64	21.35	22.96
HPI92857	R1.5	**3.0**	6	2.5	20	70	2.85	**2°**	4.5	3.84	8.36	11.79	20.08	20.77	22.33
HPI92858	R1.5	**3.0**	6	2.5	25	70	2.85	**0.5°**	4.5	2.99	25.39	26.22	27.12	28.08	-
HPI92859	R1.5	**3.0**	6	2.5	25	70	2.85	**1°**	4.5	3.06	16.09	25.51	26.38	27.31	29.40
HPI92860	R1.5	**3.0**	6	2.5	25	70	2.85	**1.5°**	4.5	3.14	10.30	19.09	25.64	26.54	28.57
HPI92861	R1.5	**3.0**	6	2.5	30	70	2.85	**0.5°**	4.5	2.56	30.39	31.40	32.48	33.64	-
HPI92862	R1.5	**3.0**	6	2.5	30	70	2.85	**1°**	4.5	2.63	16.09	30.51	31.56	32.68	-
HPI92863	R1.5	**3.0**	6	2.5	30	70	2.85	**1.5°**	4.5	2.69	10.30	19.09	30.64	31.73	-
HPI92864	R1.5	**3.0**	6	2.5	30	70	2.85	**2°**	4.5	2.77	8.36	11.79	22.08	30.77	-
HPI92865	R1.5	**3.0**	6	2.5	40	80	2.85	**0.5°**	4.5	1.99	40.39	41.75	43.20	-	-
HPI92866	R1.5	**3.0**	6	2.5	40	80	2.85	**1°**	4.5	2.04	16.09	40.51	41.92	43.43	-
HPI92867	R1.5	**3.0**	6	2.5	40	80	2.85	**1.5°**	4.5	2.10	10.30	19.09	40.64	42.10	-
HPI92868	R1.5	**3.0**	6	2.5	50	90	2.85	**0.5°**	4.5	1.62	50.39	52.09	53.92	-	-
HPI92869	R1.5	**3.0**	6	2.5	50	90	2.85	**1°**	4.5	1.67	16.09	50.51	52.28	-	-
HPI92870	R1.5	**3.0**	6	2.5	50	90	2.85	**1.5°**	4.5	1.72	10.30	19.09	50.64	-	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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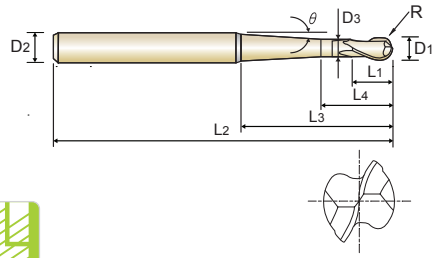
C-COATED SOLID CARBIDE END MILLS

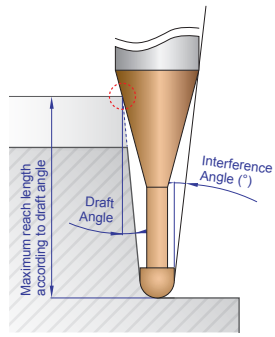
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPI92**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92040	R2.0	**4.0**	6	3	20	80	3.85	**1°**	5	2.72	16.59	20.51	21.18	21.90	-
HPI92871	R2.0	**4.0**	6	3	30	80	3.85	**1°**	5	1.89	16.59	30.51	31.54	-	-
HPI92872	R2.0	**4.0**	6	3	40	80	3.85	**1°**	5	1.44	16.59	40.51	-	-	-
HPI92873	R2.0	**4.0**	6	3	50	90	3.85	**1°**	5	1.17	16.59	50.51	-	-	-
HPI92874	R2.0	**4.0**	6	3	61.1	110	3.85	**1°**	5	0.96	16.59	-	-	-	-
HPI92897	R2.5	**5.0**	8	10	30	80	4.85	**1°**	13	2.66	30.07	31.03	32.06	33.17	-
HPI92898	R2.5	**5.0**	8	10	40	90	4.85	**1°**	13	2.06	32.09	41.03	42.42	43.92	-
HPI92899	R2.5	**5.0**	8	10	60	110	4.85	**1°**	13	1.42	32.09	61.03	-	-	-
HPI92702	R2.5	**5.0**	8	10	74	150	4.75	**1.5°**	13	1.20	25.41	48.31	-	-	-
HPI92701	R2.5	**5.0**	8	10	90	140	4.85	**1°**	13	0.97	32.09	-	-	-	-
HPI92703	R2.5	**5.0**	8	10	100	150	4.85	**0.5°**	13	0.85	100.64	-	-	-	-
HPI92704	R3.0	**6.0**	8	12	30	80	5.85	**1°**	15	1.91	30.19	31.14	32.15	-	-
HPI92705	R3.0	**6.0**	8	12	40	90	5.85	**1°**	15	1.45	35.59	41.14	-	-	-
HPI92706	R3.0	**6.0**	8	12	45	95	5.85	**1°**	15	1.30	35.59	46.14	-	-	-
HPI92707	R3.0	**6.0**	8	12	50	100	5.85	**1°**	15	1.18	35.59	51.14	-	-	-
HPI92708	R3.0	**6.0**	8	12	120	200	5.85	**0.5°**	15	0.49	-	-	-	-	-
HPI92709	R3.0	**6.0**	10	12	30	80	5.85	**3°**	15	3.60	19.11	23.14	29.84	30.99	33.27
HPI92710	R3.0	**6.0**	10	12	50	100	5.85	**1.5°**	15	2.23	25.29	47.58	51.61	53.43	-
HPI92711	R3.0	**6.0**	10	12	60	110	5.85	**1°**	15	1.85	35.59	61.14	63.24	-	-
HPI92712	R3.0	**6.0**	10	12	70	120	5.85	**1°**	15	1.61	35.59	71.14	73.60	-	-
HPI92713	R3.0	**6.0**	10	12	80	130	5.85	**1°**	15	1.42	35.59	81.14	-	-	-
HPI92714	R3.0	**6.0**	10	12	96	200	5.75	**1.5°**	15	1.23	28.16	53.31	-	-	-
HPI92715	R3.0	**6.0**	10	12	120	200	5.85	**1°**	15	0.97	35.59	-	-	-	-
HPI92070	R3.5	**7.0**	10	14	40	90	6.70	**3°**	17	2.25	23.13	28.03	36.20	40.94	-
HPI92875	R3.5	**7.0**	10	14	45	95	6.70	**1°**	17	1.87	45.09	46.54	48.09	-	-
HPI92876	R3.5	**7.0**	10	14	60	110	6.70	**1.5°**	17	1.47	32.34	60.04	-	-	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

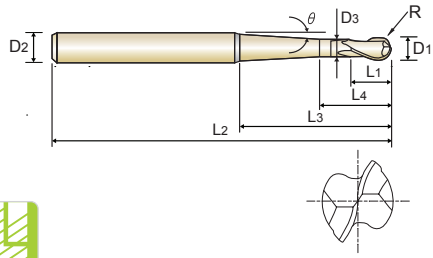
C-COATED SOLID CARBIDE END MILLS

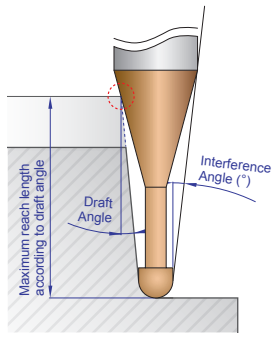
SERIES **HPI92**

2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPI92080	R4.0	**8.0**	10	14	35	95	7.70	**3°**	17	1.80	23.03	27.78	35.08	-	-
HPI92877	R4.0	**8.0**	10	14	50	110	7.70	**1°**	17	1.19	47.18	51.50	-	-	-
HPI92878	R4.0	**8.0**	10	14	50	110	7.70	**1.5°**	17	1.22	32.09	50.35	-	-	-
HPI92879	R4.0	**8.0**	10	14	55	115	7.70	**1°**	17	1.08	47.18	56.50	-	-	-
HPI92880	R4.0	**8.0**	10	14	60	120	7.70	**1°**	17	1.00	47.18	-	-	-	-
HPI92881	R4.0	**8.0**	10	14	70	130	7.70	**1°**	17	0.86	47.18	-	-	-	-
HPI92882	R4.0	**8.0**	10	14	120	200	7.70	**0.5°**	17	0.49	-	-	-	-	-
HPI92883	R4.0	**8.0**	12	14	80	140	7.70	**1°**	17	1.43	47.18	81.50	-	-	-
HPI92884	R4.0	**8.0**	12	14	98	200	7.70	**1.5°**	17	1.22	32.09	60.17	-	-	-
HPI92885	R4.0	**8.0**	12	14	120	200	7.70	**1°**	17	0.98	47.18	-	-	-	-
HPI92100	R5.0	**10.0**	12	18	35	105	9.70	**3°**	21	1.82	27.63	33.28	35.83	-	-
HPI92886	R5.0	**10.0**	12	18	55	125	9.70	**1.5°**	21	1.12	37.59	55.53	-	-	-
HPI92887	R5.0	**10.0**	12	18	60	130	9.70	**1°**	21	1.01	54.18	61.71	-	-	-
HPI92888	R5.0	**10.0**	12	18	65	135	9.70	**1°**	21	0.93	54.18	-	-	-	-
HPI92889	R5.0	**10.0**	12	18	75	140	9.70	**1°**	21	0.81	54.18	-	-	-	-
HPI92890	R5.0	**10.0**	12	18	86	200	9.70	**1°**	21	0.71	54.18	-	-	-	-
HPI92891	R5.0	**10.0**	12	18	120	200	9.70	**0.5°**	21	0.49	-	-	-	-	-
HPI92892	R5.0	**10.0**	16	18	120	200	9.70	**1.5°**	21	1.47	37.59	70.17	-	-	-
HPI92120	R6.0	**12.0**	16	22	60	140	11.70	**3°**	25	2.08	32.23	38.78	49.69	60.86	-
HPI92893	R6.0	**12.0**	16	22	80	160	11.70	**1.5°**	25	1.49	43.09	80.01	-	-	-
HPI92894	R6.0	**12.0**	16	22	106	200	11.70	**1.5°**	25	1.14	43.09	80.17	-	-	-
HPI92895	R6.0	**12.0**	16	22	120	200	11.70	**1°**	25	0.99	61.18	-	-	-	-

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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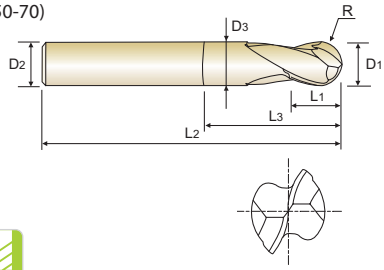
C-COATED SOLID CARBIDE END MILLS

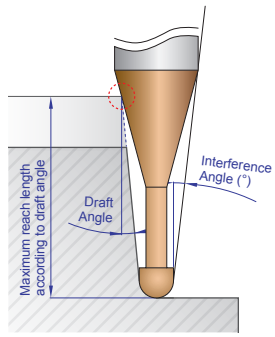
2 FLUTE BALL NOSE with NECK

SERIES **HPK24**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +.00005" ~-.00020" | R +.00010" ~-.00030" | PLAIN | C Coating

P. 106

R1/64~R1/8 R5/32~R1/4

Unit : Inch

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK24002	R1/64	**1/32**	1/4	1/32	1/16	2	.029	12.97	1.84	1.94	2.05	2.18	2.49
HPK24004	R1/32	**1/16**	1/4	1/16	1/8	2	.059	11.02	3.45	3.57	3.70	3.84	4.15
HPK24006	R3/64	**3/32**	1/4	3/32	3/16	2	.090	9.13	5.11	5.28	5.48	5.68	6.14
HPK24008	R1/16	**1/8**	1/4	1/8	1/4	2-1/2	.121	7.26	6.76	7.00	7.25	7.52	8.13
HPK24012	R3/32	**3/16**	1/4	3/16	3/8	3	.184	3.59	10.02	10.37	10.74	11.14	12.05
HPK24016	R1/8	**1/4**	1/4	1/4	1/2	3-1/2	.246	0.00	-	-	-	-	-
HPK24020	R5/32	**5/16**	5/16	5/16	5/8	4	.309	0.00	-	-	-	-	-
HPK24024	R3/16	**3/8**	3/8	3/8	3/4	4	.371	0.00	-	-	-	-	-
HPK24032	R1/4	**1/2**	1/2	1/2	1	4-1/2	.496	0.00	-	-	-	-	-

Size	Mill Dia. Tolerance (Inch)
up to Ø1/2	0~-.0004"

Size	Ball Radius Tolerance (Inch)	Shank Dia. Tolerance
up to Ø1/4	+.00005"~-.00020"	h4
over Ø1/4	+.00010"~-.00030"	* Shank Dia.>ø1/4 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel			High alloyed steel, and tool steel				Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

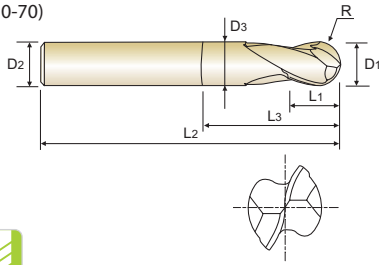
C-COATED SOLID CARBIDE END MILLS

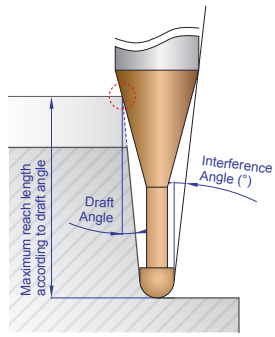
2 FLUTE BALL NOSE with NECK

SERIES **HPK10**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.5~R3) | R +0.003 ~-0.007 (R3.5~R12.5) | PLAIN | C Coating

P. 94 -105

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK10010	R0.5	**1.0**	4	1	2.5	45	0.95	10.38	2.78	2.93	3.10	3.29	3.76
HPK10015	R0.75	**1.5**	4	1.5	3.75	45	1.45	8.36	3.97	4.11	4.26	4.42	4.78
HPK10020	R1.0	**2.0**	6	2	5	45	1.95	9.05	5.26	5.45	5.64	5.86	6.33
HPK10025	R1.25	**2.5**	6	2.5	6.25	45	2.4	7.69	6.65	6.89	7.13	7.40	8.00
HPK10030	R1.5	**3.0**	6	3	7.5	45	2.85	6.40	8.04	8.32	8.62	8.95	9.67
HPK10035	R1.75	**3.5**	6	3.5	8.75	45	3.35	5.22	9.33	9.66	10.01	10.38	11.23
HPK10040	R2.0	**4.0**	6	4	10	45	3.85	4.08	10.63	11.00	11.39	11.82	12.78
HPK10050	R2.5	**5.0**	6	5	12.5	50	4.85	1.96	13.21	13.67	14.16	-	-
HPK10060	R3.0	**6.0**	6	6	15	50	5.85	0.00	-	-	-	-	-
HPK10080	R4.0	**8.0**	8	8	20	60	7.7	0.00	-	-	-	-	-
HPK10100	R5.0	**10.0**	10	10	25	70	9.7	0.00	-	-	-	-	-
HPK10120	R6.0	**12.0**	12	12	30	75	11.7	0.00	-	-	-	-	-
HPK10140	R7.0	**14.0**	14	14	28	110	13.7	0.00	-	-	-	-	-
HPK10160	R8.0	**16.0**	16	16	32	140	15.7	0.00	-	-	-	-	-
HPK10180	R9.0	**18.0**	18	18	36	140	17.7	0.00	-	-	-	-	-
HPK10200	R10.0	**20.0**	20	20	40	160	19.7	0.00	-	-	-	-	-
HPK10250	R12.5	**25.0**	25	25	50	180	24.7	0.00	-	-	-	-	-

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

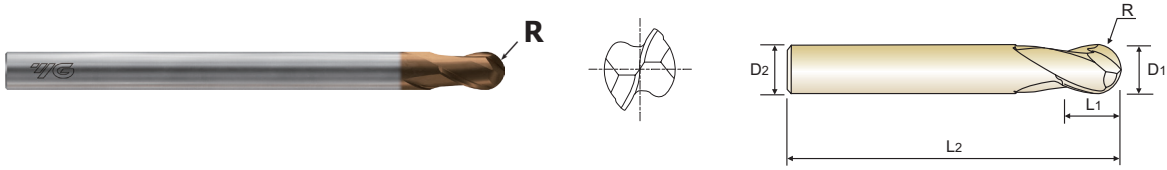
ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

C-COATED SOLID CARBIDE END MILLS

2 FLUTE BALL NOSE

SERIES **HPI90**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)



CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

P. 107-108

R0.05~R3 R3.5~R10

✻ NEW SIZE Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D1	D2	L1	L2
HPI90001	R0.05	**0.1**	4	0.1	50
HPI900015	R0.075	**0.15**	4	0.15	50
HPI90002	R0.1	**0.2**	4	0.2	50
HPI90003	R0.15	**0.3**	4	0.3	50
HPI90004	R0.2	**0.4**	4	0.6	50
✻ HPI90902	R0.2	**0.4**	6	0.4	50
HPI90005	R0.25	**0.5**	4	0.8	50
✻ HPI90903	R0.25	**0.5**	6	0.5	50
HPI90006	R0.3	**0.6**	4	0.9	50
✻ HPI90904	R0.3	**0.6**	6	0.6	50
HPI90008	R0.4	**0.8**	4	1.2	50
✻ HPI90905	R0.4	**0.8**	6	0.8	50
HPI90010	R0.5	**1.0**	4	1.5	50
✻ HPI90906	R0.5	**1.0**	6	1	50
✻ HPI90012	R0.6	**1.2**	6	1.2	50
HPI90015	R0.75	**1.5**	4	2.3	50
✻ HPI90907	R0.75	**1.5**	6	1.5	50
HPI90020	R1.0	**2.0**	4	3	60
✻ HPI90908	R1.0	**2.0**	6	2	50
HPI90025	R1.25	**2.5**	6	3.8	60
HPI90030	R1.5	**3.0**	6	5	60
HPI90040	R2.0	**4.0**	4	6	70
HPI90901	R2.0	**4.0**	6	6	70
HPI90050	R2.5	**5.0**	6	8	70
HPI90060	R3.0	**6.0**	6	10	80
HPI90080	R4.0	**8.0**	8	12	100
HPI90100	R5.0	**10.0**	10	15	100
HPI90120	R6.0	**12.0**	12	18	110
HPI90160	R8.0	**16.0**	16	24	140
HPI90200	R10.0	**20.0**	20	30	160

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

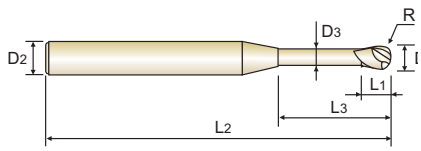
C-COATED SOLID CARBIDE END MILLS

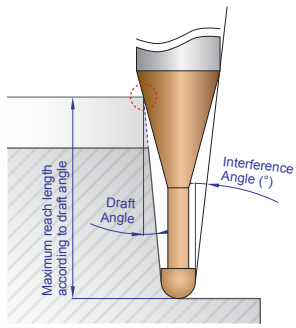
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

P. 109-120

R0.05~R3 R3.5~R6

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45001	R0.05	**0.1**	4	0.07	0.2	45	0.085	14.66	0.25	0.26	0.28	0.29	0.32
HPK45901	R0.05	**0.1**	4	0.07	0.3	45	0.085	14.47	0.36	0.37	0.39	0.41	0.47
HPK45902	R0.05	**0.1**	4	0.07	0.5	45	0.085	14.11	0.57	0.60	0.63	0.66	0.75
HPK450015	R0.075	**0.15**	4	0.1	0.3	45	0.135	14.51	0.36	0.37	0.39	0.41	0.46
HPK45903	R0.075	**0.15**	4	0.1	0.5	45	0.135	14.15	0.57	0.59	0.62	0.66	0.74
HPK45904	R0.075	**0.15**	4	0.1	1	45	0.135	13.31	1.09	1.15	1.21	1.28	1.45
HPK45002	R0.1	**0.2**	4	0.15	0.3	45	0.17	14.50	0.40	0.42	0.43	0.46	0.51
HPK45905	R0.1	**0.2**	4	0.15	0.5	45	0.17	14.13	0.61	0.64	0.67	0.70	0.79
HPK45906	R0.1	**0.2**	4	0.15	0.75	45	0.17	13.70	0.87	0.92	0.96	1.02	1.15
HPK45907	R0.1	**0.2**	4	0.15	1	45	0.17	13.29	1.14	1.19	1.26	1.33	1.50
HPK45908	R0.1	**0.2**	4	0.15	1	50	0.17	13.29	1.14	1.19	1.26	1.33	1.50
HPK45909	R0.1	**0.2**	4	0.15	1.25	45	0.17	12.90	1.40	1.47	1.55	1.64	1.86
HPK45910	R0.1	**0.2**	4	0.15	1.5	45	0.17	12.53	1.66	1.75	1.84	1.95	2.21
HPK45911	R0.1	**0.2**	4	0.15	1.75	45	0.17	12.19	1.93	2.03	2.14	2.26	2.57
HPK45912	R0.1	**0.2**	4	0.15	2	45	0.17	11.86	2.19	2.30	2.43	2.58	2.92
HPK45913	R0.1	**0.2**	4	0.15	2.5	45	0.17	11.26	2.71	2.86	3.02	3.20	3.64
HPK45914	R0.1	**0.2**	4	0.15	3	45	0.17	10.71	3.24	3.41	3.61	3.82	4.35
HPK45915	R0.1	**0.2**	4	0.2	0.5	35	0.17	14.13	0.61	0.64	0.67	0.70	0.79
HPK45916	R0.1	**0.2**	4	0.2	0.5	50	0.17	14.13	0.61	0.64	0.67	0.70	0.79
HPK45917	R0.1	**0.2**	6	0.2	0.5	50	0.17	14.42	0.61	0.64	0.67	0.70	0.79
HPK45003	R0.15	**0.3**	4	0.2	0.5	45	0.27	14.20	0.61	0.63	0.66	0.69	0.77
HPK45918	R0.15	**0.3**	4	0.2	0.6	45	0.27	14.02	0.71	0.74	0.78	0.82	0.91
HPK45919	R0.15	**0.3**	4	0.2	0.75	45	0.27	13.75	0.87	0.91	0.95	1.00	1.12
HPK45920	R0.15	**0.3**	4	0.2	1	45	0.27	13.33	1.13	1.19	1.25	1.32	1.48
HPK45921	R0.15	**0.3**	4	0.2	1.25	45	0.27	12.93	1.40	1.47	1.54	1.63	1.84
HPK45922	R0.15	**0.3**	4	0.2	1.5	45	0.27	12.55	1.66	1.74	1.84	1.94	2.19

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

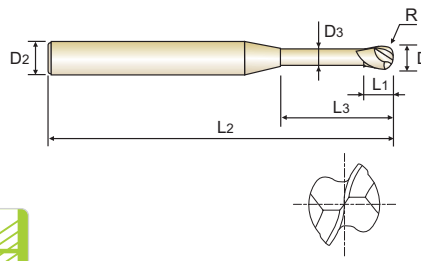
C-COATED SOLID CARBIDE END MILLS

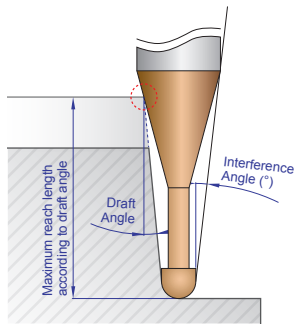
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45923	R0.15	**0.3**	4	0.2	1.75	45	0.27	12.19	1.92	2.02	2.13	2.25	2.55
HPK45924	R0.15	**0.3**	4	0.2	2	45	0.27	11.86	2.19	2.30	2.42	2.56	2.90
HPK45925	R0.15	**0.3**	4	0.2	2.25	45	0.27	11.54	2.45	2.58	2.72	2.87	3.26
HPK45926	R0.15	**0.3**	4	0.2	2.5	45	0.27	11.24	2.71	2.85	3.01	3.19	3.61
HPK45927	R0.15	**0.3**	4	0.2	3	45	0.27	10.68	3.24	3.41	3.60	3.81	4.33
HPK45928	R0.15	**0.3**	4	0.2	3.5	45	0.27	10.17	3.76	3.96	4.18	4.43	5.04
HPK45929	R0.15	**0.3**	4	0.2	4	45	0.27	9.71	4.29	4.52	4.77	5.06	5.75
HPK45930	R0.15	**0.3**	6	0.2	1.5	50	0.27	13.31	1.66	1.74	1.84	1.94	2.19
HPK45004	R0.2	**0.4**	4	0.3	0.5	45	0.37	14.28	0.61	0.63	0.65	0.68	0.75
HPK45931	R0.2	**0.4**	4	0.3	0.8	45	0.37	13.72	0.92	0.96	1.00	1.05	1.17
HPK45932	R0.2	**0.4**	4	0.3	1	45	0.37	13.37	1.13	1.18	1.24	1.30	1.46
HPK45933	R0.2	**0.4**	4	0.3	1.5	45	0.37	12.57	1.66	1.74	1.83	1.93	2.17
HPK45934	R0.2	**0.4**	4	0.3	2	45	0.37	11.86	2.18	2.29	2.41	2.55	2.88
HPK45935	R0.2	**0.4**	4	0.3	2.5	45	0.37	11.22	2.71	2.85	3.00	3.17	3.59
HPK45936	R0.2	**0.4**	4	0.3	3	45	0.37	10.65	3.24	3.40	3.59	3.80	4.31
HPK45937	R0.2	**0.4**	4	0.3	3.5	45	0.37	10.13	3.76	3.96	4.18	4.42	5.02
HPK45938	R0.2	**0.4**	4	0.3	4	45	0.37	9.66	4.29	4.51	4.76	5.04	5.73
HPK45939	R0.2	**0.4**	4	0.3	4.5	45	0.37	9.23	4.81	5.07	5.35	5.67	6.44
HPK45940	R0.2	**0.4**	4	0.3	5	45	0.37	8.84	5.34	5.62	5.94	6.29	7.15
HPK45941	R0.2	**0.4**	4	0.3	6	45	0.37	8.15	6.39	6.73	7.11	7.54	8.57
HPK45942	R0.2	**0.4**	4	0.4	1	35	0.37	13.37	1.13	1.18	1.24	1.30	1.46
HPK45943	R0.2	**0.4**	4	0.4	1	50	0.37	13.37	1.13	1.18	1.24	1.30	1.46
HPK45944	R0.2	**0.4**	6	0.3	1	50	0.37	13.91	1.13	1.18	1.24	1.30	1.46
HPK45945	R0.2	**0.4**	6	0.3	2	50	0.37	12.82	2.18	2.29	2.41	2.55	2.88
HPK45946	R0.2	**0.4**	6	0.4	1	50	0.37	13.91	1.13	1.18	1.24	1.30	1.46
HPK45005	R0.25	**0.5**	4	0.35	1	45	0.45	13.35	1.19	1.24	1.30	1.36	1.52

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

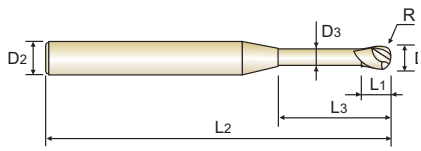
C-COATED SOLID CARBIDE END MILLS

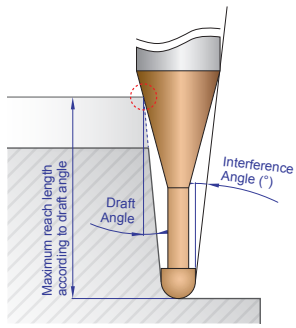
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

P. 109-120

R0.05~R3 R3.5~R6

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45947	R0.25	**0.5**	4	0.35	1.5	45	0.45	12.53	1.71	1.79	1.88	1.99	2.23
HPK45948	R0.25	**0.5**	4	0.35	2	45	0.45	11.80	2.24	2.35	2.47	2.61	2.94
HPK45949	R0.25	**0.5**	4	0.35	2.5	45	0.45	11.16	2.77	2.90	3.06	3.23	3.65
HPK45950	R0.25	**0.5**	4	0.35	3	45	0.45	10.57	3.29	3.46	3.65	3.86	4.36
HPK45951	R0.25	**0.5**	4	0.35	3.5	45	0.45	10.05	3.82	4.01	4.23	4.48	5.08
HPK45952	R0.25	**0.5**	4	0.35	4	45	0.45	9.57	4.34	4.57	4.82	5.10	5.79
HPK45953	R0.25	**0.5**	4	0.35	4.5	45	0.45	9.14	4.87	5.12	5.41	5.73	6.50
HPK45954	R0.25	**0.5**	4	0.35	5	45	0.45	8.75	5.40	5.68	5.99	6.35	7.21
HPK45955	R0.25	**0.5**	4	0.35	5.5	45	0.45	8.38	5.92	6.23	6.58	6.97	7.92
HPK45956	R0.25	**0.5**	4	0.35	6	45	0.45	8.05	6.45	6.79	7.17	7.60	8.63
HPK45957	R0.25	**0.5**	4	0.35	8	45	0.45	6.94	8.55	9.01	9.52	10.09	11.43
HPK45958	R0.25	**0.5**	4	0.35	10	45	0.45	6.10	10.66	11.23	11.87	12.58	13.76
HPK45959	R0.25	**0.5**	4	0.5	1.25	50	0.45	12.93	1.45	1.52	1.59	1.67	1.87
HPK45960	R0.25	**0.5**	6	0.5	1.25	50	0.45	13.61	1.45	1.52	1.59	1.67	1.87
HPK45006	R0.3	**0.6**	4	0.45	1	45	0.55	13.40	1.19	1.23	1.29	1.35	1.50
HPK45961	R0.3	**0.6**	4	0.45	1.5	45	0.55	12.55	1.71	1.79	1.88	1.97	2.21
HPK45962	R0.3	**0.6**	4	0.45	2	45	0.55	11.80	2.24	2.34	2.46	2.60	2.92
HPK45963	R0.3	**0.6**	4	0.45	2.5	45	0.55	11.13	2.76	2.90	3.05	3.22	3.63
HPK45964	R0.3	**0.6**	4	0.45	3	45	0.55	10.54	3.29	3.45	3.64	3.84	4.34
HPK45965	R0.3	**0.6**	4	0.45	3.5	45	0.55	10.00	3.82	4.01	4.22	4.47	5.06
HPK45966	R0.3	**0.6**	4	0.45	4	45	0.55	9.52	4.34	4.56	4.81	5.09	5.77
HPK45967	R0.3	**0.6**	4	0.45	4.5	45	0.55	9.08	4.87	5.12	5.40	5.71	6.48
HPK45968	R0.3	**0.6**	4	0.45	5	45	0.55	8.68	5.39	5.67	5.99	6.34	7.19
HPK45969	R0.3	**0.6**	4	0.45	5.5	45	0.55	8.31	5.92	6.23	6.57	6.96	7.90
HPK45970	R0.3	**0.6**	4	0.45	6	45	0.55	7.97	6.45	6.78	7.16	7.58	8.61
HPK45971	R0.3	**0.6**	4	0.45	7	45	0.55	7.37	7.50	7.89	8.34	8.83	10.04

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

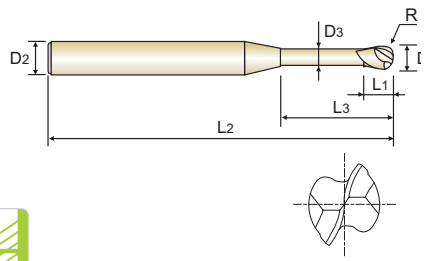
C-COATED SOLID CARBIDE END MILLS

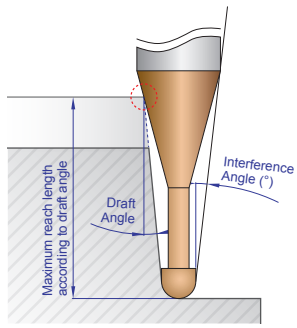
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45972	R0.3	**0.6**	4	0.45	8	45	0.55	6.86	8.55	9.00	9.51	10.08	11.36
HPK45973	R0.3	**0.6**	4	0.45	9	45	0.55	6.41	9.60	10.11	10.68	11.33	12.53
HPK45974	R0.3	**0.6**	4	0.45	10	45	0.55	6.01	10.65	11.22	11.86	12.57	13.70
HPK45975	R0.3	**0.6**	4	0.45	12	45	0.55	5.35	12.76	13.44	14.21	15.07	16.03
HPK45976	R0.3	**0.6**	4	0.6	1.5	35	0.55	12.55	1.71	1.79	1.88	1.97	2.21
HPK45977	R0.3	**0.6**	4	0.6	1.5	50	0.55	12.55	1.71	1.79	1.88	1.97	2.21
HPK45978	R0.3	**0.6**	6	0.45	2	50	0.55	12.81	2.24	2.34	2.46	2.60	2.92
HPK45979	R0.3	**0.6**	6	0.45	3	50	0.55	11.85	3.29	3.45	3.64	3.84	4.34
HPK45980	R0.3	**0.6**	6	0.45	4	50	0.55	11.02	4.34	4.56	4.81	5.09	5.77
HPK45981	R0.3	**0.6**	6	0.6	1.5	50	0.55	13.36	1.71	1.79	1.88	1.97	2.21
HPK45007	R0.35	**0.7**	4	0.5	2	45	0.65	11.80	2.24	2.34	2.45	2.58	2.90
HPK45982	R0.35	**0.7**	4	0.5	4	45	0.65	9.46	4.34	4.56	4.80	5.08	5.75
HPK45983	R0.35	**0.7**	4	0.5	6	45	0.65	7.89	6.44	6.78	7.15	7.57	8.59
HPK45984	R0.35	**0.7**	4	0.5	8	45	0.65	6.77	8.55	9.00	9.50	10.07	11.29
HPK45008	R0.4	**0.8**	4	0.6	2	45	0.75	11.79	2.23	2.33	2.45	2.57	2.88
HPK45985	R0.4	**0.8**	4	0.6	3	45	0.75	10.46	3.28	3.44	3.62	3.82	4.30
HPK45986	R0.4	**0.8**	4	0.6	4	45	0.75	9.40	4.34	4.55	4.79	5.07	5.72
HPK45987	R0.4	**0.8**	4	0.6	5	45	0.75	8.53	5.39	5.66	5.97	6.31	7.15
HPK45988	R0.4	**0.8**	4	0.6	6	45	0.75	7.81	6.44	6.77	7.14	7.56	8.57
HPK45989	R0.4	**0.8**	4	0.6	7	45	0.75	7.20	7.49	7.88	8.32	8.81	9.99
HPK45990	R0.4	**0.8**	4	0.6	8	45	0.75	6.68	8.54	8.99	9.49	10.05	11.23
HPK45991	R0.4	**0.8**	4	0.6	10	45	0.75	5.83	10.65	11.21	11.84	12.55	13.56
HPK45992	R0.4	**0.8**	4	0.6	12	45	0.75	5.18	12.75	13.43	14.19	15.04	15.90
HPK45993	R0.4	**0.8**	4	0.8	2	35	0.75	11.79	2.23	2.33	2.45	2.57	2.88
HPK45994	R0.4	**0.8**	4	0.8	2	50	0.75	11.79	2.23	2.33	2.45	2.57	2.88
HPK45995	R0.4	**0.8**	6	0.6	2	50	0.75	12.85	2.23	2.33	2.45	2.57	2.88

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

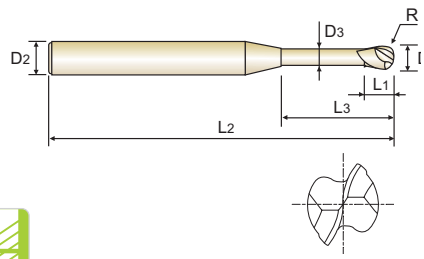
C-COATED SOLID CARBIDE END MILLS

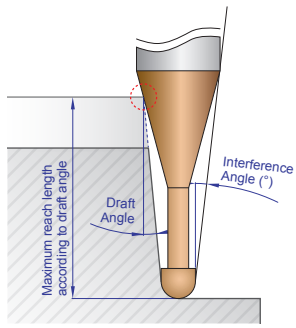
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

P. 109-120

R0.05~R3 R3.5~R6

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45996	R0.4	**0.8**	6	0.8	2	50	0.75	12.85	2.23	2.33	2.45	2.57	2.88
HPK45009	R0.45	**0.9**	4	0.65	2	45	0.85	11.79	2.23	2.33	2.44	2.56	2.86
HPK45997	R0.45	**0.9**	4	0.65	4	45	0.85	9.34	4.33	4.55	4.79	5.05	5.70
HPK45998	R0.45	**0.9**	4	0.65	6	45	0.85	7.72	6.44	6.77	7.13	7.55	8.55
HPK45999	R0.45	**0.9**	4	0.65	8	45	0.85	6.58	8.54	8.99	9.48	10.04	11.16
HPK45010	R0.5	**1.0**	4	0.75	2	45	0.95	11.78	2.23	2.32	2.43	2.55	2.84
HPK45801	R0.5	**1.0**	4	0.75	2.5	45	0.95	11.04	2.75	2.88	3.02	3.17	3.55
HPK45802	R0.5	**1.0**	4	0.75	3	45	0.95	10.38	3.28	3.43	3.60	3.79	4.26
HPK45803	R0.5	**1.0**	4	0.75	4	45	0.95	9.27	4.33	4.54	4.78	5.04	5.68
HPK45804	R0.5	**1.0**	4	0.75	5	45	0.95	8.37	5.38	5.65	5.95	6.29	7.10
HPK45805	R0.5	**1.0**	4	0.75	6	45	0.95	7.63	6.44	6.76	7.13	7.54	8.53
HPK45806	R0.5	**1.0**	4	0.75	7	45	0.95	7.01	7.49	7.87	8.30	8.78	9.93
HPK45807	R0.5	**1.0**	4	0.75	8	45	0.95	6.49	8.54	8.98	9.47	10.03	11.10
HPK45808	R0.5	**1.0**	4	0.75	9	45	0.95	6.03	9.59	10.09	10.65	11.28	12.26
HPK45809	R0.5	**1.0**	4	0.75	10	45	0.95	5.64	10.64	11.20	11.82	12.52	13.43
HPK45810	R0.5	**1.0**	4	0.75	12	45	0.95	4.99	12.75	13.42	14.17	14.96	15.77
HPK45811	R0.5	**1.0**	4	0.75	13	45	0.95	4.71	13.80	14.53	15.35	16.06	16.94
HPK45812	R0.5	**1.0**	4	0.75	14	50	0.95	4.47	14.85	15.64	16.52	17.17	18.10
HPK45813	R0.5	**1.0**	4	0.75	16	50	0.95	4.05	16.96	17.86	18.87	19.38	20.44
HPK45814	R0.5	**1.0**	4	0.75	18	55	0.95	3.70	19.06	20.08	21.05	21.59	22.78
HPK45815	R0.5	**1.0**	4	0.75	20	55	0.95	3.41	21.16	22.30	23.20	23.81	25.11
HPK45816	R0.5	**1.0**	4	1	2.5	40	0.95	11.04	2.75	2.88	3.02	3.17	3.55
HPK45817	R0.5	**1.0**	4	1	2.5	50	0.95	11.04	2.75	2.88	3.02	3.17	3.55
HPK45818	R0.5	**1.0**	6	0.75	3	50	0.95	11.84	3.28	3.43	3.60	3.79	4.26
HPK45819	R0.5	**1.0**	6	0.75	4	50	0.95	10.95	4.33	4.54	4.78	5.04	5.68
HPK45820	R0.5	**1.0**	6	0.75	5	50	0.95	10.18	5.38	5.65	5.95	6.29	7.10

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

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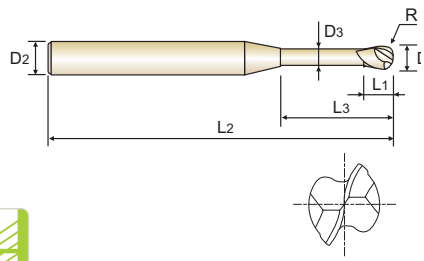
C-COATED SOLID CARBIDE END MILLS

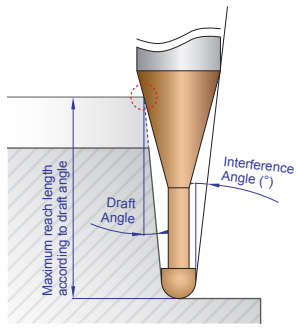
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES
HPK45

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45821	R0.5	**1.0**	6	0.75	6	50	0.95	9.51	6.44	6.76	7.13	7.54	8.53
HPK45822	R0.5	**1.0**	6	0.75	7	50	0.95	8.92	7.49	7.87	8.30	8.78	9.95
HPK45823	R0.5	**1.0**	6	0.75	8	50	0.95	8.40	8.54	8.98	9.47	10.03	11.37
HPK45824	R0.5	**1.0**	6	0.75	10	50	0.95	7.53	10.64	11.20	11.82	12.52	14.22
HPK45825	R0.5	**1.0**	6	0.75	22	60	0.95	4.62	23.27	24.52	25.92	27.11	28.60
HPK45826	R0.5	**1.0**	6	1	2.5	50	0.95	12.34	2.75	2.88	3.02	3.17	3.55
HPK45012	R0.6	**1.2**	4	0.9	2.4	45	1.15	11.13	2.56	2.63	2.70	2.78	2.95
HPK45827	R0.6	**1.2**	4	0.9	4	45	1.15	9.12	4.21	4.34	4.47	4.62	4.94
HPK45828	R0.6	**1.2**	4	0.9	6	45	1.15	7.44	6.28	6.48	6.69	6.92	7.43
HPK45829	R0.6	**1.2**	4	0.9	8	45	1.15	6.28	8.35	8.62	8.90	9.22	9.92
HPK45830	R0.6	**1.2**	4	0.9	10	45	1.15	5.43	10.41	10.75	11.12	11.52	12.40
HPK45831	R0.6	**1.2**	4	0.9	12	45	1.15	4.79	12.48	12.89	13.34	13.82	14.89
HPK45832	R0.6	**1.2**	4	0.9	14	50	1.15	4.28	14.55	15.03	15.55	16.12	17.37
HPK45833	R0.6	**1.2**	4	0.9	16	50	1.15	3.87	16.61	17.17	17.77	18.42	19.86
HPK45834	R0.6	**1.2**	4	1.2	3	40	1.15	10.28	3.18	3.27	3.36	3.47	3.70
HPK45014	R0.7	**1.4**	4	1	8	45	1.35	6.06	8.34	8.61	8.89	9.20	9.89
HPK45835	R0.7	**1.4**	4	1	12	50	1.35	4.58	12.48	12.89	13.33	13.80	14.86
HPK45836	R0.7	**1.4**	4	1	16	50	1.35	3.67	16.61	17.17	17.76	18.40	19.84
HPK45015	R0.75	**1.5**	4	1.1	3	45	1.45	10.11	3.17	3.26	3.35	3.44	3.66
HPK45837	R0.75	**1.5**	4	1.1	4	45	1.45	8.87	4.21	4.33	4.46	4.59	4.91
HPK45838	R0.75	**1.5**	4	1.1	6	45	1.45	7.12	6.27	6.47	6.67	6.89	7.39
HPK45839	R0.75	**1.5**	4	1.1	8	45	1.45	5.94	8.34	8.61	8.89	9.19	9.88
HPK45840	R0.75	**1.5**	4	1.1	10	45	1.45	5.10	10.41	10.74	11.11	11.49	12.37
HPK45841	R0.75	**1.5**	4	1.1	12	45	1.45	4.46	12.48	12.88	13.32	13.79	14.85
HPK45842	R0.75	**1.5**	4	1.1	14	50	1.45	3.97	14.54	15.02	15.54	16.09	17.34
HPK45843	R0.75	**1.5**	4	1.1	16	50	1.45	3.57	16.61	17.16	17.76	18.39	19.82

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

C-COATED SOLID CARBIDE END MILLS

2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

- Improvement of tool life by applying new coating
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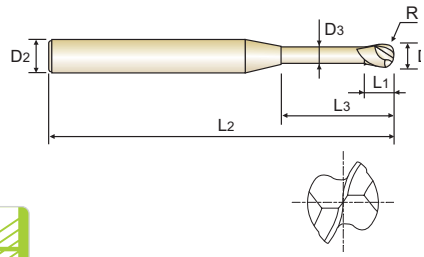

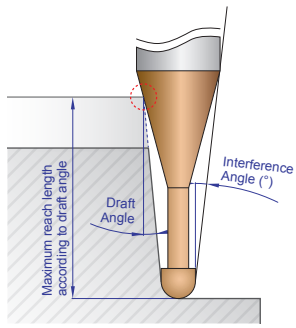

CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45844	R0.75	**1.5**	4	1.1	18	55	1.45	3.25	18.68	19.30	19.97	20.69	22.31
HPK45845	R0.75	**1.5**	4	1.1	20	55	1.45	2.98	20.74	21.44	22.19	22.99	-
HPK45846	R0.75	**1.5**	4	1.1	22	60	1.45	2.75	22.81	23.58	24.41	25.29	-
HPK45847	R0.75	**1.5**	4	1.1	30	70	1.45	2.10	31.08	32.14	33.27	34.49	-
HPK45848	R0.75	**1.5**	4	1.5	3.8	40	1.45	9.10	4.00	4.11	4.23	4.36	4.66
HPK45849	R0.75	**1.5**	4	1.5	3.8	50	1.45	9.10	4.00	4.11	4.23	4.36	4.66
HPK45850	R0.75	**1.5**	6	1.1	6	50	1.45	9.30	6.27	6.47	6.67	6.89	7.39
HPK45851	R0.75	**1.5**	6	1.1	8	50	1.45	8.13	8.34	8.61	8.89	9.19	9.88
HPK45852	R0.75	**1.5**	6	1.5	3.8	50	1.45	11.03	4.00	4.11	4.23	4.36	4.66
HPK45016	R0.8	**1.6**	4	1.2	8	45	1.55	5.82	8.34	8.60	8.88	9.19	9.87
HPK45853	R0.8	**1.6**	4	1.2	12	45	1.55	4.35	12.47	12.88	13.32	13.79	14.84
HPK45854	R0.8	**1.6**	4	1.2	16	50	1.55	3.47	16.61	17.16	17.75	18.39	19.81
HPK45855	R0.8	**1.6**	4	1.2	20	55	1.55	2.89	20.74	21.44	22.18	22.98	-
HPK45020	R1.0	**2.0**	4	1.5	3	45	1.95	9.74	3.16	3.24	3.32	3.41	3.60
HPK45856	R1.0	**2.0**	4	1.5	4	45	1.95	8.34	4.20	4.31	4.43	4.56	4.85
HPK45857	R1.0	**2.0**	4	1.5	6	45	1.95	6.46	6.26	6.45	6.64	6.86	7.33
HPK45858	R1.0	**2.0**	4	1.5	8	45	1.95	5.28	8.33	8.59	8.86	9.16	9.82
HPK45859	R1.0	**2.0**	4	1.5	10	45	1.95	4.46	10.40	10.73	11.08	11.46	12.30
HPK45860	R1.0	**2.0**	4	1.5	12	45	1.95	3.86	12.47	12.87	13.29	13.76	14.79
HPK45861	R1.0	**2.0**	4	1.5	13	45	1.95	3.62	13.50	13.94	14.40	14.91	16.03
HPK45862	R1.0	**2.0**	4	1.5	14	50	1.95	3.40	14.53	15.01	15.51	16.06	17.28
HPK45863	R1.0	**2.0**	4	1.5	16	50	1.95	3.04	16.60	17.15	17.73	18.36	19.76
HPK45864	R1.0	**2.0**	4	1.5	18	55	1.95	2.75	18.67	19.28	19.94	20.65	-
HPK45865	R1.0	**2.0**	4	1.5	20	55	1.95	2.51	20.74	21.42	22.16	22.95	-
HPK45866	R1.0	**2.0**	4	1.5	22	60	1.95	2.31	22.80	23.56	24.38	25.25	-
HPK45867	R1.0	**2.0**	4	1.5	25	65	1.95	2.06	25.90	26.77	27.70	28.70	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

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C-COATED SOLID CARBIDE END MILLS

2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

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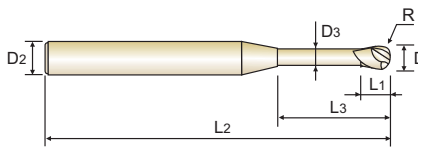
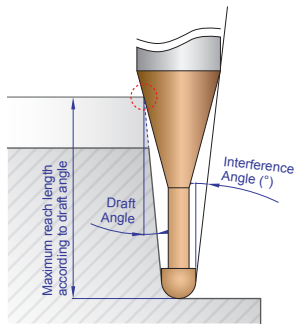
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45868	R1.0	**2.0**	4	1.5	30	70	1.95	1.74	31.07	32.12	33.24	-	-
HPK45869	R1.0	**2.0**	4	1.5	35	70	1.95	1.51	36.24	37.47	38.79	-	-
HPK45870	R1.0	**2.0**	4	1.5	40	90	1.95	1.34	41.41	42.82	-	-	-
HPK45871	R1.0	**2.0**	4	2	5	40	1.95	7.28	5.23	5.38	5.54	5.71	6.09
HPK45872	R1.0	**2.0**	4	2	5	50	1.95	7.28	5.23	5.38	5.54	5.71	6.09
HPK45873	R1.0	**2.0**	6	1.5	4	50	1.95	10.73	4.20	4.31	4.43	4.56	4.85
HPK45874	R1.0	**2.0**	6	1.5	6	50	1.95	9.05	6.26	6.45	6.64	6.86	7.33
HPK45875	R1.0	**2.0**	6	1.5	8	50	1.95	7.82	8.33	8.59	8.86	9.16	9.82
HPK45876	R1.0	**2.0**	6	1.5	10	50	1.95	6.89	10.40	10.73	11.08	11.46	12.30
HPK45877	R1.0	**2.0**	6	1.5	16	60	1.95	5.07	16.60	17.15	17.73	18.36	19.76
HPK45878	R1.0	**2.0**	6	1.5	25	65	1.95	3.63	25.90	26.77	27.70	28.70	30.95
HPK45879	R1.0	**2.0**	6	2	5	50	1.95	9.82	5.23	5.38	5.54	5.71	6.09
HPK45025	R1.25	**2.5**	4	2.3	6	45	2.4	5.54	6.35	6.53	6.72	6.93	7.39
HPK45880	R1.25	**2.5**	4	2.3	8	45	2.4	4.41	8.42	8.67	8.94	9.23	9.87
HPK45881	R1.25	**2.5**	4	2.3	10	45	2.4	3.66	10.49	10.81	11.15	11.53	12.36
HPK45882	R1.25	**2.5**	4	2.3	15	50	2.4	2.57	15.66	16.16	16.70	17.28	-
HPK45883	R1.25	**2.5**	4	2.3	20	55	2.4	1.98	20.82	21.51	22.24	-	-
HPK45884	R1.25	**2.5**	4	2.3	25	65	2.4	1.61	25.99	26.85	27.78	-	-
HPK45885	R1.25	**2.5**	4	2.3	30	70	2.4	1.35	31.16	32.20	-	-	-
HPK45886	R1.25	**2.5**	4	2.3	35	70	2.4	1.17	36.33	37.55	-	-	-
HPK45030	R1.5	**3.0**	4	3	8	40	2.85	3.31	8.51	8.75	9.01	9.30	9.93
HPK45887	R1.5	**3.0**	6	2.5	6	60	2.85	8.22	6.44	6.61	6.80	7.00	7.44
HPK45888	R1.5	**3.0**	6	2.5	8	60	2.85	6.91	8.51	8.75	9.01	9.30	9.93
HPK45889	R1.5	**3.0**	6	2.5	10	60	2.85	5.96	10.58	10.89	11.23	11.60	12.41
HPK45890	R1.5	**3.0**	6	2.5	12	60	2.85	5.23	12.64	13.03	13.45	13.90	14.90
HPK45891	R1.5	**3.0**	6	2.5	14	60	2.85	4.67	14.71	15.17	15.66	16.20	17.39

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
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Recommended					○			○	◎		○	◎									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
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HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

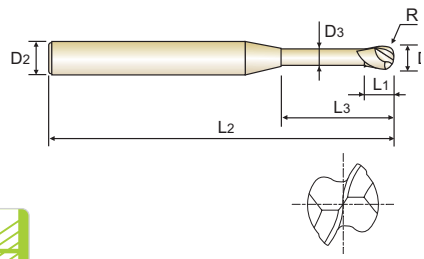
C-COATED SOLID CARBIDE END MILLS

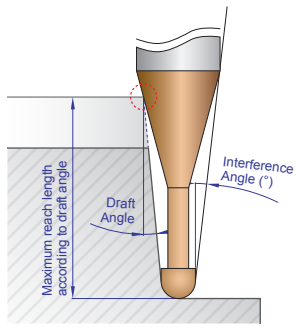
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES **HPK45**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

P. 109-120

R0.05~R3 R3.5~R6

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45892	R1.5	**3.0**	6	2.5	16	60	2.85	4.21	16.78	17.31	17.88	18.49	19.87
HPK45893	R1.5	**3.0**	6	2.5	20	65	2.85	3.52	20.91	21.59	22.31	23.09	24.85
HPK45894	R1.5	**3.0**	6	2.5	25	65	2.85	2.92	26.08	26.94	27.86	28.84	-
HPK45895	R1.5	**3.0**	6	2.5	30	70	2.85	2.50	31.25	32.29	33.40	34.59	-
HPK45896	R1.5	**3.0**	6	2.5	35	80	2.85	2.18	36.42	37.63	38.94	40.34	-
HPK45897	R1.5	**3.0**	6	2.5	40	90	2.85	1.94	41.59	42.98	44.48	-	-
HPK45898	R1.5	**3.0**	6	3	8	60	2.85	6.91	8.51	8.75	9.01	9.30	9.93
HPK45035	R1.75	**3.5**	6	2.8	15	60	1.25	3.24	19.79	20.41	21.09	21.81	23.44
HPK45899	R1.75	**3.5**	6	2.8	20	65	3.35	3.08	20.90	21.57	22.29	23.06	24.79
HPK45701	R1.75	**3.5**	6	2.8	25	65	3.35	2.54	26.07	26.92	27.83	28.81	-
HPK45702	R1.75	**3.5**	6	2.8	30	70	3.35	2.16	31.24	32.27	33.37	34.56	-
HPK45703	R1.75	**3.5**	6	2.8	35	80	3.35	1.87	36.41	37.62	38.91	-	-
HPK45704	R1.75	**3.5**	6	2.8	40	90	3.35	1.66	41.58	42.96	44.45	-	-
HPK45705	R1.75	**3.5**	6	2.8	45	90	3.35	1.49	46.75	48.31	-	-	-
HPK45040	R2.0	**4.0**	4	3	8	65	3.85	0.00	-	-	-	-	-
HPK45706	R2.0	**4.0**	6	3	8	65	3.85	5.70	8.49	8.72	8.96	9.22	9.81
HPK45707	R2.0	**4.0**	6	3	10	65	3.85	4.76	10.56	10.86	11.18	11.52	12.29
HPK45708	R2.0	**4.0**	6	3	12	65	3.85	4.08	12.63	13.00	13.39	13.82	14.78
HPK45709	R2.0	**4.0**	6	3	14	65	3.85	3.57	14.69	15.14	15.61	16.12	17.27
HPK45710	R2.0	**4.0**	6	3	15	65	3.85	3.36	15.73	16.21	16.72	17.27	18.51
HPK45711	R2.0	**4.0**	6	3	20	65	3.85	2.60	20.90	21.55	22.26	23.02	-
HPK45712	R2.0	**4.0**	6	3	25	70	3.85	2.12	26.06	26.90	27.80	28.77	-
HPK45713	R2.0	**4.0**	6	3	30	70	3.85	1.79	31.23	32.25	33.34	-	-
HPK45714	R2.0	**4.0**	6	3	35	80	3.85	1.55	36.40	37.60	38.88	-	-
HPK45715	R2.0	**4.0**	6	3	40	85	3.85	1.36	41.57	42.95	-	-	-
HPK45716	R2.0	**4.0**	6	3	45	90	3.85	1.22	46.74	48.30	-	-	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

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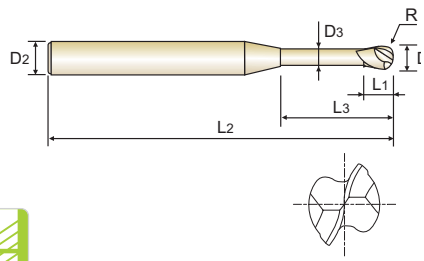
C-COATED SOLID CARBIDE END MILLS

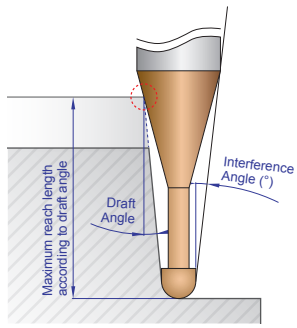
2 FLUTE BALL NOSE for RIB PROCESSING

SERIES
HPK45

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK45717	R2.0	**4.0**	6	3	50	100	3.85	1.10	51.91	53.64	-	-	-
HPK45718	R2.0	**4.0**	6	4	10	40	3.85	4.76	10.56	10.86	11.18	11.52	12.29
HPK45719	R2.0	**4.0**	6	4	10	60	3.85	4.76	10.56	10.86	11.18	11.52	12.29
HPK45050	R2.5	**5.0**	6	3.5	10	70	4.85	2.97	10.54	10.82	11.12	11.45	-
HPK45720	R2.5	**5.0**	6	3.5	15	70	4.85	1.96	15.71	16.17	16.66	-	-
HPK45721	R2.5	**5.0**	6	3.5	20	70	4.85	1.46	20.88	21.52	-	-	-
HPK45722	R2.5	**5.0**	6	3.5	25	70	4.85	1.16	26.05	26.87	-	-	-
HPK45723	R2.5	**5.0**	6	3.5	30	80	4.85	0.97	31.22	-	-	-	-
HPK45724	R2.5	**5.0**	6	3.5	40	90	4.85	0.72	41.55	-	-	-	-
HPK45725	R2.5	**5.0**	6	5	12	45	4.85	2.46	12.61	12.96	13.34	13.75	-
HPK45726	R2.5	**5.0**	6	5	12	60	4.85	2.46	12.61	12.96	13.34	13.75	-
HPK45060	R3.0	**6.0**	6	6	10	70	5.85	0.00	-	-	-	-	-
HPK45727	R3.0	**6.0**	6	6	15	45	5.85	0.00	-	-	-	-	-
HPK45728	R3.0	**6.0**	6	6	15	60	5.85	0.00	-	-	-	-	-
HPK45729	R3.0	**6.0**	6	6	15	70	5.85	0.00	-	-	-	-	-
HPK45730	R3.0	**6.0**	6	6	20	70	5.85	0.00	-	-	-	-	-
HPK45731	R3.0	**6.0**	6	6	25	70	5.85	0.00	-	-	-	-	-
HPK45732	R3.0	**6.0**	6	6	30	80	5.85	0.00	-	-	-	-	-
HPK45733	R3.0	**6.0**	6	6	35	85	5.85	0.00	-	-	-	-	-
HPK45734	R3.0	**6.0**	6	6	40	90	5.85	0.00	-	-	-	-	-
HPK45735	R3.0	**6.0**	6	6	50	120	5.85	0.00	-	-	-	-	-
HPK45736	R3.0	**6.0**	6	6	60	120	5.85	0.00	-	-	-	-	-
HPK45080	R4.0	**8.0**	8	12	24	100	7.7	0.00	-	-	-	-	-
HPK45100	R5.0	**10.0**	10	15	30	100	9.7	0.00	-	-	-	-	-
HPK45120	R6.0	**12.0**	12	18	36	110	11.7	0.00	-	-	-	-	-

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

C-COATED SOLID CARBIDE END MILLS

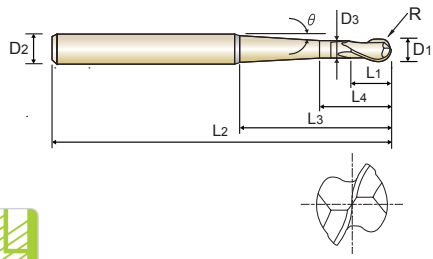
SERIES

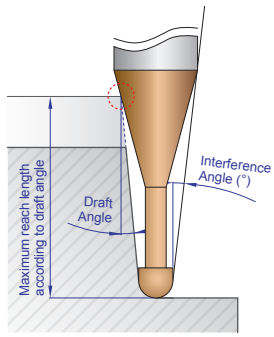
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

HPK47

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

P. 109-120

R0.05~R3 R3.5~R6

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47001	R0.05	**0.1**	4	0.07	0.5	50	0.085	**3°**	0.17	14.23	0.37	0.44	0.51	0.53	0.56
HPK47901	R0.05	**0.1**	4	0.07	0.75	50	0.085	**3°**	0.17	13.88	0.37	0.44	0.58	0.76	0.81
HPK470015	R0.075	**0.15**	4	0.1	1	50	0.135	**3°**	0.25	13.55	0.46	0.55	0.71	1.00	1.08
HPK47902	R0.075	**0.15**	4	0.1	1.5	50	0.135	**3°**	0.25	12.92	0.46	0.55	0.71	1.03	1.58
HPK47002	R0.1	**0.2**	4	0.15	1.5	50	0.17	**0.5°**	0.35	12.59	1.57	1.62	1.67	1.73	1.86
HPK47903	R0.1	**0.2**	4	0.15	1.5	50	0.17	**1°**	0.35	12.64	1.53	1.58	1.63	1.69	1.82
HPK47904	R0.1	**0.2**	4	0.15	1.5	50	0.17	**1.5°**	0.35	12.69	1.33	1.54	1.59	1.64	1.77
HPK47905	R0.1	**0.2**	4	0.15	1.5	50	0.17	**2°**	0.35	12.75	1.01	1.46	1.55	1.60	1.72
HPK47906	R0.1	**0.2**	4	0.15	2	50	0.17	**0.5°**	0.35	11.93	2.07	2.13	2.21	2.29	2.46
HPK47907	R0.1	**0.2**	4	0.15	2	50	0.17	**1°**	0.35	12.00	2.01	2.08	2.15	2.23	2.40
HPK47908	R0.1	**0.2**	4	0.15	2	50	0.17	**1.5°**	0.35	12.07	1.33	2.02	2.09	2.16	2.33
HPK47909	R0.1	**0.2**	4	0.15	2	50	0.17	**2°**	0.35	12.14	1.01	1.46	2.03	2.10	2.26
HPK47910	R0.1	**0.2**	4	0.15	3	50	0.17	**3°**	0.35	11.28	0.74	0.90	1.17	1.71	3.13
HPK47911	R0.1	**0.2**	4	0.15	3	50	0.17	**5°**	0.35	11.69	0.57	0.63	0.70	0.80	1.15
HPK47912	R0.1	**0.2**	4	0.15	5	50	0.17	**3°**	0.35	9.68	0.74	0.90	1.17	1.71	5.13
HPK47913	R0.1	**0.2**	4	0.15	5	50	0.17	**5°**	0.35	10.23	0.57	0.63	0.70	0.80	1.15
HPK47003	R0.15	**0.3**	4	0.2	2	50	0.27	**0.5°**	0.5	11.92	2.07	2.14	2.21	2.29	2.46
HPK47914	R0.15	**0.3**	4	0.2	2	50	0.27	**1°**	0.5	11.99	2.02	2.08	2.15	2.23	2.40
HPK47915	R0.15	**0.3**	4	0.2	2	50	0.27	**1.5°**	0.5	12.05	1.53	2.03	2.10	2.17	2.34
HPK47916	R0.15	**0.3**	4	0.2	2	50	0.27	**2°**	0.5	12.12	1.19	1.71	2.05	2.12	2.28
HPK47917	R0.15	**0.3**	4	0.2	2	50	0.27	**3°**	0.5	12.26	0.91	1.10	1.42	2.00	2.15
HPK47918	R0.15	**0.3**	4	0.2	3	50	0.27	**0.5°**	0.5	10.77	3.07	3.17	3.28	3.40	3.66
HPK47919	R0.15	**0.3**	4	0.2	3	50	0.27	**1°**	0.5	10.86	2.57	3.08	3.19	3.30	3.56
HPK47920	R0.15	**0.3**	4	0.2	3	50	0.27	**1.5°**	0.5	10.95	1.53	2.92	3.10	3.21	3.46
HPK47921	R0.15	**0.3**	4	0.2	3	50	0.27	**2°**	0.5	11.04	1.19	1.71	3.01	3.12	3.36
HPK47922	R0.15	**0.3**	4	0.2	3	50	0.27	**3°**	0.5	11.23	0.91	1.10	1.42	2.06	3.15

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
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HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

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SERIES **HPK47**

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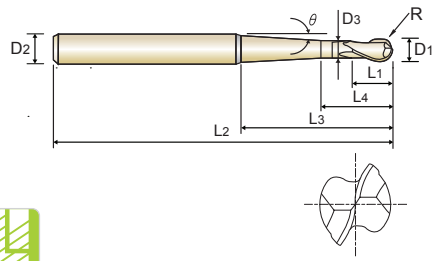
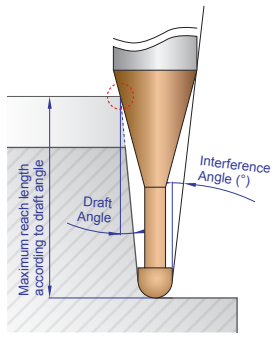
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.05~R3) | R +0.003 ~-0.007 (R3.5~R6) | PLAIN | C Coating

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47923	R0.15	**0.3**	4	0.2	3	50	0.27	**5°**	0.5	11.62	0.73	0.80	0.89	1.02	1.45
HPK47924	R0.15	**0.3**	4	0.2	5	50	0.27	**3°**	0.5	9.61	0.91	1.10	1.42	2.06	5.15
HPK47925	R0.15	**0.3**	4	0.2	5	50	0.27	**5°**	0.5	10.14	0.73	0.80	0.89	1.02	1.45
HPK47926	R0.15	**0.3**	4	0.2	7	50	0.27	**3°**	0.5	8.39	0.91	1.10	1.42	2.06	7.15
HPK47927	R0.15	**0.3**	4	0.2	7	50	0.27	**5°**	0.5	8.99	0.73	0.80	0.89	1.02	1.45
HPK47004	R0.2	**0.4**	4	0.3	3	50	0.37	**0.5°**	0.7	10.73	3.07	3.17	3.28	3.40	3.66
HPK47928	R0.2	**0.4**	4	0.3	3	50	0.37	**1°**	0.7	10.81	2.92	3.09	3.20	3.31	3.56
HPK47929	R0.2	**0.4**	4	0.3	3	50	0.37	**1.5°**	0.7	10.90	1.81	3.01	3.12	3.23	3.47
HPK47930	R0.2	**0.4**	4	0.3	3	50	0.37	**2°**	0.7	10.98	1.44	2.06	3.03	3.14	3.38
HPK47931	R0.2	**0.4**	4	0.3	4	50	0.37	**0.5°**	0.7	9.76	4.07	4.21	4.35	4.51	4.86
HPK47932	R0.2	**0.4**	4	0.3	4	50	0.37	**1°**	0.7	9.86	2.92	4.09	4.24	4.39	4.73
HPK47933	R0.2	**0.4**	4	0.3	4	50	0.37	**1.5°**	0.7	9.96	1.81	3.42	4.12	4.26	4.59
HPK47934	R0.2	**0.4**	4	0.3	4	50	0.37	**2°**	0.7	10.06	1.44	2.06	3.92	4.14	4.46
HPK47935	R0.2	**0.4**	4	0.3	5	50	0.37	**3°**	0.7	9.52	1.14	1.38	1.77	2.56	5.19
HPK47936	R0.2	**0.4**	4	0.3	5	50	0.37	**5°**	0.7	10.04	0.95	1.04	1.16	1.32	1.87
HPK47937	R0.2	**0.4**	4	0.3	6	50	0.37	**0.5°**	0.7	8.26	6.07	6.28	6.50	6.74	7.27
HPK47938	R0.2	**0.4**	4	0.3	6	50	0.37	**1°**	0.7	8.37	2.92	6.09	6.31	6.54	7.05
HPK47939	R0.2	**0.4**	4	0.3	6	50	0.37	**1.5°**	0.7	8.49	1.81	3.42	6.12	6.34	6.84
HPK47940	R0.2	**0.4**	4	0.3	6	50	0.37	**2°**	0.7	8.61	1.44	2.06	3.92	6.14	6.62
HPK47941	R0.2	**0.4**	4	0.3	7	50	0.37	**3°**	0.7	8.30	1.14	1.38	1.77	2.56	7.19
HPK47942	R0.2	**0.4**	4	0.3	7	50	0.37	**5°**	0.7	8.88	0.95	1.04	1.16	1.32	1.87
HPK47005	R0.25	**0.5**	4	0.35	4	50	0.45	**0.5°**	0.85	9.67	4.12	4.25	4.40	4.55	4.90
HPK47943	R0.25	**0.5**	4	0.35	4	50	0.45	**1°**	0.85	9.76	4.01	4.14	4.28	4.43	4.77
HPK47944	R0.25	**0.5**	4	0.35	4	50	0.45	**1.5°**	0.85	9.86	2.58	4.03	4.17	4.32	4.65
HPK47945	R0.25	**0.5**	4	0.35	4	50	0.45	**2°**	0.85	9.96	2.00	2.88	4.05	4.20	4.52
HPK47946	R0.25	**0.5**	4	0.35	5	50	0.45	**0.5°**	0.85	8.85	5.12	5.29	5.47	5.66	6.10

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

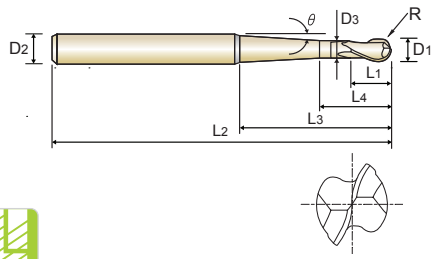
C-COATED SOLID CARBIDE END MILLS

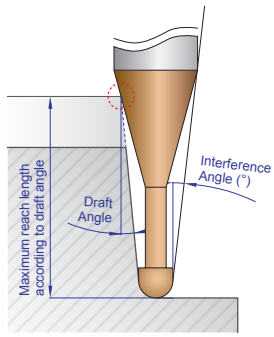
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPK47**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47947	R0.25	**0.5**	4	0.35	5	50	0.45	**1°**	0.85	8.96	4.31	5.14	5.32	5.51	5.93
HPK47948	R0.25	**0.5**	4	0.35	5	50	0.45	**1.5°**	0.85	9.06	2.58	4.91	5.17	5.35	5.77
HPK47949	R0.25	**0.5**	4	0.35	5	50	0.45	**2°**	0.85	9.18	2.00	2.88	5.02	5.20	5.60
HPK47006	R0.3	**0.6**	4	0.45	4	50	0.55	**0.5°**	1.05	9.61	4.12	4.25	4.40	4.55	4.90
HPK47950	R0.3	**0.6**	4	0.45	4	50	0.55	**1°**	1.05	9.70	4.02	4.15	4.29	4.44	4.78
HPK47951	R0.3	**0.6**	4	0.45	4	50	0.55	**1.5°**	1.05	9.79	2.86	4.05	4.18	4.33	4.66
HPK47952	R0.3	**0.6**	4	0.45	4	50	0.55	**3°**	1.05	10.08	1.77	2.14	2.75	3.98	4.30
HPK47953	R0.3	**0.6**	4	0.45	5	50	0.55	**0.5°**	1.05	8.78	5.12	5.29	5.47	5.66	6.10
HPK47954	R0.3	**0.6**	4	0.45	5	50	0.55	**1°**	1.05	8.88	4.66	5.15	5.33	5.52	5.94
HPK47955	R0.3	**0.6**	4	0.45	5	50	0.55	**1.5°**	1.05	8.98	2.86	5.01	5.18	5.37	5.78
HPK47956	R0.3	**0.6**	4	0.45	5	50	0.55	**2°**	1.05	9.09	2.25	3.23	5.04	5.22	5.62
HPK47957	R0.3	**0.6**	4	0.45	5	50	0.55	**3°**	1.05	9.31	1.77	2.14	2.75	3.98	5.30
HPK47958	R0.3	**0.6**	4	0.45	5	50	0.55	**5°**	1.05	9.79	1.45	1.59	1.78	2.02	2.88
HPK47959	R0.3	**0.6**	4	0.45	6	50	0.55	**0.5°**	1.05	8.08	6.12	6.32	6.54	6.78	7.30
HPK47960	R0.3	**0.6**	4	0.45	6	50	0.55	**1°**	1.05	8.19	4.66	6.15	6.36	6.59	7.10
HPK47961	R0.3	**0.6**	4	0.45	6	50	0.55	**1.5°**	1.05	8.30	2.86	5.41	6.18	6.41	6.90
HPK47962	R0.3	**0.6**	4	0.45	6	50	0.55	**2°**	1.05	8.41	2.25	3.23	6.01	6.22	6.70
HPK47963	R0.3	**0.6**	4	0.45	7	50	0.55	**3°**	1.05	8.08	1.77	2.14	2.75	3.98	7.30
HPK47964	R0.3	**0.6**	4	0.45	7	50	0.55	**5°**	1.05	8.63	1.45	1.59	1.78	2.02	2.88
HPK47965	R0.3	**0.6**	4	0.45	8	50	0.55	**0.5°**	1.05	6.97	8.12	8.39	8.69	9.00	9.71
HPK47966	R0.3	**0.6**	4	0.45	8	50	0.55	**1°**	1.05	7.08	4.66	8.15	8.44	8.74	9.43
HPK47967	R0.3	**0.6**	4	0.45	8	50	0.55	**1.5°**	1.05	7.20	2.86	5.41	8.18	8.48	9.14
HPK47968	R0.3	**0.6**	4	0.45	8	50	0.55	**2°**	1.05	7.32	2.25	3.23	6.16	8.22	8.86
HPK47008	R0.4	**0.8**	4	0.6	8	60	0.75	**0.5°**	1.4	6.78	8.13	8.40	8.69	9.00	9.70
HPK47969	R0.4	**0.8**	4	0.6	8	60	0.75	**1°**	1.4	6.89	5.26	8.17	8.45	8.75	9.43
HPK47970	R0.4	**0.8**	4	0.6	8	60	0.75	**1.5°**	1.4	7.01	3.33	6.26	8.21	8.50	9.16

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

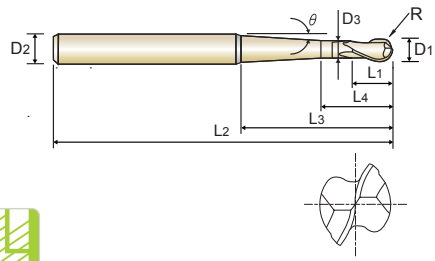
C-COATED SOLID CARBIDE END MILLS

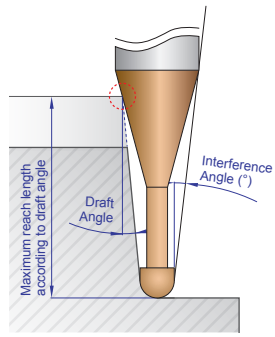
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPK47**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.05~R3) | R +0.003 ~-0.007 (R3.5~R6) | PLAIN | C Coating

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47971	R0.4	**0.8**	4	0.6	8	60	0.75	**2°**	1.4	7.12	2.69	3.83	7.26	8.26	8.89
HPK47972	R0.4	**0.8**	4	0.6	12	60	0.75	**0.5°**	1.4	5.28	12.13	12.54	12.98	13.45	14.51
HPK47973	R0.4	**0.8**	4	0.6	12	60	0.75	**1°**	1.4	5.38	5.26	12.17	12.59	13.05	14.08
HPK47974	R0.4	**0.8**	4	0.6	12	60	0.75	**1.5°**	1.4	5.50	3.33	6.26	12.21	12.65	13.65
HPK47975	R0.4	**0.8**	4	0.6	12	60	0.75	**2°**	1.4	5.61	2.69	3.83	7.26	12.26	13.22
HPK47010	R0.5	**1.0**	4	0.75	6	60	0.95	**0.5°**	2.75	7.71	6.17	6.37	6.58	6.81	7.32
HPK47976	R0.5	**1.0**	4	0.75	6	60	0.95	**1°**	2.75	7.78	6.06	6.26	6.46	6.69	7.19
HPK47977	R0.5	**1.0**	4	0.75	6	60	0.95	**1.5°**	2.75	7.85	5.31	6.14	6.35	6.57	7.06
HPK47978	R0.5	**1.0**	4	0.75	8	60	0.95	**0.5°**	2.75	6.57	8.17	8.44	8.73	9.03	9.73
HPK47979	R0.5	**1.0**	4	0.75	8	60	0.95	**1°**	2.75	6.66	7.86	8.26	8.54	8.84	9.51
HPK47980	R0.5	**1.0**	4	0.75	8	60	0.95	**1.5°**	2.75	6.75	5.31	8.07	8.35	8.64	9.30
HPK47981	R0.5	**1.0**	4	0.75	8	60	0.95	**2°**	2.75	6.84	4.45	6.43	8.16	8.44	9.09
HPK47982	R0.5	**1.0**	4	0.75	10	60	0.95	**0.5°**	2.75	5.73	10.17	10.51	10.87	11.26	12.13
HPK47983	R0.5	**1.0**	4	0.75	10	60	0.95	**1°**	2.75	5.82	7.86	10.26	10.61	10.99	11.84
HPK47984	R0.5	**1.0**	4	0.75	10	60	0.95	**1.5°**	2.75	5.91	5.31	10.00	10.35	10.72	11.55
HPK47985	R0.5	**1.0**	4	0.75	10	60	0.95	**2°**	2.75	6.01	4.45	6.43	10.09	10.44	11.25
HPK47986	R0.5	**1.0**	4	0.75	10	60	0.95	**3°**	2.75	6.22	3.77	4.59	5.95	8.67	10.66
HPK47987	R0.5	**1.0**	4	0.75	12	60	0.95	**0.5°**	2.75	5.08	12.17	12.58	13.02	13.48	14.54
HPK47988	R0.5	**1.0**	4	0.75	12	60	0.95	**1°**	2.75	5.17	7.86	12.26	12.68	13.14	14.16
HPK47989	R0.5	**1.0**	4	0.75	12	60	0.95	**1.5°**	2.75	5.26	5.31	10.11	12.35	12.79	13.79
HPK47990	R0.5	**1.0**	4	0.75	16	60	0.95	**0.5°**	2.75	4.13	16.17	16.72	17.30	17.93	19.35
HPK47991	R0.5	**1.0**	4	0.75	16	60	0.95	**1°**	2.75	4.22	7.86	16.26	16.83	17.44	18.81
HPK47992	R0.5	**1.0**	4	0.75	16	60	0.95	**1.5°**	2.75	4.31	5.31	10.11	16.35	16.94	18.28
HPK47993	R0.5	**1.0**	4	0.75	20	70	0.95	**0.5°**	2.75	3.49	20.17	20.86	21.59	22.38	24.16
HPK47994	R0.5	**1.0**	4	0.75	20	70	0.95	**1°**	2.75	3.57	7.86	20.26	20.97	21.74	23.46
HPK47995	R0.5	**1.0**	4	0.75	20	70	0.95	**1.5°**	2.75	3.65	5.31	10.11	20.35	21.09	22.76

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
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HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

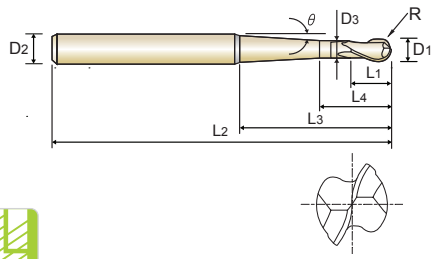
C-COATED SOLID CARBIDE END MILLS

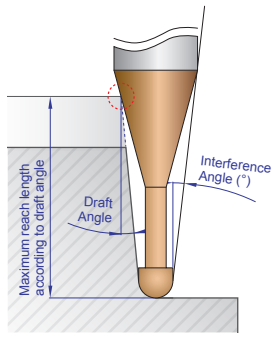
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPK47**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47996	R0.5	**1.0**	4	0.75	20	70	0.95	**2°**	2.75	3.74	4.45	6.43	12.36	20.44	22.06
HPK47997	R0.5	**1.0**	4	0.75	20	70	0.95	**3°**	2.75	3.93	3.77	4.59	5.95	8.67	20.66
HPK47998	R0.5	**1.0**	4	0.75	25	70	0.95	**0.5°**	2.75	2.91	25.17	26.03	26.95	27.95	-
HPK47999	R0.5	**1.0**	4	0.75	25	70	0.95	**1°**	2.75	2.99	7.86	25.26	26.15	27.11	-
HPK47801	R0.5	**1.0**	4	0.75	25	70	0.95	**1.5°**	2.75	3.06	5.31	10.11	25.35	26.28	28.37
HPK47802	R0.5	**1.0**	4	0.75	30	70	0.95	**0.5°**	2.75	2.50	30.17	31.21	32.31	33.51	-
HPK47803	R0.5	**1.0**	4	0.75	30	70	0.95	**1°**	2.75	2.57	7.86	30.26	31.33	32.49	-
HPK47804	R0.5	**1.0**	4	0.75	30	70	0.95	**1.5°**	2.75	2.64	5.31	10.11	30.35	31.47	-
HPK47805	R0.5	**1.0**	4	0.75	30	70	0.95	**2°**	2.75	2.71	4.45	6.43	12.36	30.44	-
HPK47896	R0.5	**1.0**	6	0.75	30	70	0.95	**3°**	2.75	4.26	3.77	4.59	5.95	8.67	30.66
HPK47015	R0.75	**1.5**	4	1.1	10	60	1.45	**0.5°**	3.1	5.18	10.18	10.50	10.86	11.24	12.09
HPK47806	R0.75	**1.5**	4	1.1	10	60	1.45	**1°**	3.1	5.27	8.31	10.26	10.61	10.98	11.81
HPK47807	R0.75	**1.5**	4	1.1	10	60	1.45	**1.5°**	3.1	5.36	5.71	10.02	10.36	10.72	11.53
HPK47808	R0.75	**1.5**	4	1.1	10	60	1.45	**2°**	3.1	5.45	4.84	6.88	10.11	10.46	11.25
HPK47809	R0.75	**1.5**	4	1.1	15	60	1.45	**0.5°**	3.1	3.84	15.18	15.68	16.22	16.80	18.10
HPK47810	R0.75	**1.5**	4	1.1	15	60	1.45	**1°**	3.1	3.92	8.31	15.26	15.79	16.35	17.62
HPK47811	R0.75	**1.5**	4	1.1	15	60	1.45	**1.5°**	3.1	4.01	5.71	10.66	15.36	15.91	17.14
HPK47812	R0.75	**1.5**	4	1.1	15	60	1.45	**2°**	3.1	4.10	4.84	6.88	13.01	15.46	16.65
HPK47813	R0.75	**1.5**	4	1.1	20	70	1.45	**0.5°**	3.1	3.05	20.18	20.85	21.58	22.36	24.11
HPK47814	R0.75	**1.5**	4	1.1	20	70	1.45	**1°**	3.1	3.12	8.31	20.26	20.97	21.73	23.43
HPK47815	R0.75	**1.5**	4	1.1	20	70	1.45	**1.5°**	3.1	3.20	5.71	10.66	20.36	21.09	22.74
HPK47816	R0.75	**1.5**	4	1.1	20	70	1.45	**2°**	3.1	3.28	4.84	6.88	13.01	20.46	22.06
HPK47817	R0.75	**1.5**	4	1.1	25	70	1.45	**0.5°**	3.1	2.53	25.18	26.03	26.94	27.92	-
HPK47818	R0.75	**1.5**	4	1.1	25	70	1.45	**1°**	3.1	2.59	8.31	25.26	26.15	27.10	-
HPK47819	R0.75	**1.5**	4	1.1	30	70	1.45	**0.5°**	3.1	2.16	30.18	31.20	32.30	33.48	-
HPK47820	R0.75	**1.5**	4	1.1	30	70	1.45	**1°**	3.1	2.22	8.31	30.26	31.33	32.48	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

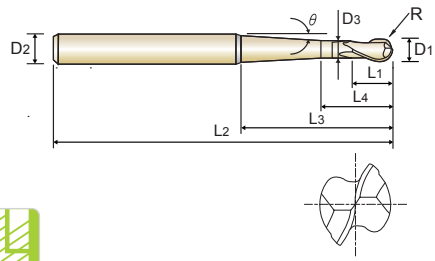
C-COATED SOLID CARBIDE END MILLS

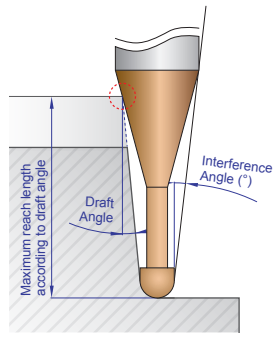
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPK47**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.05~R3) | R +0.003 ~-0.007 (R3.5~R6) | PLAIN | C Coating

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47020	R1.0	**2.0**	4	1.5	12	60	1.95	**0.5°**	3.5	3.93	12.18	12.57	12.99	13.44	14.45
HPK47821	R1.0	**2.0**	4	1.5	12	60	1.95	**1°**	3.5	4.01	8.86	12.27	12.68	13.12	14.10
HPK47822	R1.0	**2.0**	4	1.5	12	60	1.95	**1.5°**	3.5	4.09	6.18	11.36	12.37	12.80	13.76
HPK47823	R1.0	**2.0**	4	1.5	12	60	1.95	**2°**	3.5	4.17	5.29	7.43	12.07	12.48	13.41
HPK47824	R1.0	**2.0**	4	1.5	16	60	1.95	**0.5°**	3.5	3.11	16.18	16.71	17.28	17.89	19.26
HPK47825	R1.0	**2.0**	4	1.5	16	60	1.95	**1°**	3.5	3.18	8.86	16.27	16.83	17.42	18.75
HPK47826	R1.0	**2.0**	4	1.5	16	60	1.95	**1.5°**	3.5	3.25	6.18	11.36	16.37	16.95	18.24
HPK47827	R1.0	**2.0**	4	1.5	16	60	1.95	**2°**	3.5	3.33	5.29	7.43	13.86	16.48	17.74
HPK47828	R1.0	**2.0**	4	1.5	20	70	1.95	**0.5°**	3.5	2.57	20.18	20.85	21.57	22.34	-
HPK47829	R1.0	**2.0**	4	1.5	20	70	1.95	**1°**	3.5	2.63	8.86	20.27	20.97	21.72	-
HPK47830	R1.0	**2.0**	4	1.5	20	70	1.95	**1.5°**	3.5	2.70	6.18	11.36	20.37	21.10	-
HPK47831	R1.0	**2.0**	4	1.5	20	70	1.95	**2°**	3.5	2.77	5.29	7.43	13.86	20.48	-
HPK47832	R1.0	**2.0**	4	1.5	25	70	1.95	**0.5°**	3.5	2.11	25.18	26.02	26.93	27.90	-
HPK47833	R1.0	**2.0**	4	1.5	25	70	1.95	**1°**	3.5	2.17	8.86	25.27	26.15	27.09	-
HPK47834	R1.0	**2.0**	4	1.5	25	70	1.95	**1.5°**	3.5	2.23	6.18	11.36	25.37	26.29	-
HPK47835	R1.0	**2.0**	4	1.5	30	70	1.95	**0.5°**	3.5	1.79	30.18	31.20	32.29	-	-
HPK47836	R1.0	**2.0**	4	1.5	30	70	1.95	**1°**	3.5	1.84	8.86	30.27	31.33	-	-
HPK47837	R1.0	**2.0**	4	1.5	35	80	1.95	**0.5°**	3.5	1.56	35.18	36.37	37.65	-	-
HPK47838	R1.0	**2.0**	4	1.5	40	80	1.95	**0.5°**	3.5	1.38	40.18	41.55	-	-	-
HPK47839	R1.0	**2.0**	4	1.5	50	90	1.95	**0.5°**	3.5	1.12	50.18	51.89	-	-	-
HPK47840	R1.0	**2.0**	6	1.5	25	70	1.95	**2°**	3.5	3.98	5.29	7.43	13.86	25.48	27.47
HPK47841	R1.0	**2.0**	6	1.5	30	70	1.95	**1.5°**	3.5	3.37	6.18	11.36	30.37	31.48	33.95
HPK47842	R1.0	**2.0**	6	1.5	30	70	1.95	**2°**	3.5	3.46	5.29	7.43	13.86	30.48	32.87
HPK47843	R1.0	**2.0**	6	1.5	35	80	1.95	**1°**	3.5	2.90	8.86	35.27	36.51	37.84	-
HPK47844	R1.0	**2.0**	6	1.5	35	80	1.95	**1.5°**	3.5	2.98	6.18	11.36	35.37	36.66	-
HPK47845	R1.0	**2.0**	6	1.5	40	80	1.95	**1°**	3.5	2.59	8.86	40.27	41.69	43.22	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

C-COATED SOLID CARBIDE END MILLS

2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPK47**

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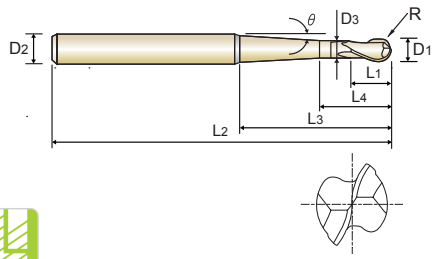
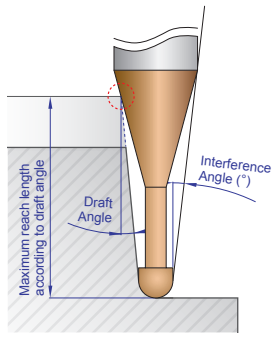
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47846	R1.0	**2.0**	6	1.5	40	80	1.95	**1.5°**	3.5	2.66	6.18	11.36	40.37	41.85	-
HPK47847	R1.0	**2.0**	6	1.5	40	80	1.95	**2°**	3.5	2.74	5.29	7.43	13.86	40.48	-
HPK47848	R1.0	**2.0**	6	1.5	50	90	1.95	**1°**	3.5	2.14	8.86	50.27	52.05	53.97	-
HPK47849	R1.0	**2.0**	6	1.5	50	90	1.95	**1.5°**	3.5	2.20	6.18	11.36	50.37	52.22	-
HPK47850	R1.0	**2.0**	6	1.5	50	90	1.95	**2°**	3.5	2.27	5.29	7.43	13.86	50.48	-
HPK47030	R1.5	**3.0**	6	2.5	15	70	2.85	**0.5°**	4.5	4.51	15.39	15.87	16.39	16.95	18.21
HPK47851	R1.5	**3.0**	6	2.5	15	70	2.85	**1°**	4.5	4.59	15.04	15.51	16.01	16.56	17.78
HPK47852	R1.5	**3.0**	6	2.5	15	70	2.85	**1.5°**	4.5	4.67	10.30	15.14	15.64	16.17	17.35
HPK47853	R1.5	**3.0**	6	2.5	15	70	2.85	**2°**	4.5	4.76	8.36	11.79	15.26	15.77	16.93
HPK47854	R1.5	**3.0**	6	2.5	20	70	2.85	**0.5°**	4.5	3.60	20.39	21.05	21.75	22.51	24.22
HPK47855	R1.5	**3.0**	6	2.5	20	70	2.85	**1°**	4.5	3.67	16.09	20.51	21.19	21.93	23.59
HPK47856	R1.5	**3.0**	6	2.5	20	70	2.85	**1.5°**	4.5	3.75	10.30	19.09	20.64	21.35	22.96
HPK47857	R1.5	**3.0**	6	2.5	20	70	2.85	**2°**	4.5	3.84	8.36	11.79	20.08	20.77	22.33
HPK47858	R1.5	**3.0**	6	2.5	25	70	2.85	**0.5°**	4.5	2.99	25.39	26.22	27.12	28.08	-
HPK47859	R1.5	**3.0**	6	2.5	25	70	2.85	**1°**	4.5	3.06	16.09	25.51	26.38	27.31	29.40
HPK47860	R1.5	**3.0**	6	2.5	25	70	2.85	**1.5°**	4.5	3.14	10.30	19.09	25.64	26.54	28.57
HPK47861	R1.5	**3.0**	6	2.5	30	70	2.85	**0.5°**	4.5	2.56	30.39	31.40	32.48	33.64	-
HPK47862	R1.5	**3.0**	6	2.5	30	70	2.85	**1°**	4.5	2.63	16.09	30.51	31.56	32.68	-
HPK47863	R1.5	**3.0**	6	2.5	30	70	2.85	**1.5°**	4.5	2.69	10.30	19.09	30.64	31.73	-
HPK47864	R1.5	**3.0**	6	2.5	30	70	2.85	**2°**	4.5	2.77	8.36	11.79	22.08	30.77	-
HPK47865	R1.5	**3.0**	6	2.5	40	80	2.85	**0.5°**	4.5	1.99	40.39	41.75	43.20	-	-
HPK47866	R1.5	**3.0**	6	2.5	40	80	2.85	**1°**	4.5	2.04	16.09	40.51	41.92	43.43	-
HPK47867	R1.5	**3.0**	6	2.5	40	80	2.85	**1.5°**	4.5	2.10	10.30	19.09	40.64	42.10	-
HPK47868	R1.5	**3.0**	6	2.5	50	90	2.85	**0.5°**	4.5	1.62	50.39	52.09	53.92	-	-
HPK47869	R1.5	**3.0**	6	2.5	50	90	2.85	**1°**	4.5	1.67	16.09	50.51	52.28	-	-
HPK47870	R1.5	**3.0**	6	2.5	50	90	2.85	**1.5°**	4.5	1.72	10.30	19.09	50.64	-	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R3	+0.001~-0.005	0~-0.010	h4
over R3	+0.003~-0.007		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

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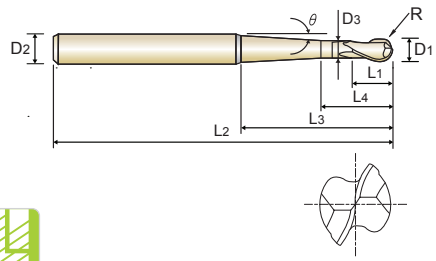
C-COATED SOLID CARBIDE END MILLS

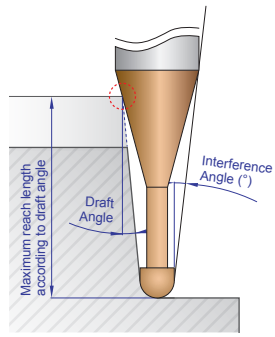
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPK47**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47040	R2.0	**4.0**	6	3	20	80	3.85	**1°**	5	2.72	16.59	20.51	21.18	21.90	-
HPK47871	R2.0	**4.0**	6	3	30	80	3.85	**1°**	5	1.89	16.59	30.51	31.54	-	-
HPK47872	R2.0	**4.0**	6	3	40	80	3.85	**1°**	5	1.44	16.59	40.51	-	-	-
HPK47873	R2.0	**4.0**	6	3	50	90	3.85	**1°**	5	1.17	16.59	50.51	-	-	-
HPK47874	R2.0	**4.0**	6	3	61.1	110	3.85	**1°**	5	0.96	16.59	-	-	-	-
HPK47897	R2.5	**5.0**	8	10	30	80	4.85	**1°**	13	2.66	30.07	31.03	32.06	33.17	-
HPK47898	R2.5	**5.0**	8	10	40	90	4.85	**1°**	13	2.06	32.09	41.03	42.42	43.92	-
HPK47899	R2.5	**5.0**	8	10	60	110	4.85	**1°**	13	1.42	32.09	61.03	-	-	-
HPK47702	R2.5	**5.0**	8	10	74	150	4.75	**1.5°**	13	1.20	25.41	48.31	-	-	-
HPK47701	R2.5	**5.0**	8	10	90	140	4.85	**1°**	13	0.97	32.09	-	-	-	-
HPK47703	R2.5	**5.0**	8	10	100	150	4.85	**0.5°**	13	0.85	100.64	-	-	-	-
HPK47704	R3.0	**6.0**	8	12	30	80	5.85	**1°**	15	1.91	30.19	31.14	32.15	-	-
HPK47705	R3.0	**6.0**	8	12	40	90	5.85	**1°**	15	1.45	35.59	41.14	-	-	-
HPK47706	R3.0	**6.0**	8	12	45	95	5.85	**1°**	15	1.30	35.59	46.14	-	-	-
HPK47707	R3.0	**6.0**	8	12	50	100	5.85	**1°**	15	1.18	35.59	51.14	-	-	-
HPK47708	R3.0	**6.0**	8	12	120	200	5.85	**0.5°**	15	0.49	-	-	-	-	-
HPK47709	R3.0	**6.0**	10	12	30	80	5.85	**3°**	15	3.60	19.11	23.14	29.84	30.99	33.27
HPK47710	R3.0	**6.0**	10	12	50	100	5.85	**1.5°**	15	2.23	25.29	47.58	51.61	53.43	-
HPK47711	R3.0	**6.0**	10	12	60	110	5.85	**1°**	15	1.85	35.59	61.14	63.24	-	-
HPK47712	R3.0	**6.0**	10	12	70	120	5.85	**1°**	15	1.61	35.59	71.14	73.60	-	-
HPK47713	R3.0	**6.0**	10	12	80	130	5.85	**1°**	15	1.42	35.59	81.14	-	-	-
HPK47714	R3.0	**6.0**	10	12	96	200	5.75	**1.5°**	15	1.23	28.16	53.31	-	-	-
HPK47715	R3.0	**6.0**	10	12	120	200	5.85	**1°**	15	0.97	35.59	-	-	-	-
HPK47070	R3.5	**7.0**	10	14	40	90	6.70	**3°**	17	2.25	23.13	28.03	36.20	40.94	-
HPK47875	R3.5	**7.0**	10	14	45	95	6.70	**1°**	17	1.87	45.09	46.54	48.09	-	-
HPK47876	R3.5	**7.0**	10	14	60	110	6.70	**1.5°**	17	1.47	32.34	60.04	-	-	-

NEXT PAGE ▶

Size	Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R3	+0.001~-0.005	0~-0.010	h4
over R3	+0.003~-0.007		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

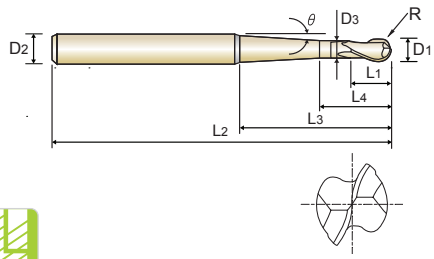
C-COATED SOLID CARBIDE END MILLS

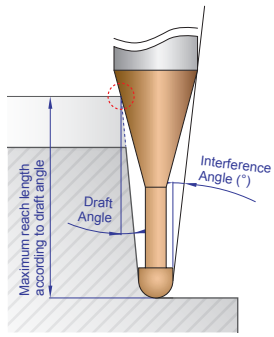
2 FLUTE BALL NOSE for RIB PROCESSING with TAPER NECK

SERIES **HPK47**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 | R +0.003 ~-0.007 | PLAIN | C Coating

R0.05~R3 R3.5~R6

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Neck Taper Angle(°)	Under Neck Parallel Length	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3	θ°	L_4		0.5°	1°	1.5°	2°	3°
HPK47080	R4.0	**8.0**	10	14	35	95	7.70	**3°**	17	1.80	23.03	27.78	35.08	-	-
HPK47877	R4.0	**8.0**	10	14	50	110	7.70	**1°**	17	1.19	47.18	51.50	-	-	-
HPK47878	R4.0	**8.0**	10	14	50	110	7.70	**1.5°**	17	1.22	32.09	50.35	-	-	-
HPK47879	R4.0	**8.0**	10	14	55	115	7.70	**1°**	17	1.08	47.18	56.50	-	-	-
HPK47880	R4.0	**8.0**	10	14	60	120	7.70	**1°**	17	1.00	47.18	-	-	-	-
HPK47881	R4.0	**8.0**	10	14	70	130	7.70	**1°**	17	0.86	47.18	-	-	-	-
HPK47882	R4.0	**8.0**	10	14	120	200	7.70	**0.5°**	17	0.49	-	-	-	-	-
HPK47883	R4.0	**8.0**	12	14	80	140	7.70	**1°**	17	1.43	47.18	81.50	-	-	-
HPK47884	R4.0	**8.0**	12	14	98	200	7.70	**1.5°**	17	1.22	32.09	60.17	-	-	-
HPK47885	R4.0	**8.0**	12	14	120	200	7.70	**1°**	17	0.98	47.18	-	-	-	-
HPK47100	R5.0	**10.0**	12	18	35	105	9.70	**3°**	21	1.82	27.63	33.28	35.83	-	-
HPK47886	R5.0	**10.0**	12	18	55	125	9.70	**1.5°**	21	1.12	37.59	55.53	-	-	-
HPK47887	R5.0	**10.0**	12	18	60	130	9.70	**1°**	21	1.01	54.18	61.71	-	-	-
HPK47888	R5.0	**10.0**	12	18	65	135	9.70	**1°**	21	0.93	54.18	-	-	-	-
HPK47889	R5.0	**10.0**	12	18	75	140	9.70	**1°**	21	0.81	54.18	-	-	-	-
HPK47890	R5.0	**10.0**	12	18	86	200	9.70	**1°**	21	0.71	54.18	-	-	-	-
HPK47891	R5.0	**10.0**	12	18	120	200	9.70	**0.5°**	21	0.49	-	-	-	-	-
HPK47892	R5.0	**10.0**	16	18	120	200	9.70	**1.5°**	21	1.47	37.59	70.17	-	-	-
HPK47120	R6.0	**12.0**	16	22	60	140	11.70	**3°**	25	2.08	32.23	38.78	49.69	60.86	-
HPK47893	R6.0	**12.0**	16	22	80	160	11.70	**1.5°**	25	1.49	43.09	80.01	-	-	-
HPK47894	R6.0	**12.0**	16	22	106	200	11.70	**1.5°**	25	1.14	43.09	80.17	-	-	-
HPK47895	R6.0	**12.0**	16	22	120	200	11.70	**1°**	25	0.99	61.18	-	-	-	-

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

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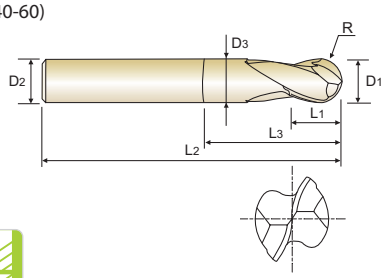
C-COATED SOLID CARBIDE END MILLS

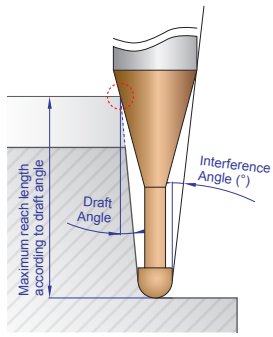
2 FLUTE BALL NOSE with NECK

SERIES
HPK48

- ▶ Improvement of tool life by applying new coating
- ▶ Application of tight tolerances for precision machining
- ▶ Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)









P. 121

R1/64~R1/8 R5/32~R1/4

Unit : Inch

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK48002	R1/64	**1/32**	1/4	1/32	1/16	2	.029	12.97	1.84	1.94	2.05	2.18	2.49
HPK48004	R1/32	**1/16**	1/4	1/16	1/8	2	.059	11.02	3.45	3.57	3.70	3.84	4.15
HPK48006	R3/64	**3/32**	1/4	3/32	3/16	2	.090	9.13	5.11	5.28	5.48	5.68	6.14
HPK48008	R1/16	**1/8**	1/4	1/8	1/4	2-1/2	.121	7.26	6.76	7.00	7.25	7.52	8.13
HPK48012	R3/32	**3/16**	1/4	3/16	3/8	3	.184	3.59	10.02	10.37	10.74	11.14	12.05
HPK48016	R1/8	**1/4**	1/4	1/4	1/2	3-1/2	.246	0.00	-	-	-	-	-
HPK48020	R5/32	**5/16**	5/16	5/16	5/8	4	.309	0.00	-	-	-	-	-
HPK48024	R3/16	**3/8**	3/8	3/8	3/4	4	.371	0.00	-	-	-	-	-
HPK48032	R1/4	**1/2**	1/2	1/2	1	4-1/2	.496	0.00	-	-	-	-	-

Size	Mill Dia. Tolerance (Inch)
up to Ø1/2	0~-.0004"

Size	Ball Radius Tolerance (Inch)	Shank Dia. Tolerance
up to Ø1/4	+.00005"~-.00020"	h4
over Ø1/4	+.00010"~-.00030"	* Shank Dia.>ø1/4 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

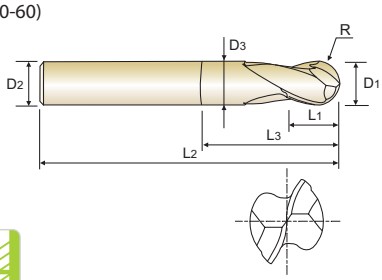
C-COATED SOLID CARBIDE END MILLS

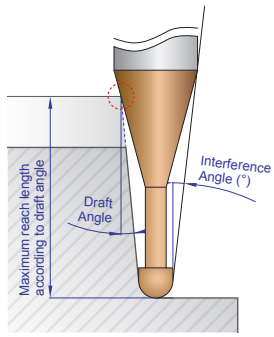
2 FLUTE BALL NOSE with NECK

SERIES **HPK46**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.5~R3) | R +0.003 ~-0.007 (R3.5~R12.5) | PLAIN | C Coating

P. 109-120

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK46010	R0.5	**1.0**	4	1	2.5	45	0.95	10.38	2.78	2.93	3.10	3.29	3.76
HPK46015	R0.75	**1.5**	4	1.5	3.75	45	1.45	8.36	3.97	4.11	4.26	4.42	4.78
HPK46020	R1.0	**2.0**	6	2	5	45	1.95	9.05	5.26	5.45	5.64	5.86	6.33
HPK46025	R1.25	**2.5**	6	2.5	6.25	45	2.4	7.69	6.65	6.89	7.13	7.40	8.00
HPK46030	R1.5	**3.0**	6	3	7.5	45	2.85	6.40	8.04	8.32	8.62	8.95	9.67
HPK46035	R1.75	**3.5**	6	3.5	8.75	45	3.35	5.22	9.33	9.66	10.01	10.38	11.23
HPK46040	R2.0	**4.0**	6	4	10	45	3.85	4.08	10.63	11.00	11.39	11.82	12.78
HPK46050	R2.5	**5.0**	6	5	12.5	50	4.85	1.96	13.21	13.67	14.16	-	-
HPK46060	R3.0	**6.0**	6	6	15	50	5.85	0.00	-	-	-	-	-
HPK46080	R4.0	**8.0**	8	8	20	60	7.7	0.00	-	-	-	-	-
HPK46100	R5.0	**10.0**	10	10	25	70	9.7	0.00	-	-	-	-	-
HPK46120	R6.0	**12.0**	12	12	30	75	11.7	0.00	-	-	-	-	-
HPK46140	R7.0	**14.0**	14	14	28	110	13.7	0.00	-	-	-	-	-
HPK46160	R8.0	**16.0**	16	16	32	140	15.7	0.00	-	-	-	-	-
HPK46180	R9.0	**18.0**	18	18	36	140	17.7	0.00	-	-	-	-	-
HPK46200	R10.0	**20.0**	20	20	40	160	19.7	0.00	-	-	-	-	-
HPK46250	R12.5	**25.0**	25	25	50	180	24.7	0.00	-	-	-	-	-

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

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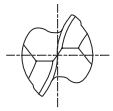
C-COATED SOLID CARBIDE END MILLS

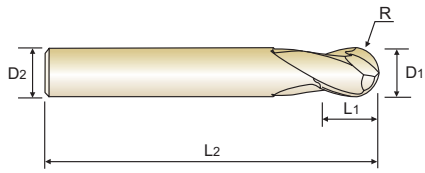
2 FLUTE BALL NOSE

SERIES
HPK44

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc40-60)







CARBIDE | 2 | 30° | R +0.001 ~-0.005 (R0.05~R3) | R +0.003 ~-0.007 (R3.5~R10) | PLAIN | C Coating

P. 122-123

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D_1	D_2	L_1	L_2
HPK44001	R0.05	**0.1**	4	0.1	50
HPK440015	R0.075	**0.15**	4	0.15	50
HPK44002	R0.1	**0.2**	4	0.2	50
HPK44003	R0.15	**0.3**	4	0.3	50
HPK44004	R0.2	**0.4**	4	0.6	50
HPK44902	R0.2	**0.4**	6	0.4	50
HPK44005	R0.25	**0.5**	4	0.8	50
HPK44903	R0.25	**0.5**	6	0.5	50
HPK44006	R0.3	**0.6**	4	0.9	50
HPK44904	R0.3	**0.6**	6	0.6	50
HPK44008	R0.4	**0.8**	4	1.2	50
HPK44905	R0.4	**0.8**	6	0.8	50
HPK44010	R0.5	**1.0**	4	1.5	50
HPK44906	R0.5	**1.0**	6	1	50
HPK44012	R0.6	**1.2**	6	1.2	50
HPK44015	R0.75	**1.5**	4	2.3	50
HPK44907	R0.75	**1.5**	6	1.5	50
HPK44020	R1.0	**2.0**	4	3	60
HPK44908	R1.0	**2.0**	6	2	50
HPK44025	R1.25	**2.5**	6	3.8	60
HPK44030	R1.5	**3.0**	6	5	60
HPK44040	R2.0	**4.0**	4	6	70
HPK44901	R2.0	**4.0**	6	6	70
HPK44050	R2.5	**5.0**	6	8	70
HPK44060	R3.0	**6.0**	6	10	80
HPK44080	R4.0	**8.0**	8	12	100
HPK44100	R5.0	**10.0**	10	15	100
HPK44120	R6.0	**12.0**	12	18	110
HPK44160	R8.0	**16.0**	16	24	140
HPK44200	R10.0	**20.0**	20	30	160

Size	Radius Tolerance (mm)
up to R3	+0.001~-0.005
over R3	+0.003~-0.007

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	◎		○	◎									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎				◎	◎

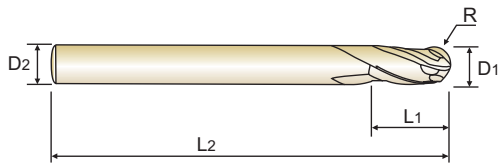
C-COATED SOLID CARBIDE END MILLS

3 FLUTE BALL NOSE - CENTER MATCH

SERIES **HPK11**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)





CARBIDE | 3 | 30° | R ±0.005 | R ±0.008 | PLAIN | C Coating | P. 124

R1.5~R6 R8~R10

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D_1	D_2	L_1	L_2
HPK11030	R1.5	**3.0**	6	5	60
HPK11040	R2.0	**4.0**	6	6	70
HPK11050	R2.5	**5.0**	6	8	70
HPK11060	R3.0	**6.0**	6	10	80
HPK11080	R4.0	**8.0**	8	14	100
HPK11100	R5.0	**10.0**	10	18	100
HPK11120	R6.0	**12.0**	12	22	110
HPK11160	R8.0	**16.0**	16	30	140
HPK11200	R10.0	**20.0**	20	38	160

Size	Radius Tolerance (mm)
up to R3	±0.005
over R3	±0.008

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

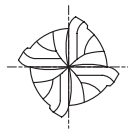
C-COATED SOLID CARBIDE END MILLS

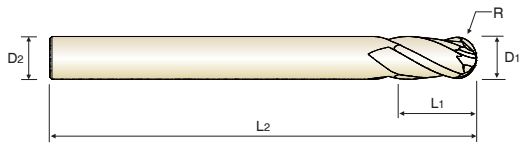
4 FLUTE BALL NOSE - CENTER MATCH

SERIES
HPK12

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4 | 30° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 125

R1.5~R6 R8~R10

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D_1	D_2	L_1	L_2
HPK12030	R1.5	**3.0**	6	8	60
HPK12040	R2.0	**4.0**	6	8	70
HPK12050	R2.5	**5.0**	6	10	80
HPK12060	R3.0	**6.0**	6	12	90
HPK12080	R4.0	**8.0**	8	14	100
HPK12100	R5.0	**10.0**	10	18	100
HPK12120	R6.0	**12.0**	12	22	110
HPK12160	R8.0	**16.0**	16	30	140
HPK12200	R10.0	**20.0**	20	38	160

Size	Radius Tolerance (mm)
up to R3	±0.005
over R3	±0.008

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R6	0~-0.010	h4
over R6	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel			High alloyed steel, and tool steel				Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

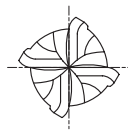
C-COATED SOLID CARBIDE END MILLS

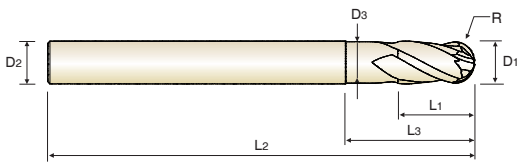
4 FLUTE BALL NOSE with NECK - CENTER MATCH

SERIES **HPK13**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4 | 30° | R ±0.005 (R0.5~R3) | R ±0.008 (R4~R6) | PLAIN | C Coating

P. 125

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK13010	R0.5	**1.0**	6	1.5	3	50	0.95	11.38	3.31	3.49	3.69	3.92	4.47
HPK13015	R0.75	**1.5**	6	2.5	4.5	50	1.45	9.83	4.75	4.91	5.09	5.28	5.71
HPK13020	R1.0	**2.0**	6	3	6	50	1.95	8.39	6.30	6.52	6.75	7.01	7.57
HPK13025	R1.25	**2.5**	6	4	7.5	50	2.40	7.02	7.95	8.22	8.52	8.84	9.56
HPK13030	R1.5	**3.0**	6	4.5	9	70	2.85	5.76	9.59	9.93	10.29	10.67	11.54
HPK13040	R2.0	**4.0**	6	6	12	70	3.85	3.57	12.69	13.14	13.61	14.12	15.27
HPK13050	R2.5	**5.0**	6	7.5	15	80	4.85	1.67	15.79	16.34	16.93	-	-
HPK13060	R3.0	**6.0**	6	9	18	90	5.85	0.00	-	-	-	-	-
HPK13080	R4.0	**8.0**	8	12	24	100	7.70	0.00	-	-	-	-	-
HPK13100	R5.0	**10.0**	10	15	30	100	9.70	0.00	-	-	-	-	-
HPK13120	R6.0	**12.0**	12	18	36	110	11.70	0.00	-	-	-	-	-

Size	Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R3	±0.005	0~-0.010	h4
over R3	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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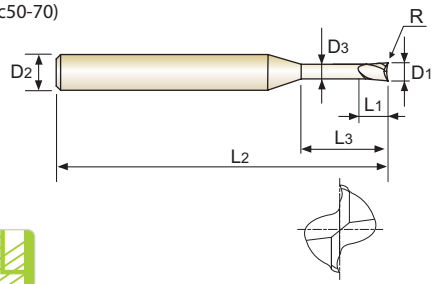
C-COATED SOLID CARBIDE END MILLS

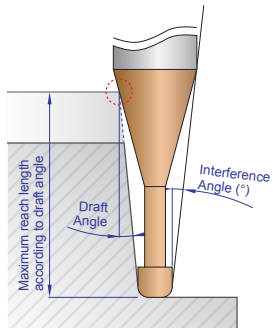
2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.2~D6 D8~D12

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D1	D2	L1	L3	L2	D3		0.5°	1°	1.5°	2°	3°
HPI89002	R0.02	**0.2**	4	0.15	0.5	45	0.17	13.99	0.61	0.65	0.68	0.72	0.82
HPI89901	R0.05	**0.2**	4	0.15	0.5	45	0.17	14.04	0.61	0.64	0.68	0.72	0.81
HPI89902	R0.02	**0.2**	4	0.15	1	45	0.17	13.16	1.14	1.20	1.27	1.35	1.54
HPI89903	R0.05	**0.2**	4	0.15	1	45	0.17	13.21	1.14	1.20	1.27	1.34	1.52
HPI89904	R0.02	**0.2**	4	0.15	1.5	45	0.17	12.42	1.67	1.76	1.86	1.97	2.25
HPI89905	R0.05	**0.2**	4	0.15	1.5	45	0.17	12.46	1.66	1.75	1.85	1.96	2.23
HPI89906	R0.02	**0.2**	4	0.15	2	45	0.17	11.76	2.19	2.31	2.45	2.60	2.96
HPI89907	R0.05	**0.2**	4	0.15	2	45	0.17	11.80	2.19	2.31	2.44	2.59	2.95
HPI89003	R0.02	**0.3**	4	0.25	1	45	0.27	13.12	1.14	1.20	1.27	1.35	1.54
HPI89908	R0.05	**0.3**	4	0.25	1	45	0.27	13.16	1.14	1.20	1.27	1.34	1.52
HPI89909	R0.02	**0.3**	4	0.25	1.5	45	0.27	12.36	1.67	1.76	1.86	1.97	2.25
HPI89910	R0.05	**0.3**	4	0.25	1.5	45	0.27	12.41	1.66	1.75	1.85	1.96	2.23
HPI89911	R0.02	**0.3**	4	0.25	2	45	0.27	11.69	2.19	2.31	2.45	2.60	2.96
HPI89912	R0.05	**0.3**	4	0.25	2	45	0.27	11.73	2.19	2.31	2.44	2.59	2.95
HPI89913	R0.02	**0.3**	4	0.25	2.5	45	0.27	11.09	2.72	2.87	3.03	3.22	3.67
HPI89914	R0.05	**0.3**	4	0.25	2.5	45	0.27	11.12	2.72	2.86	3.03	3.21	3.66
HPI89915	R0.02	**0.3**	4	0.25	3	45	0.27	10.54	3.24	3.42	3.62	3.84	4.38
HPI89916	R0.05	**0.3**	4	0.25	3	45	0.27	10.57	3.24	3.42	3.61	3.83	4.37
HPI89004	R0.02	**0.4**	4	0.3	1	45	0.37	13.07	1.14	1.20	1.27	1.35	1.54
HPI89917	R0.05	**0.4**	4	0.3	1	45	0.37	13.12	1.14	1.20	1.27	1.34	1.52
HPI89918	R0.1	**0.4**	4	0.3	1	45	0.37	13.20	1.14	1.19	1.26	1.33	1.50
HPI89919	R0.02	**0.4**	4	0.3	1.5	45	0.37	12.30	1.67	1.76	1.86	1.97	2.25
HPI89920	R0.05	**0.4**	4	0.3	1.5	45	0.37	12.35	1.66	1.75	1.85	1.96	2.23
HPI89921	R0.02	**0.4**	4	0.3	2	45	0.37	11.62	2.19	2.31	2.45	2.60	2.96
HPI89922	R0.05	**0.4**	4	0.3	2	45	0.37	11.66	2.19	2.31	2.44	2.59	2.95
HPI89923	R0.1	**0.4**	4	0.3	2	45	0.37	11.72	2.19	2.30	2.43	2.58	2.92

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

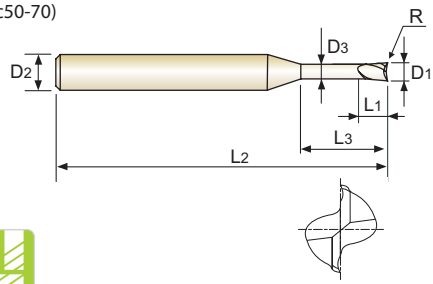
C-COATED SOLID CARBIDE END MILLS

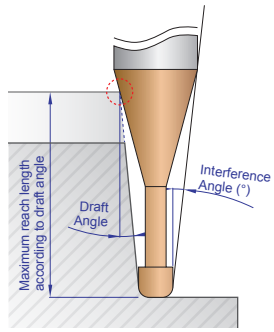
2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 (D0.2~D6) | R ±0.008 (D8~D12) | PLAIN | C Coating

P. 126-131

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI89924	R0.02	**0.4**	4	0.3	2.5	45	0.37	11.01	2.72	2.87	3.03	3.22	3.67
HPI89925	R0.05	**0.4**	4	0.3	2.5	45	0.37	11.04	2.72	2.86	3.03	3.21	3.66
HPI89926	R0.02	**0.4**	4	0.3	3	45	0.37	10.46	3.24	3.42	3.62	3.84	4.38
HPI89927	R0.05	**0.4**	4	0.3	3	45	0.37	10.49	3.24	3.42	3.61	3.83	4.37
HPI89928	R0.1	**0.4**	4	0.3	3	45	0.37	10.54	3.24	3.41	3.61	3.82	4.35
HPI89929	R0.02	**0.4**	4	0.3	4	45	0.37	9.50	4.30	4.53	4.79	5.09	5.80
HPI89930	R0.05	**0.4**	4	0.3	4	45	0.37	9.53	4.30	4.53	4.79	5.08	5.79
HPI89931	R0.1	**0.4**	4	0.3	4	45	0.37	9.57	4.29	4.52	4.78	5.07	5.77
HPI89005	R0.02	**0.5**	4	0.4	1	45	0.45	12.96	1.20	1.27	1.34	1.42	1.62
HPI89932	R0.05	**0.5**	4	0.4	1	45	0.45	13.01	1.20	1.26	1.33	1.41	1.60
HPI89933	R0.1	**0.5**	4	0.4	1	45	0.45	13.09	1.20	1.26	1.32	1.40	1.58
HPI89934	R0.02	**0.5**	4	0.4	2	45	0.45	11.50	2.25	2.37	2.51	2.67	3.04
HPI89935	R0.05	**0.5**	4	0.4	2	45	0.45	11.54	2.25	2.37	2.51	2.66	3.03
HPI89936	R0.1	**0.5**	4	0.4	2	45	0.45	11.60	2.25	2.37	2.50	2.65	3.01
HPI89937	R0.02	**0.5**	4	0.4	3	45	0.45	10.33	3.30	3.48	3.69	3.91	4.46
HPI89938	R0.05	**0.5**	4	0.4	3	45	0.45	10.36	3.30	3.48	3.68	3.91	4.45
HPI89939	R0.1	**0.5**	4	0.4	3	45	0.45	10.41	3.30	3.48	3.67	3.89	4.43
HPI89940	R0.02	**0.5**	4	0.4	4	45	0.45	9.37	4.36	4.59	4.86	5.16	5.88
HPI89941	R0.05	**0.5**	4	0.4	4	45	0.45	9.40	4.35	4.59	4.86	5.15	5.87
HPI89942	R0.1	**0.5**	4	0.4	4	45	0.45	9.44	4.35	4.59	4.85	5.14	5.85
HPI89943	R0.02	**0.5**	4	0.4	5	45	0.45	8.58	5.41	5.70	6.04	6.41	7.31
HPI89944	R0.05	**0.5**	4	0.4	5	45	0.45	8.60	5.41	5.70	6.03	6.40	7.30
HPI89945	R0.1	**0.5**	4	0.4	5	45	0.45	8.63	5.40	5.70	6.02	6.39	7.27
HPI89946	R0.02	**0.5**	4	0.4	6	45	0.45	7.90	6.46	6.81	7.21	7.65	8.73
HPI89947	R0.05	**0.5**	4	0.4	6	45	0.45	7.92	6.46	6.81	7.20	7.65	8.72
HPI89948	R0.1	**0.5**	4	0.4	6	45	0.45	7.95	6.46	6.81	7.20	7.63	8.70

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

C-COATED SOLID CARBIDE END MILLS

2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

- Improvement of tool life by applying new coating
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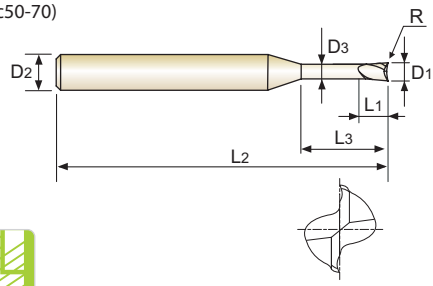

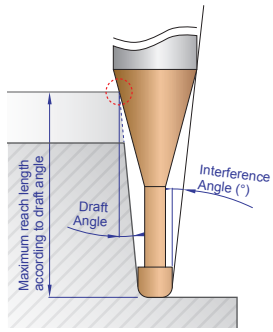

CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.2~D6 D8~D12

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI89006	R0.02	**0.6**	4	0.5	2	45	0.55	11.42	2.25	2.37	2.51	2.67	3.04
HPI89949	R0.05	**0.6**	4	0.5	2	45	0.55	11.46	2.25	2.37	2.51	2.66	3.03
HPI89950	R0.1	**0.6**	4	0.5	2	45	0.55	11.52	2.25	2.37	2.50	2.65	3.01
HPI89951	R0.02	**0.6**	4	0.5	4	45	0.55	9.27	4.36	4.59	4.86	5.16	5.88
HPI89952	R0.05	**0.6**	4	0.5	4	45	0.55	9.29	4.35	4.59	4.86	5.15	5.87
HPI89953	R0.1	**0.6**	4	0.5	4	45	0.55	9.34	4.35	4.59	4.85	5.14	5.85
HPI89954	R0.02	**0.6**	4	0.5	6	45	0.55	7.80	6.46	6.81	7.21	7.65	8.73
HPI89955	R0.05	**0.6**	4	0.5	6	45	0.55	7.81	6.46	6.81	7.20	7.65	8.72
HPI89956	R0.1	**0.6**	4	0.5	6	45	0.55	7.85	6.46	6.81	7.20	7.63	8.70
HPI89957	R0.02	**0.6**	4	0.5	8	50	0.55	6.72	8.56	9.03	9.56	10.15	11.41
HPI89958	R0.05	**0.6**	4	0.5	8	50	0.55	6.74	8.56	9.03	9.55	10.14	11.40
HPI89959	R0.1	**0.6**	4	0.5	8	50	0.55	6.76	8.56	9.03	9.54	10.13	11.39
HPI89960	R0.02	**0.6**	4	0.5	10	50	0.55	5.91	10.67	11.25	11.91	12.64	13.74
HPI89961	R0.05	**0.6**	4	0.5	10	50	0.55	5.92	10.67	11.25	11.90	12.63	13.74
HPI89962	R0.1	**0.6**	4	0.5	10	50	0.55	5.94	10.66	11.25	11.89	12.62	13.73
HPI89007	R0.02	**0.7**	4	0.55	2	45	0.65	11.34	2.25	2.37	2.51	2.67	3.04
HPI89963	R0.05	**0.7**	4	0.55	2	45	0.65	11.38	2.25	2.37	2.51	2.66	3.03
HPI89964	R0.1	**0.7**	4	0.55	2	45	0.65	11.44	2.25	2.37	2.50	2.65	3.01
HPI89965	R0.02	**0.7**	4	0.55	4	45	0.65	9.16	4.36	4.59	4.86	5.16	5.88
HPI89966	R0.05	**0.7**	4	0.55	4	45	0.65	9.19	4.35	4.59	4.86	5.15	5.87
HPI89967	R0.1	**0.7**	4	0.55	4	45	0.65	9.23	4.35	4.59	4.85	5.14	5.85
HPI89968	R0.02	**0.7**	4	0.55	6	45	0.65	7.68	6.46	6.81	7.21	7.65	8.73
HPI89969	R0.05	**0.7**	4	0.55	6	45	0.65	7.70	6.46	6.81	7.20	7.65	8.72
HPI89970	R0.1	**0.7**	4	0.55	6	45	0.65	7.73	6.46	6.81	7.20	7.63	8.70
HPI89008	R0.02	**0.8**	4	0.65	2	45	0.75	11.25	2.25	2.37	2.51	2.67	3.04
HPI89971	R0.05	**0.8**	4	0.65	2	45	0.75	11.29	2.25	2.37	2.51	2.66	3.03

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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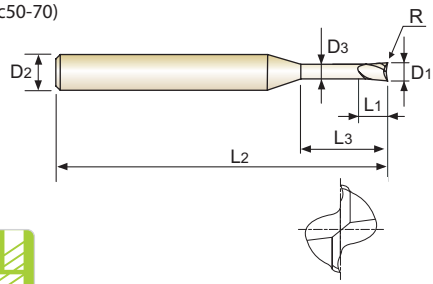

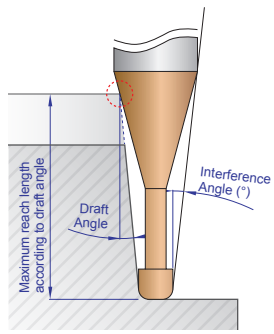

CARBIDE | 2 | 35° | R ±0.005 (D0.2~D6) | R ±0.008 (D8~D12) | PLAIN | C Coating

P. 126-131

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI89972	R0.1	**0.8**	4	0.65	2	45	0.75	11.36	2.25	2.37	2.50	2.65	3.01
HPI89973	R0.2	**0.8**	4	0.65	2	45	0.75	11.50	2.24	2.36	2.48	2.62	2.96
HPI89974	R0.02	**0.8**	4	0.65	4	45	0.75	9.05	4.36	4.59	4.86	5.16	5.88
HPI89975	R0.05	**0.8**	4	0.65	4	45	0.75	9.08	4.35	4.59	4.86	5.15	5.87
HPI89976	R0.1	**0.8**	4	0.65	4	45	0.75	9.12	4.35	4.59	4.85	5.14	5.85
HPI89977	R0.2	**0.8**	4	0.65	4	45	0.75	9.21	4.35	4.57	4.83	5.12	5.81
HPI89978	R0.02	**0.8**	4	0.65	6	45	0.75	7.57	6.46	6.81	7.21	7.65	8.73
HPI89979	R0.05	**0.8**	4	0.65	6	45	0.75	7.59	6.46	6.81	7.20	7.65	8.72
HPI89980	R0.1	**0.8**	4	0.65	6	45	0.75	7.62	6.46	6.81	7.20	7.63	8.70
HPI89981	R0.2	**0.8**	4	0.65	6	45	0.75	7.68	6.45	6.79	7.18	7.61	8.65
HPI89982	R0.02	**0.8**	4	0.65	8	50	0.75	6.50	8.56	9.03	9.56	10.15	11.29
HPI89983	R0.05	**0.8**	4	0.65	8	50	0.75	6.51	8.56	9.03	9.55	10.14	11.29
HPI89984	R0.1	**0.8**	4	0.65	8	50	0.75	6.54	8.56	9.03	9.54	10.13	11.28
HPI89985	R0.2	**0.8**	4	0.65	8	50	0.75	6.58	8.56	9.01	9.53	10.10	11.26
HPI89986	R0.05	**0.8**	4	0.65	12	50	0.75	5.08	12.77	13.47	14.25	15.11	15.96
HPI89987	R0.1	**0.8**	4	0.65	12	50	0.75	5.09	12.77	13.46	14.24	15.11	15.95
HPI89988	R0.2	**0.8**	4	0.65	12	50	0.75	5.12	12.76	13.45	14.22	15.09	15.93
HPI89009	R0.1	**0.9**	4	0.7	4	45	0.85	9.01	4.35	4.59	4.85	5.14	5.85
HPI89989	R0.1	**0.9**	4	0.7	8	50	0.85	6.42	8.56	9.03	9.54	10.13	11.22
HPI89010	R0.1	**1.0**	4	0.8	4	50	0.95	8.89	4.35	4.59	4.85	5.14	5.85
HPI89990	R0.2	**1.0**	4	0.8	4	50	0.95	8.98	4.35	4.57	4.83	5.12	5.81
HPI89991	R0.1	**1.0**	4	0.8	6	50	0.95	7.37	6.46	6.81	7.20	7.63	8.70
HPI89992	R0.2	**1.0**	4	0.8	6	50	0.95	7.44	6.45	6.79	7.18	7.61	8.65
HPI89993	R0.3	**1.0**	4	0.8	6	50	0.95	7.50	6.45	6.78	7.16	7.58	8.61
HPI89994	R0.1	**1.0**	4	0.8	8	50	0.95	6.30	8.56	9.03	9.54	10.13	11.16
HPI89995	R0.2	**1.0**	4	0.8	8	50	0.95	6.34	8.56	9.01	9.53	10.10	11.15

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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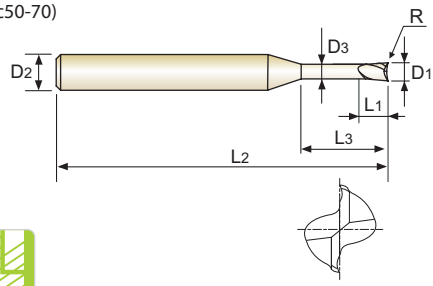
C-COATED SOLID CARBIDE END MILLS

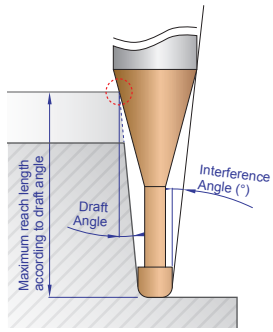
2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.2~D6 D8~D12

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI89996	R0.1	**1.0**	4	0.8	10	50	0.95	5.50	10.66	11.25	11.89	12.62	13.50
HPI89997	R0.2	**1.0**	4	0.8	10	50	0.95	5.53	10.66	11.23	11.88	12.60	13.48
HPI89998	R0.3	**1.0**	4	0.8	10	50	0.95	5.57	10.65	11.22	11.86	12.57	13.47
HPI89999	R0.1	**1.0**	4	0.8	12	55	0.95	4.87	12.77	13.46	14.24	15.00	15.84
HPI89801	R0.2	**1.0**	4	0.8	12	55	0.95	4.90	12.76	13.45	14.22	14.99	15.82
HPI89802	R0.1	**1.0**	4	0.8	16	60	0.95	3.97	16.98	17.90	18.92	19.42	20.51
HPI89803	R0.2	**1.0**	4	0.8	16	60	0.95	3.99	16.97	17.89	18.92	19.41	20.49
HPI89804	R0.3	**1.0**	4	0.8	16	60	0.95	4.01	16.97	17.88	18.90	19.40	20.47
HPI89805	R0.1	**1.0**	4	0.8	20	60	0.95	3.35	21.19	22.34	23.23	23.85	25.18
HPI89806	R0.2	**1.0**	4	0.8	20	60	0.95	3.37	21.18	22.33	23.23	23.84	25.16
HPI89807	R0.3	**1.0**	4	0.8	20	60	0.95	3.38	21.17	22.32	23.22	23.83	25.15
HPI89015	R0.1	**1.5**	4	1.35	4	50	1.45	8.21	4.23	4.37	4.53	4.69	5.06
HPI89808	R0.2	**1.5**	4	1.35	4	50	1.45	8.31	4.22	4.36	4.51	4.68	5.04
HPI89809	R0.1	**1.5**	4	1.35	8	50	1.45	5.64	8.36	8.65	8.96	9.29	10.04
HPI89810	R0.2	**1.5**	4	1.35	8	50	1.45	5.68	8.36	8.64	8.95	9.28	10.01
HPI89811	R0.3	**1.5**	4	1.35	8	50	1.45	5.73	8.36	8.64	8.94	9.26	9.99
HPI89812	R0.2	**1.5**	4	1.35	12	55	1.45	4.32	12.49	12.92	13.38	13.88	14.99
HPI89813	R0.1	**1.5**	4	1.35	15	55	1.45	3.64	15.60	16.14	16.72	17.34	18.74
HPI89814	R0.2	**1.5**	4	1.35	15	55	1.45	3.66	15.59	16.13	16.71	17.33	18.71
HPI89815	R0.3	**1.5**	4	1.35	15	55	1.45	3.68	15.59	16.12	16.70	17.31	18.69
HPI89816	R0.1	**1.5**	4	1.35	20	60	1.45	2.90	20.77	21.49	22.26	23.09	-
HPI89817	R0.2	**1.5**	4	1.35	20	60	1.45	2.91	20.76	21.48	22.25	23.07	-
HPI89818	R0.3	**1.5**	4	1.35	20	60	1.45	2.93	20.76	21.47	22.24	23.06	-
HPI89020	R0.2	**2.0**	4	1.7	6	50	1.95	5.93	6.29	6.50	6.73	6.98	7.53
HPI89819	R0.5	**2.0**	4	1.7	6	50	1.95	6.12	6.28	6.48	6.70	6.93	7.45
HPI89820	R0.2	**2.0**	4	1.7	8	50	1.95	4.92	8.36	8.64	8.95	9.28	10.01

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

C-COATED SOLID CARBIDE END MILLS

2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

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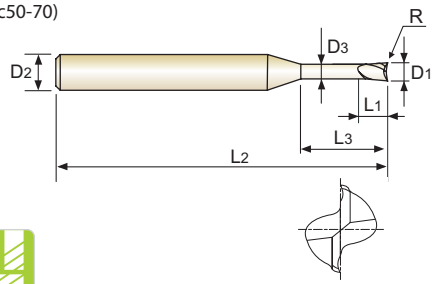
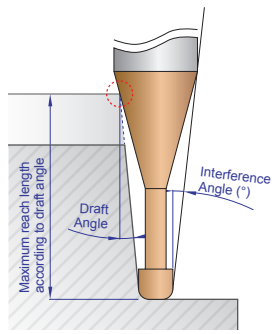
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 (D0.2~D6) | R ±0.008 (D8~D12) | PLAIN | C Coating

P. 126-131

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI89821	R0.3	**2.0**	4	1.7	8	50	1.95	4.96	8.36	8.64	8.94	9.26	9.99
HPI89822	R0.5	**2.0**	4	1.7	8	50	1.95	5.05	8.35	8.62	8.92	9.23	9.94
HPI89823	R0.8	**2.0**	4	1.7	8	50	1.95	5.18	8.34	8.60	8.88	9.19	9.87
HPI89824	R0.2	**2.0**	4	1.7	12	55	1.95	3.66	12.49	12.92	13.38	13.88	14.99
HPI89825	R0.5	**2.0**	4	1.7	12	55	1.95	3.73	12.48	12.90	13.35	13.83	14.91
HPI89826	R0.2	**2.0**	4	1.7	16	55	1.95	2.92	16.63	17.20	17.81	18.48	-
HPI89827	R0.3	**2.0**	4	1.7	16	55	1.95	2.93	16.62	17.19	17.80	18.46	-
HPI89828	R0.5	**2.0**	4	1.7	16	55	1.95	2.96	16.62	17.18	17.78	18.43	-
HPI89829	R0.8	**2.0**	4	1.7	16	55	1.95	3.01	16.61	17.16	17.75	18.39	19.81
HPI89830	R0.2	**2.0**	4	1.7	20	60	1.95	2.42	20.76	21.48	22.25	23.07	-
HPI89831	R0.3	**2.0**	4	1.7	20	60	1.95	2.43	20.76	21.47	22.24	23.06	-
HPI89832	R0.5	**2.0**	4	1.7	20	60	1.95	2.45	20.75	21.46	22.22	23.03	-
HPI89833	R0.8	**2.0**	4	1.7	20	60	1.95	2.49	20.74	21.44	22.18	22.98	-
HPI89834	R0.2	**2.0**	4	1.7	25	65	1.95	2.00	25.93	26.83	27.79	28.82	-
HPI89835	R0.5	**2.0**	4	1.7	25	65	1.95	2.02	25.92	26.81	27.76	28.78	-
HPI89836	R0.2	**2.0**	4	1.7	30	70	1.95	1.70	31.10	32.18	33.33	-	-
HPI89837	R0.5	**2.0**	4	1.7	30	70	1.95	1.72	31.09	32.16	33.30	-	-
HPI89030	R0.2	**3.0**	6	2.5	8	55	2.85	6.26	8.55	8.84	9.16	9.49	10.24
HPI89838	R0.3	**3.0**	6	2.5	8	55	2.85	6.30	8.55	8.84	9.14	9.48	10.22
HPI89839	R0.5	**3.0**	6	2.5	8	55	2.85	6.40	8.54	8.82	9.12	9.45	10.17
HPI89840	R0.2	**3.0**	6	2.5	12	60	2.85	4.85	12.69	13.12	13.59	14.09	15.22
HPI89841	R0.5	**3.0**	6	2.5	12	60	2.85	4.93	12.68	13.10	13.56	14.05	15.14
HPI89842	R0.2	**3.0**	6	2.5	16	60	2.85	3.96	16.82	17.40	18.02	18.69	20.19
HPI89843	R0.3	**3.0**	6	2.5	16	60	2.85	3.98	16.82	17.39	18.01	18.67	20.17
HPI89844	R0.5	**3.0**	6	2.5	16	60	2.85	4.01	16.81	17.38	17.99	18.64	20.12
HPI89845	R0.2	**3.0**	6	2.5	20	65	2.85	3.34	20.96	21.68	22.45	23.29	25.16

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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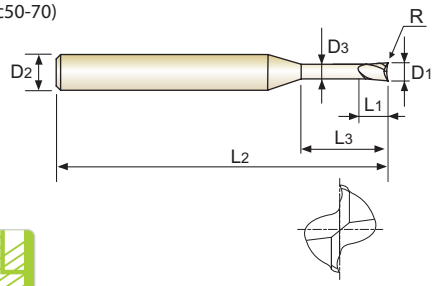
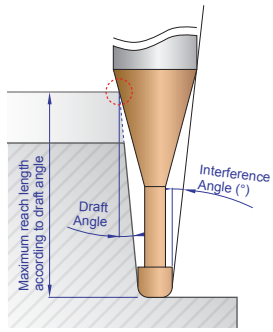




CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.2~D6 D8~D12

✻ NEW SIZE Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI89846	R0.3	**3.0**	6	2.5	20	65	2.85	3.36	20.95	21.67	22.44	23.27	25.14
HPI89847	R0.5	**3.0**	6	2.5	20	65	2.85	3.38	20.95	21.66	22.42	23.24	25.09
HPI89848	R0.2	**3.0**	6	2.5	30	75	2.85	2.41	31.29	32.38	33.54	34.79	-
HPI89849	R0.3	**3.0**	6	2.5	30	75	2.85	2.41	31.29	32.37	33.53	34.77	-
HPI89850	R0.5	**3.0**	6	2.5	30	75	2.85	2.43	31.28	32.36	33.51	34.74	-
HPI89851	R0.2	**3.0**	6	2.5	35	80	2.85	2.11	36.46	37.72	39.08	40.54	-
HPI89852	R0.5	**3.0**	6	2.5	35	80	2.85	2.13	36.45	37.70	39.05	40.49	-
✻**HPI89040**	R0.1	**4.0**	6	3.5	8	55	3.85	4.76	8.56	8.86	9.18	9.52	10.29
✻**HPI89859**	R0.2	**4.0**	6	3.5	8	55	3.85	4.76	8.56	8.86	9.18	9.52	10.29
✻**HPI89866**	R0.3	**4.0**	6	3.5	8	55	3.85	4.76	8.56	8.86	9.18	9.52	10.29
✻**HPI89853**	R0.1	**4.0**	6	3.5	12	60	3.85	3.57	12.69	13.14	13.61	14.12	15.27
✻**HPI89860**	R0.2	**4.0**	6	3.5	12	60	3.85	3.57	12.69	13.14	13.61	14.12	15.27
✻**HPI89867**	R0.3	**4.0**	6	3.5	12	60	3.85	3.57	12.69	13.14	13.61	14.12	15.27
✻**HPI89873**	R0.5	**4.0**	6	3.5	12	60	3.85	3.57	12.69	13.14	13.61	14.12	15.27
✻**HPI89879**	R1.0	**4.0**	6	3.5	12	60	3.85	3.57	12.69	13.14	13.61	14.12	15.27
✻**HPI89854**	R0.1	**4.0**	6	3.5	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
✻**HPI89861**	R0.2	**4.0**	6	3.5	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
✻**HPI89868**	R0.3	**4.0**	6	3.5	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
✻**HPI89874**	R0.5	**4.0**	6	3.5	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
✻**HPI89880**	R1.0	**4.0**	6	3.5	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
✻**HPI89855**	R0.1	**4.0**	6	3.5	20	65	3.85	2.38	20.96	21.69	22.48	23.32	-
✻**HPI89862**	R0.2	**4.0**	6	3.5	20	65	3.85	2.38	20.96	21.69	22.48	23.32	-
✻**HPI89869**	R0.3	**4.0**	6	3.5	20	65	3.85	2.38	20.96	21.69	22.48	23.32	-
✻**HPI89875**	R0.5	**4.0**	6	3.5	20	65	3.85	2.38	20.96	21.69	22.48	23.32	-
✻**HPI89881**	R1.0	**4.0**	6	3.5	20	65	3.85	2.38	20.96	21.69	22.48	23.32	-
✻**HPI89856**	R0.1	**4.0**	6	3.5	30	75	3.85	1.68	31.30	32.39	33.56	-	-

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

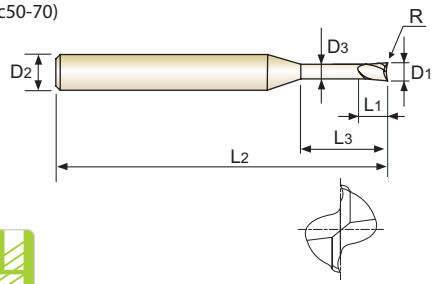
C-COATED SOLID CARBIDE END MILLS

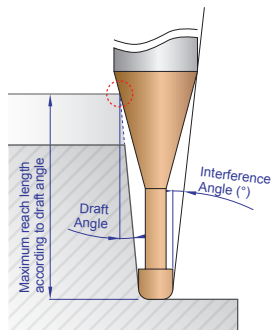
2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.2~D6 D8~D12

* NEW SIZE Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
*HPI89863	R0.2	**4.0**	6	3.5	30	75	3.85	1.68	31.30	32.39	33.56	-	-
*HPI89870	R0.3	**4.0**	6	3.5	30	75	3.85	1.68	31.30	32.39	33.56	-	-
*HPI89876	R0.5	**4.0**	6	3.5	30	75	3.85	1.68	31.30	32.39	33.56	-	-
*HPI89882	R1.0	**4.0**	6	3.5	30	75	3.85	1.68	31.30	32.39	33.56	-	-
*HPI89857	R0.1	**4.0**	6	3.5	35	80	3.85	1.47	36.47	37.74	-	-	-
*HPI89864	R0.2	**4.0**	6	3.5	35	80	3.85	1.47	36.47	37.74	-	-	-
*HPI89871	R0.3	**4.0**	6	3.5	35	80	3.85	1.47	36.47	37.74	-	-	-
*HPI89877	R0.5	**4.0**	6	3.5	35	80	3.85	1.47	36.47	37.74	-	-	-
*HPI89883	R1.0	**4.0**	6	3.5	35	80	3.85	1.47	36.47	37.74	-	-	-
*HPI89858	R0.1	**4.0**	6	3.5	45	90	3.85	1.17	46.80	48.44	-	-	-
*HPI89865	R0.2	**4.0**	6	3.5	45	90	3.85	1.17	46.80	48.44	-	-	-
*HPI89872	R0.3	**4.0**	6	3.5	45	90	3.85	1.17	46.80	48.44	-	-	-
*HPI89878	R0.5	**4.0**	6	3.5	45	90	3.85	1.17	46.80	48.44	-	-	-
*HPI89884	R1.0	**4.0**	6	3.5	45	90	3.85	1.17	46.80	48.44	-	-	-
*HPI89050	R0.1	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
*HPI89886	R0.2	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
*HPI89888	R0.3	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
*HPI89890	R0.5	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
*HPI89892	R1.0	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
*HPI89885	R0.1	**5.0**	6	4	40	85	4.85	0.68	41.64	-	-	-	-
*HPI89887	R0.2	**5.0**	6	4	40	85	4.85	0.68	41.64	-	-	-	-
*HPI89889	R0.3	**5.0**	6	4	40	85	4.85	0.68	41.64	-	-	-	-
*HPI89891	R0.5	**5.0**	6	4	40	85	4.85	0.68	41.64	-	-	-	-
*HPI89893	R1.0	**5.0**	6	4	40	85	4.85	0.68	41.64	-	-	-	-
*HPI89060	R0.1	**6.0**	6	5	12	50	5.85	0.00	-	-	-	-	-
*HPI89898	R0.2	**6.0**	6	5	12	50	5.85	0.00	-	-	-	-	-

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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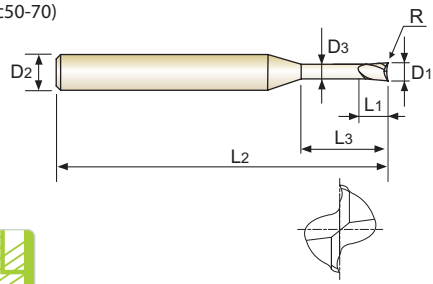
C-COATED SOLID CARBIDE END MILLS

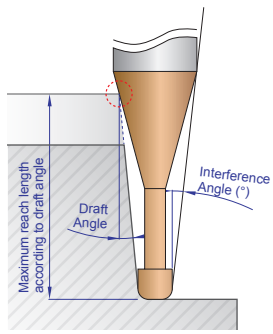
2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.2~D6 D8~D12

✻ NEW SIZE Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
✻HPI89704	R0.3	**6.0**	6	5	12	50	5.85	0.00	-	-	-	-	-
✻HPI89894	R0.1	**6.0**	6	5	18	60	5.85	0.00	-	-	-	-	-
✻HPI89899	R0.2	**6.0**	6	5	18	60	5.85	0.00	-	-	-	-	-
✻HPI89705	R0.3	**6.0**	6	5	18	60	5.85	0.00	-	-	-	-	-
✻HPI89709	R0.5	**6.0**	6	5	18	60	5.85	0.00	-	-	-	-	-
✻HPI89713	R1.0	**6.0**	6	5	18	60	5.85	0.00	-	-	-	-	-
✻HPI89895	R0.1	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
✻HPI89701	R0.2	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
✻HPI89706	R0.3	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
✻HPI89710	R0.5	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
✻HPI89714	R1.0	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
✻HPI89896	R0.1	**6.0**	6	5	35	80	5.85	0.00	-	-	-	-	-
✻HPI89702	R0.2	**6.0**	6	5	35	80	5.85	0.00	-	-	-	-	-
✻HPI89707	R0.3	**6.0**	6	5	35	80	5.85	0.00	-	-	-	-	-
✻HPI89711	R0.5	**6.0**	6	5	35	80	5.85	0.00	-	-	-	-	-
✻HPI89715	R1.0	**6.0**	6	5	35	80	5.85	0.00	-	-	-	-	-
✻HPI89897	R0.1	**6.0**	6	5	55	100	5.85	0.00	-	-	-	-	-
✻HPI89703	R0.2	**6.0**	6	5	55	100	5.85	0.00	-	-	-	-	-
✻HPI89708	R0.3	**6.0**	6	5	55	100	5.85	0.00	-	-	-	-	-
✻HPI89712	R0.5	**6.0**	6	5	55	100	5.85	0.00	-	-	-	-	-
✻HPI89716	R1.0	**6.0**	6	5	55	100	5.85	0.00	-	-	-	-	-
✻HPI89080	R0.3	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
✻HPI89717	R0.5	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
✻HPI89718	R1.0	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
✻HPI89719	R1.5	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
✻HPI89720	R2.0	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

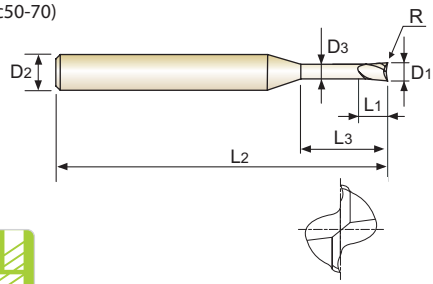
C-COATED SOLID CARBIDE END MILLS

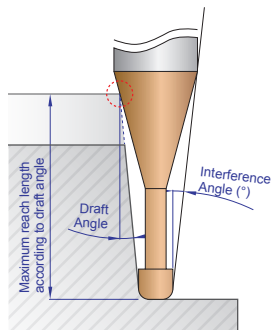
2 FLUTE CORNER RADIUS for RIB PROCESSING

SERIES **HPI89**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.2~D6 D8~D12

* NEW SIZE Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
*HPI89100	R0.3	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
*HPI89721	R0.5	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
*HPI89722	R1.0	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
*HPI89723	R1.5	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
*HPI89724	R2.0	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
*HPI89120	R0.5	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-
*HPI89725	R1.0	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-
*HPI89726	R1.5	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-
*HPI89727	R2.0	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.005	0~-0.010	h4
over Ø6	±0.008		* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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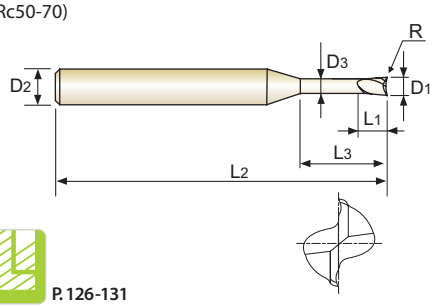
C-COATED SOLID CARBIDE END MILLS

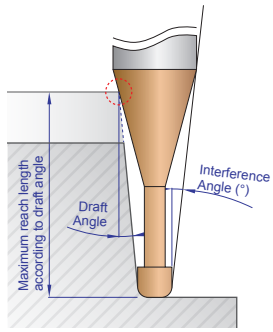
2 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK

SERIES **HPK15**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.3~D6 D8~D20

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK15003	R0.02	**0.3**	3	0.45	1	40	0.27	12.49	1.14	1.20	1.27	1.35	1.54
HPK15004	R0.05	**0.4**	3	0.6	1	40	0.37	12.41	1.14	1.20	1.27	1.35	1.54
HPK15005	R0.05	**0.5**	3	0.7	1	40	0.45	12.25	1.20	1.27	1.34	1.42	1.62
HPK15901	R0.05	**0.5**	4	1	1.5	40	0.45	12.16	1.73	1.82	1.93	2.05	2.34
HPK15006	R0.05	**0.6**	3	0.9	2	40	0.55	10.35	2.25	2.38	2.52	2.67	3.05
HPK15902	R0.05	**0.6**	4	1.2	2	40	0.55	11.39	2.25	2.38	2.52	2.67	3.05
HPK15007	R0.05	**0.7**	4	1.4	2	40	0.65	11.31	2.25	2.38	2.52	2.67	3.05
HPK15008	R0.05	**0.8**	3	1.2	2	40	0.75	10.06	2.25	2.38	2.52	2.67	3.05
HPK15903	R0.05	**0.8**	4	1.6	2	40	0.75	11.22	2.25	2.38	2.52	2.67	3.05
HPK15009	R0.05	**0.9**	4	2	3	40	0.85	9.90	3.31	3.49	3.69	3.92	4.47
HPK15010	R0.1	**1.0**	3	1.5	3	40	0.95	8.34	3.31	3.49	3.69	3.92	4.47
HPK15904	R0.1	**1.0**	4	1.5	3	40	0.95	9.79	3.31	3.49	3.69	3.92	4.47
HPK15905	R0.1	**1.0**	6	1.5	3	40	0.95	11.38	3.31	3.49	3.69	3.92	4.47
HPK15015	R0.1	**1.5**	3	2.2	4	40	1.45	6.21	4.23	4.38	4.54	4.71	5.09
HPK15906	R0.1	**1.5**	6	2.2	4	40	1.45	10.21	4.23	4.38	4.54	4.71	5.09
HPK15020	R0.1	**2.0**	3	3	6	40	1.95	3.59	6.30	6.52	6.75	7.01	7.57
HPK15907	R0.1	**2.0**	4	3	6	40	1.95	5.81	6.30	6.52	6.75	7.01	7.57
HPK15908	R0.1	**2.0**	6	3	6	40	1.95	8.39	6.30	6.52	6.75	7.01	7.57
HPK15025	R0.1	**2.5**	3	4	6	40	2.40	2.01	6.39	6.62	6.86	7.11	-
HPK15909	R0.1	**2.5**	6	4	6	40	2.40	7.83	6.39	6.62	6.86	7.11	7.69
HPK15030	R0.1	**3.0**	6	4	7	45	2.85	6.64	7.52	7.79	8.07	8.37	9.05
HPK15035	R0.1	**3.5**	6	5	9	45	3.35	5.12	9.59	9.93	10.29	10.67	11.54
HPK15040	R0.1	**4.0**	6	5	9	45	3.85	4.39	9.59	9.93	10.29	10.67	11.54
HPK15045	R0.1	**4.5**	6	6	10	45	4.35	3.28	10.63	11.00	11.39	11.82	12.78
HPK15050	R0.2	**5.0**	6	6	11	50	4.85	2.18	11.66	12.07	12.50	12.97	-

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)
up to Ø6	±0.005
over Ø6	±0.008

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø12	0~-0.010	h4 * Shank Dia.>ø6 : h5
over Ø12	0~-0.012	

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

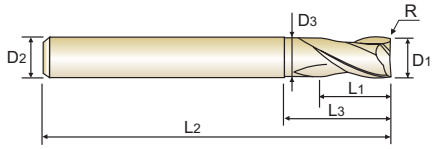
C-COATED SOLID CARBIDE END MILLS

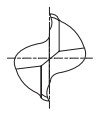
2 FLUTE STUB LENGTH CORNER RADIUS with EXTENDED NECK

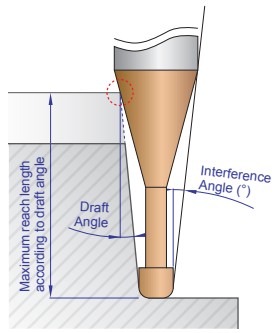
SERIES **HPK15**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 35° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 126-131

D0.3~D6 D8~D20

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK15060	R0.2	**6.0**	6	7	14	50	5.85	0.00	-	-	-	-	-
HPK15080	R0.2	**8.0**	8	9	18	60	7.70	0.00	-	-	-	-	-
HPK15100	R0.2	**10.0**	10	12	25	75	9.70	0.00	-	-	-	-	-
HPK15120	R0.3	**12.0**	12	15	30	75	11.70	0.00	-	-	-	-	-
HPK15160	R0.3	**16.0**	16	18	38	90	15.70	0.00	-	-	-	-	-
HPK15200	R0.3	**20.0**	20	24	45	100	19.70	0.00	-	-	-	-	-

Size	Corner Radius Tolerance (mm)
up to Ø6	±0.005
over Ø6	±0.008

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø12	0~-0.010	h4
over Ø12	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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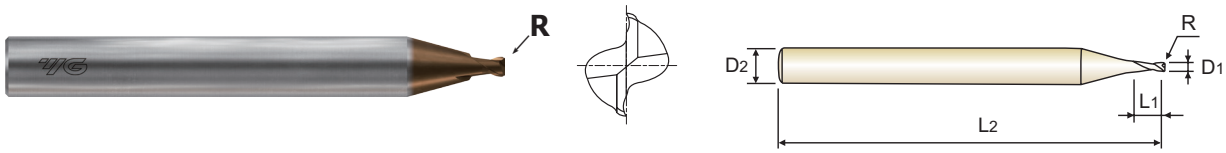
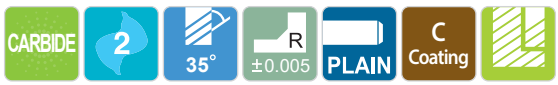
C-COATED SOLID CARBIDE END MILLS

2 FLUTE MINIATURE CORNER RADIUS

SERIES
HPK14

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)





P. 132

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D_1	D_2	L_1	L_2
HPK14003	R0.02	**0.3**	6	0.45	50
HPK14004	R0.05	**0.4**	6	0.6	50
HPK14005	R0.05	**0.5**	6	0.7	50
HPK14006	R0.05	**0.6**	6	0.9	50
HPK14008	R0.05	**0.8**	6	1.2	50
HPK14010	R0.1	**1.0**	6	1.5	50
HPK14012	R0.1	**1.2**	6	1.8	50
HPK14015	R0.15	**1.5**	6	2.2	50
HPK14020	R0.15	**2.0**	6	2.2	50

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.005	0~-0.010	h4

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel			High alloyed steel, and tool steel				Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

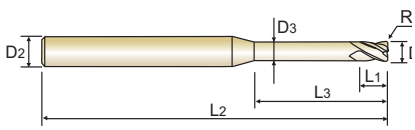
C-COATED SOLID CARBIDE END MILLS

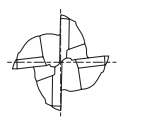
4 FLUTE CORNER RADIUS for RIB PROCESSING with NECK

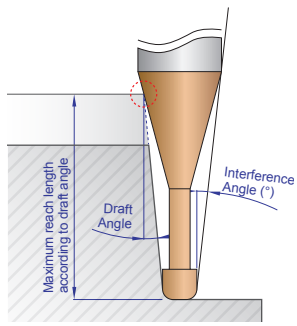
SERIES **HPK16**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 4 | 30° | 27°/30° | R ±0.005 | PLAIN | C Coating

up to Ø3 | Over Ø3

P. 133-134

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK16005	R0.02	**0.5**	4	0.4	1	50	0.45	12.93	1.20	1.27	1.34	1.42	1.62
HPK16903	R0.05	**0.5**	4	0.4	1	50	0.45	12.93	1.20	1.27	1.34	1.42	1.62
HPK16906	R0.1	**0.5**	4	0.4	1	50	0.45	12.93	1.20	1.27	1.34	1.42	1.62
HPK16901	R0.02	**0.5**	4	0.4	3	50	0.45	10.31	3.31	3.49	3.69	3.92	4.47
HPK16904	R0.05	**0.5**	4	0.4	3	50	0.45	10.31	3.31	3.49	3.69	3.92	4.47
HPK16907	R0.1	**0.5**	4	0.4	3	50	0.45	10.31	3.31	3.49	3.69	3.92	4.47
HPK16902	R0.02	**0.5**	4	0.4	6	50	0.45	7.89	6.46	6.82	7.21	7.66	8.74
HPK16905	R0.05	**0.5**	4	0.4	6	50	0.45	7.89	6.46	6.82	7.21	7.66	8.74
HPK16908	R0.1	**0.5**	4	0.4	6	50	0.45	7.89	6.46	6.82	7.21	7.66	8.74
HPK16006	R0.02	**0.6**	4	0.5	2	50	0.55	11.39	2.25	2.38	2.52	2.67	3.05
HPK16911	R0.05	**0.6**	4	0.5	2	50	0.55	11.39	2.25	2.38	2.52	2.67	3.05
HPK16914	R0.1	**0.6**	4	0.5	2	50	0.55	11.39	2.25	2.38	2.52	2.67	3.05
HPK16909	R0.02	**0.6**	4	0.5	6	50	0.55	7.78	6.46	6.82	7.21	7.66	8.74
HPK16912	R0.05	**0.6**	4	0.5	6	50	0.55	7.78	6.46	6.82	7.21	7.66	8.74
HPK16915	R0.1	**0.6**	4	0.5	6	50	0.55	7.78	6.46	6.82	7.21	7.66	8.74
HPK16910	R0.02	**0.6**	4	0.5	10	50	0.55	5.90	10.67	11.26	11.91	12.65	13.75
HPK16913	R0.05	**0.6**	4	0.5	10	50	0.55	5.90	10.67	11.26	11.91	12.65	13.75
HPK16916	R0.1	**0.6**	4	0.5	10	50	0.55	5.90	10.67	11.26	11.91	12.65	13.75
HPK16007	R0.02	**0.7**	4	0.55	2	50	0.65	11.31	2.25	2.38	2.52	2.67	3.05
HPK16918	R0.05	**0.7**	4	0.55	2	50	0.65	11.31	2.25	2.38	2.52	2.67	3.05
HPK16920	R0.1	**0.7**	4	0.55	2	50	0.65	11.31	2.25	2.38	2.52	2.67	3.05
HPK16917	R0.02	**0.7**	4	0.55	6	50	0.65	7.67	6.46	6.82	7.21	7.66	8.74
HPK16919	R0.05	**0.7**	4	0.55	6	50	0.65	7.67	6.46	6.82	7.21	7.66	8.74
HPK16921	R0.1	**0.7**	4	0.55	6	50	0.65	7.67	6.46	6.82	7.21	7.66	8.74
HPK16008	R0.02	**0.8**	4	0.65	2	50	0.75	11.22	2.25	2.38	2.52	2.67	3.05
HPK16923	R0.05	**0.8**	4	0.65	2	50	0.75	11.22	2.25	2.38	2.52	2.67	3.05

NEXT PAGE ▶

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.005	0~-0.010	h4

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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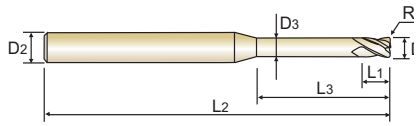
C-COATED SOLID CARBIDE END MILLS

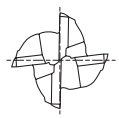
4 FLUTE CORNER RADIUS for RIB PROCESSING with NECK

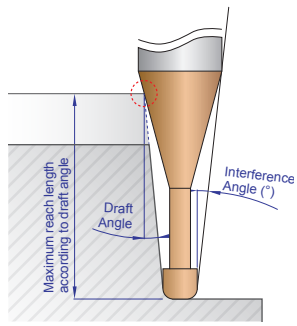
SERIES **HPK16**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 4 | 30° | 27°/30° | R ±0.005 | PLAIN | C Coating

up to Ø3 Over Ø3

P. 133-134

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK16926	R0.1	**0.8**	4	0.65	2	50	0.75	11.22	2.25	2.38	2.52	2.67	3.05
HPK16929	R0.2	**0.8**	4	0.65	2	50	0.75	11.22	2.25	2.38	2.52	2.67	3.05
HPK16922	R0.02	**0.8**	4	0.65	6	50	0.75	7.55	6.46	6.82	7.21	7.66	8.74
HPK16924	R0.05	**0.8**	4	0.65	6	50	0.75	7.55	6.46	6.82	7.21	7.66	8.74
HPK16927	R0.1	**0.8**	4	0.65	6	50	0.75	7.55	6.46	6.82	7.21	7.66	8.74
HPK16930	R0.2	**0.8**	4	0.65	6	50	0.75	7.55	6.46	6.82	7.21	7.66	8.74
HPK16925	R0.05	**0.8**	4	0.65	12	50	0.75	5.06	12.77	13.48	14.26	15.12	15.97
HPK16928	R0.1	**0.8**	4	0.65	12	50	0.75	5.06	12.77	13.48	14.26	15.12	15.97
HPK16931	R0.2	**0.8**	4	0.65	12	50	0.75	5.06	12.77	13.48	14.26	15.12	15.97
HPK16010	R0.05	**1.0**	4	0.8	2	50	0.95	11.04	2.25	2.38	2.52	2.67	3.05
HPK16937	R0.1	**1.0**	4	0.8	2	50	0.95	11.04	2.25	2.38	2.52	2.67	3.05
HPK16943	R0.2	**1.0**	4	0.8	2	50	0.95	11.04	2.25	2.38	2.52	2.67	3.05
HPK16932	R0.05	**1.0**	4	0.8	3	50	0.95	9.79	3.31	3.49	3.69	3.92	4.47
HPK16938	R0.1	**1.0**	4	0.8	3	50	0.95	9.79	3.31	3.49	3.69	3.92	4.47
HPK16944	R0.2	**1.0**	4	0.8	3	50	0.95	9.79	3.31	3.49	3.69	3.92	4.47
HPK16933	R0.05	**1.0**	4	0.8	4	50	0.95	8.80	4.36	4.60	4.86	5.16	5.89
HPK16939	R0.1	**1.0**	4	0.8	4	50	0.95	8.80	4.36	4.60	4.86	5.16	5.89
HPK16945	R0.2	**1.0**	4	0.8	4	50	0.95	8.80	4.36	4.60	4.86	5.16	5.89
HPK16934	R0.05	**1.0**	4	0.8	5	50	0.95	7.99	5.41	5.71	6.04	6.41	7.32
HPK16940	R0.1	**1.0**	4	0.8	5	50	0.95	7.99	5.41	5.71	6.04	6.41	7.32
HPK16946	R0.2	**1.0**	4	0.8	5	50	0.95	7.99	5.41	5.71	6.04	6.41	7.32
HPK16935	R0.05	**1.0**	4	0.8	6	50	0.95	7.31	6.46	6.82	7.21	7.66	8.74
HPK16941	R0.1	**1.0**	4	0.8	6	50	0.95	7.31	6.46	6.82	7.21	7.66	8.74
HPK16947	R0.2	**1.0**	4	0.8	6	50	0.95	7.31	6.46	6.82	7.21	7.66	8.74
HPK16936	R0.05	**1.0**	4	0.8	8	50	0.95	6.25	8.57	9.04	9.56	10.15	11.18
HPK16942	R0.1	**1.0**	4	0.8	8	50	0.95	6.25	8.57	9.04	9.56	10.15	11.18

NEXT PAGE ▶

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.005	0~-0.010	h4

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

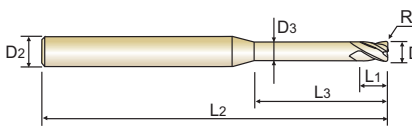
C-COATED SOLID CARBIDE END MILLS

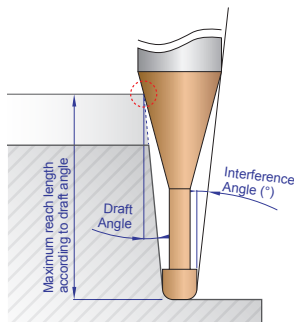
4 FLUTE CORNER RADIUS for RIB PROCESSING with NECK

SERIES **HPK16**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4 | 30° | 27°/30° | R ±0.005 | PLAIN | C Coating

P. 133-134

up to Ø3 Over Ø3

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK16948	R0.2	**1.0**	4	0.8	8	50	0.95	6.25	8.57	9.04	9.56	10.15	11.18
HPK16015	R0.1	**1.5**	4	1.2	3	50	1.45	9.15	3.20	3.31	3.43	3.56	3.85
HPK16952	R0.2	**1.5**	4	1.2	3	50	1.45	9.15	3.20	3.31	3.43	3.56	3.85
HPK16955	R0.3	**1.5**	4	1.2	3	50	1.45	9.15	3.20	3.31	3.43	3.56	3.85
HPK16949	R0.1	**1.5**	4	1.2	4	50	1.45	8.12	4.23	4.38	4.54	4.71	5.09
HPK16950	R0.1	**1.5**	4	1.2	6	50	1.45	6.63	6.30	6.52	6.75	7.01	7.57
HPK16953	R0.2	**1.5**	4	1.2	6	50	1.45	6.63	6.30	6.52	6.75	7.01	7.57
HPK16956	R0.3	**1.5**	4	1.2	6	50	1.45	6.63	6.30	6.52	6.75	7.01	7.57
HPK16951	R0.1	**1.5**	4	1.2	12	50	1.45	4.27	12.50	12.94	13.40	13.91	15.03
HPK16954	R0.2	**1.5**	4	1.2	12	50	1.45	4.27	12.50	12.94	13.40	13.91	15.03
HPK16957	R0.3	**1.5**	4	1.2	12	50	1.45	4.27	12.50	12.94	13.40	13.91	15.03
HPK16020	R0.1	**2.0**	4	1.6	4	50	1.95	7.28	4.23	4.38	4.54	4.71	5.09
HPK16961	R0.2	**2.0**	4	1.6	4	50	1.95	7.28	4.23	4.38	4.54	4.71	5.09
HPK16965	R0.3	**2.0**	4	1.6	4	50	1.95	7.28	4.23	4.38	4.54	4.71	5.09
HPK16968	R0.5	**2.0**	4	1.6	4	50	1.95	7.28	4.23	4.38	4.54	4.71	5.09
HPK16958	R0.1	**2.0**	4	1.6	6	50	1.95	5.81	6.30	6.52	6.75	7.01	7.57
HPK16962	R0.2	**2.0**	4	1.6	6	50	1.95	5.81	6.30	6.52	6.75	7.01	7.57
HPK16959	R0.1	**2.0**	4	1.6	8	50	1.95	4.83	8.37	8.66	8.97	9.31	10.06
HPK16963	R0.2	**2.0**	4	1.6	8	50	1.95	4.83	8.37	8.66	8.97	9.31	10.06
HPK16966	R0.3	**2.0**	4	1.6	8	50	1.95	4.83	8.37	8.66	8.97	9.31	10.06
HPK16969	R0.5	**2.0**	4	1.6	8	50	1.95	4.83	8.37	8.66	8.97	9.31	10.06
HPK16960	R0.1	**2.0**	4	1.6	12	50	1.95	3.62	12.50	12.94	13.40	13.91	15.03
HPK16964	R0.2	**2.0**	4	1.6	12	50	1.95	3.62	12.50	12.94	13.40	13.91	15.03
HPK16967	R0.3	**2.0**	4	1.6	12	50	1.95	3.62	12.50	12.94	13.40	13.91	15.03
HPK16970	R0.5	**2.0**	4	1.6	12	50	1.95	3.62	12.50	12.94	13.40	13.91	15.03
HPK16030	R0.2	**3.0**	6	2.5	8	55	2.85	6.17	8.56	8.86	9.18	9.52	10.29

NEXT PAGE ▶

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.005	0~-0.010	h4

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

Phone: 800-765-8665 | Technical Support : 888-868-5988 | yg1usa.com

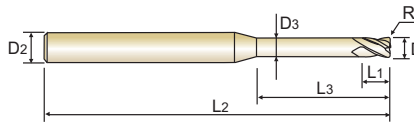
C-COATED SOLID CARBIDE END MILLS

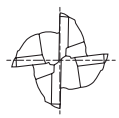
4 FLUTE CORNER RADIUS for RIB PROCESSING with NECK

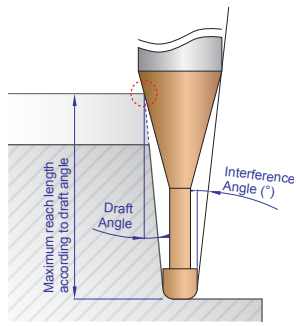
SERIES **HPK16**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 4 | 30° | 27°/30° | R ±0.005 | PLAIN | C Coating

P. 133-134

up to Ø3 Over Ø3

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK16974	R0.3	**3.0**	6	2.5	8	55	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPK16977	R0.5	**3.0**	6	2.5	8	55	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPK16971	R0.2	**3.0**	6	2.5	12	60	2.85	4.80	12.69	13.14	13.61	14.12	15.27
HPK16972	R0.2	**3.0**	6	2.5	16	60	2.85	3.92	16.83	17.41	18.04	18.72	20.24
HPK16975	R0.3	**3.0**	6	2.5	16	60	2.85	3.92	16.83	17.41	18.04	18.72	20.24
HPK16978	R0.5	**3.0**	6	2.5	16	60	2.85	3.92	16.83	17.41	18.04	18.72	20.24
HPK16973	R0.2	**3.0**	6	2.5	20	65	2.85	3.32	20.96	21.69	22.48	23.32	25.21
HPK16976	R0.3	**3.0**	6	2.5	20	65	2.85	3.32	20.96	21.69	22.48	23.32	25.21
HPK16979	R0.5	**3.0**	6	2.5	20	65	2.85	3.32	20.96	21.69	22.48	23.32	25.21
HPK16980	R0.2	**4.0**	6	3.2	8	55	3.85	4.76	8.56	8.86	9.18	9.52	10.29
HPK16984	R0.3	**4.0**	6	3.2	8	55	3.85	4.76	8.56	8.86	9.18	9.52	10.29
HPK16987	R0.5	**4.0**	6	3.2	8	55	3.85	4.76	8.56	8.86	9.18	9.52	10.29
HPK16990	R1.0	**4.0**	6	3.2	8	55	3.85	4.76	8.56	8.86	9.18	9.52	10.29
HPK16981	R0.2	**4.0**	6	3.2	12	60	3.85	3.57	12.69	13.14	13.61	14.12	15.27
HPK16040	R0.1	**4.0**	6	3.2	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
HPK16982	R0.2	**4.0**	6	3.2	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
HPK16985	R0.3	**4.0**	6	3.2	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
HPK16988	R0.5	**4.0**	6	3.2	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
HPK16991	R1.0	**4.0**	6	3.2	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
HPK16983	R0.2	**4.0**	6	3.2	24	70	3.85	2.04	25.10	25.97	26.91	27.92	-
HPK16986	R0.3	**4.0**	6	3.2	24	70	3.85	2.04	25.10	25.97	26.91	27.92	-
HPK16989	R0.5	**4.0**	6	3.2	24	70	3.85	2.04	25.10	25.97	26.91	27.92	-
HPK16992	R1.0	**4.0**	6	3.2	24	70	3.85	2.04	25.10	25.97	26.91	27.92	-
HPK16050	R0.2	**5.0**	6	4	10	60	4.85	2.36	10.63	11.00	11.39	11.82	-
HPK16995	R0.3	**5.0**	6	4	10	60	4.85	2.36	10.63	11.00	11.39	11.82	-
HPK16998	R0.5	**5.0**	6	4	10	60	4.85	2.36	10.63	11.00	11.39	11.82	-

NEXT PAGE ▶

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.005	0~-0.010	h4

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel			High alloyed steel, and tool steel				Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

C-COATED SOLID CARBIDE END MILLS

4 FLUTE CORNER RADIUS for RIB PROCESSING with NECK

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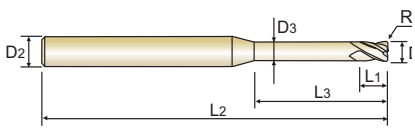
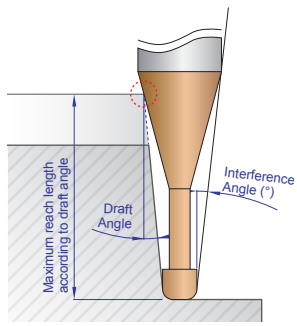
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4 | 30° | 27°/30° | R ±0.005 | PLAIN | C Coating

P. 133-134

up to Ø3 Over Ø3

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK16802	R1.0	**5.0**	6	4	10	60	4.85	2.36	10.63	11.00	11.39	11.82	-
HPK16993	R0.2	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
HPK16996	R0.3	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
HPK16999	R0.5	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
HPK16803	R1.0	**5.0**	6	4	20	65	4.85	1.29	20.96	21.69	-	-	-
HPK16994	R0.2	**5.0**	6	4	25	70	4.85	1.06	26.13	27.04	-	-	-
HPK16997	R0.3	**5.0**	6	4	25	70	4.85	1.06	26.13	27.04	-	-	-
HPK16801	R0.5	**5.0**	6	4	25	70	4.85	1.06	26.13	27.04	-	-	-
HPK16804	R1.0	**5.0**	6	4	25	70	4.85	1.06	26.13	27.04	-	-	-
HPK16060	R0.2	**6.0**	6	5	12	60	5.85	0.00	-	-	-	-	-
HPK16807	R0.3	**6.0**	6	5	12	60	5.85	0.00	-	-	-	-	-
HPK16810	R0.5	**6.0**	6	5	12	60	5.85	0.00	-	-	-	-	-
HPK16813	R1.0	**6.0**	6	5	12	60	5.85	0.00	-	-	-	-	-
HPK16805	R0.2	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
HPK16808	R0.3	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
HPK16811	R0.5	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
HPK16814	R1.0	**6.0**	6	5	24	70	5.85	0.00	-	-	-	-	-
HPK16806	R0.2	**6.0**	6	5	30	80	5.85	0.00	-	-	-	-	-
HPK16809	R0.3	**6.0**	6	5	30	80	5.85	0.00	-	-	-	-	-
HPK16812	R0.5	**6.0**	6	5	30	80	5.85	0.00	-	-	-	-	-
HPK16815	R1.0	**6.0**	6	5	30	80	5.85	0.00	-	-	-	-	-

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.005	0~-0.010	h4

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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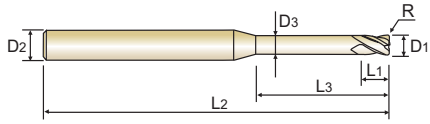
C-COATED SOLID CARBIDE END MILLS

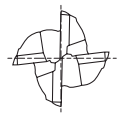
4 FLUTE CORNER RADIUS with NECK

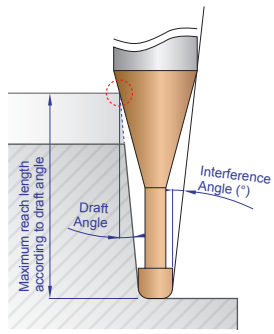
SERIES
HPK26

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 4 | 30° | 27°/30° | R ±.0002" | R ±.0003" | PLAIN | C Coating

D1/16 | Over D1/8 | D1/16~D1/4 | D5/16~D3/4

P. 135

Unit : Inch

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK26004	R.004	**1/16**	1/8	3/32	5/32	1-1/2	.060	6.42	4.22	4.37	4.53	4.70	5.08
HPK26008	R.004	**1/8**	1/4	5/32	1/4	2	.119	7.20	6.86	7.10	7.35	7.63	8.25
HPK26012	R.004	**3/16**	1/4	1/4	3/8	2	.181	3.55	10.16	10.52	10.90	11.31	12.22
HPK26016	R.008	**1/4**	1/4	5/16	9/16	2	.238	0.00	-	-	-	-	-
HPK26020	R.008	**5/16**	5/16	3/8	3/4	2-1/2	.301	0.00	-	-	-	-	-
HPK26024	R.008	**3/8**	3/8	1/2	1	3	.363	0.00	-	-	-	-	-
HPK26032	R.012	**1/2**	1/2	5/8	1-3/16	3	.488	0.00	-	-	-	-	-
HPK26040	R.012	**5/8**	5/8	3/4	1-1/2	3-1/2	.613	0.00	-	-	-	-	-
HPK26048	R.012	**3/4**	3/4	1	1-3/4	4	.738	0.00	-	-	-	-	-

Size	Mill Dia. Tolerance (Inch)
up to Ø1/2	0~-.0004"
over Ø1/2	0~-.0005"

Size	Corner Radius Tolerance (Inch)	Shank Dia. Tolerance
up to Ø1/4	±.0002"	h4
over Ø1/4	±.0003"	* Shank Dia.>ø1/4 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

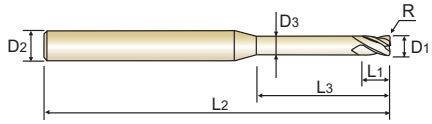
C-COATED SOLID CARBIDE END MILLS

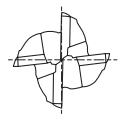
4 FLUTE CORNER RADIUS with NECK

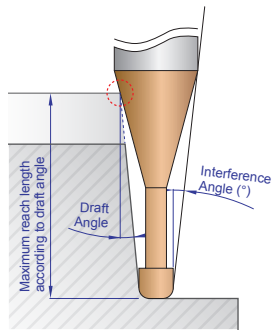
SERIES **HPK17**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 4 | 30° | 27°/30° | R ±0.005 | R ±0.008 | PLAIN | C Coating

up to Ø3 | Over Ø3 | D1~D6 | D8~D20

P. 133-134

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK17010	R0.1	**1.0**	3	1.5	3	40	0.95	8.34	3.31	3.49	3.69	3.92	4.47
HPK17901	R0.1	**1.0**	6	1.5	3	40	0.95	11.38	3.31	3.49	3.69	3.92	4.47
HPK17015	R0.1	**1.5**	3	2.2	4	40	1.45	6.21	4.23	4.38	4.54	4.71	5.09
HPK17902	R0.1	**1.5**	6	2.2	4	40	1.45	10.21	4.23	4.38	4.54	4.71	5.09
HPK17020	R0.1	**2.0**	3	3	6	40	1.95	3.59	6.30	6.52	6.75	7.01	7.57
HPK17903	R0.1	**2.0**	6	3	6	40	1.95	8.39	6.30	6.52	6.75	7.01	7.57
HPK17025	R0.1	**2.5**	3	4	6	40	2.40	2.01	6.39	6.62	6.86	7.11	-
HPK17904	R0.1	**2.5**	6	4	6	40	2.40	7.83	6.39	6.62	6.86	7.11	7.69
HPK17030	R0.1	**3.0**	6	4	7	45	2.85	6.64	7.52	7.79	8.07	8.37	9.05
HPK17908	R0.5	**3.0**	6	4	10	55	2.85	5.40	10.63	11.00	11.39	11.82	12.78
HPK17905	R0.3	**3.0**	6	4	12	55	2.85	4.80	12.69	13.14	13.61	14.12	15.27
HPK17906	R0.3	**3.0**	6	4	16	55	2.85	3.92	16.83	17.41	18.04	18.72	20.24
HPK17909	R0.5	**3.0**	6	4	16	55	2.85	3.92	16.83	17.41	18.04	18.72	20.24
HPK17907	R0.3	**3.0**	6	4	20	55	2.85	3.32	20.96	21.69	22.48	23.32	25.21
HPK17910	R0.5	**3.0**	6	4	20	55	2.85	3.32	20.96	21.69	22.48	23.32	25.21
HPK17035	R0.1	**3.5**	6	5	9	45	3.35	5.12	9.59	9.93	10.29	10.67	11.54
HPK17040	R0.1	**4.0**	6	5	9	45	3.85	4.39	9.59	9.93	10.29	10.67	11.54
HPK17911	R0.3	**4.0**	6	5	12	55	3.85	3.57	12.69	13.14	13.61	14.12	15.27
HPK17914	R0.5	**4.0**	6	5	12	55	3.85	3.57	12.69	13.14	13.61	14.12	15.27
HPK17917	R1.0	**4.0**	6	5	12	55	3.85	3.57	12.69	13.14	13.61	14.12	15.27
HPK17912	R0.3	**4.0**	6	5	16	55	3.85	2.86	16.83	17.41	18.04	18.72	-
HPK17915	R0.5	**4.0**	6	5	16	55	3.85	2.86	16.83	17.41	18.04	18.72	-
HPK17913	R0.3	**4.0**	6	5	20	55	3.85	2.38	20.96	21.69	22.48	23.32	-
HPK17916	R0.5	**4.0**	6	5	20	55	3.85	2.38	20.96	21.69	22.48	23.32	-
HPK17045	R0.1	**4.5**	6	6	10	45	4.35	3.28	10.63	11.00	11.39	11.82	12.78
HPK17050	R0.2	**5.0**	6	6	11	50	4.85	2.18	11.66	12.07	12.50	12.97	-

NEXT PAGE ▶

Size	Corner Radius Tolerance (mm)
up to Ø6	±0.005
over Ø6	±0.008

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø12	0~-0.010	h4
over Ø12	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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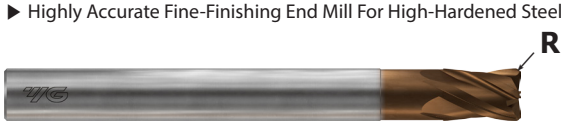
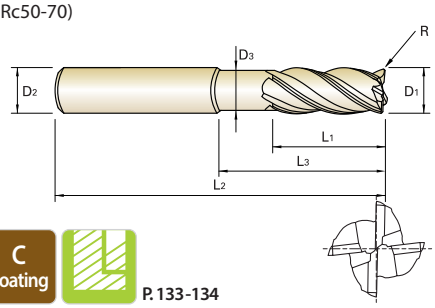
C-COATED SOLID CARBIDE END MILLS

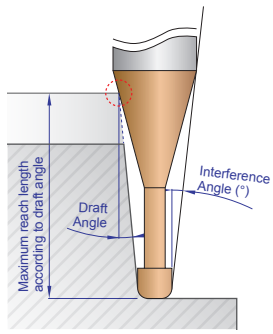
4 FLUTE CORNER RADIUS with NECK

SERIES
HPK17

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4 | 30° | 27°/30° | R ±0.005 | R ±0.008 | PLAIN | C Coating

P. 133-134

up to Ø3 | Over Ø3 | D1~D6 | D8~D20

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D1	D2	L1	L3	L2	D3		0.5°	1°	1.5°	2°	3°
HPK17060	R0.2	**6.0**	6	7	14	50	5.85	0.00	-	-	-	-	-
HPK17918	R0.5	**6.0**	6	7	20	60	5.85	0.00	-	-	-	-	-
HPK17920	R1.0	**6.0**	6	7	20	60	5.85	0.00	-	-	-	-	-
HPK17922	R1.5	**6.0**	6	7	20	60	5.85	0.00	-	-	-	-	-
HPK17919	R0.5	**6.0**	6	9	20	90	5.85	0.00	-	-	-	-	-
HPK17921	R1.0	**6.0**	6	9	20	90	5.85	0.00	-	-	-	-	-
HPK17080	R0.2	**8.0**	8	9	18	60	7.70	0.00	-	-	-	-	-
HPK17923	R0.5	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
HPK17925	R1.0	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
HPK17927	R1.5	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
HPK17928	R2.0	**8.0**	8	9	25	60	7.70	0.00	-	-	-	-	-
HPK17924	R0.5	**8.0**	8	12	25	100	7.70	0.00	-	-	-	-	-
HPK17926	R1.0	**8.0**	8	12	25	100	7.70	0.00	-	-	-	-	-
HPK17929	R0.5	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
HPK17931	R1.0	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
HPK17933	R1.5	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
HPK17934	R2.0	**10.0**	10	11	32	70	9.70	0.00	-	-	-	-	-
HPK17100	R0.2	**10.0**	10	12	25	75	9.70	0.00	-	-	-	-	-
HPK17930	R0.5	**10.0**	10	15	32	100	9.70	0.00	-	-	-	-	-
HPK17932	R1.0	**10.0**	10	15	32	100	9.70	0.00	-	-	-	-	-
HPK17935	R2.0	**10.0**	10	15	32	100	9.70	0.00	-	-	-	-	-
HPK17936	R0.5	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-
HPK17938	R1.0	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-
HPK17940	R1.5	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-
HPK17941	R2.0	**12.0**	12	12	38	80	11.70	0.00	-	-	-	-	-
HPK17120	R0.3	**12.0**	12	15	30	75	11.70	0.00	-	-	-	-	-
HPK17937	R0.5	**12.0**	12	18	38	110	11.70	0.00	-	-	-	-	-
HPK17939	R1.0	**12.0**	12	18	38	110	11.70	0.00	-	-	-	-	-
HPK17942	R2.0	**12.0**	12	18	38	110	11.70	0.00	-	-	-	-	-
HPK17160	R0.3	**16.0**	16	18	38	90	15.70	0.00	-	-	-	-	-
HPK17200	R0.3	**20.0**	20	24	45	100	19.70	0.00	-	-	-	-	-

Size	Corner Radius Tolerance (mm)
up to Ø6	±0.005
over Ø6	±0.008

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø12	0~-0.010	h4
over Ø12	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel			High alloyed steel, and tool steel				Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

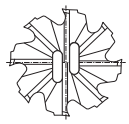
C-COATED SOLID CARBIDE END MILLS

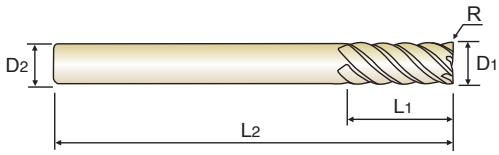
6&8 FLUTE CORNER RADIUS

SERIES **HPK27**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 6&8 | 45° | R ±.0003" | PLAIN | C Coating

P. 136

Unit : Inch

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
	R	D_1	D_2	L_1	L_2	
HPK27016	R.02	**1/4**	1/4	1/2	2-1/4	6
HPK27020	R.02	**5/16**	5/16	3/4	2-1/2	6
HPK27024	R.03	**3/8**	3/8	7/8	2-7/8	6
HPK27032	R.03	**1/2**	1/2	1	3-1/4	6
HPK27040	R.03	**5/8**	5/8	1-1/4	3-5/8	6
HPK27901	R.06	**5/8**	5/8	1-1/4	3-5/8	6
HPK27048	R.03	**3/4**	3/4	1-1/2	4-1/8	8
HPK27902	R.06	**3/4**	3/4	1-1/2	4-1/8	8
HPK27064	R.03	**1**	1	1-3/4	4-1/4	8
HPK27903	R.06	**1**	1	1-3/4	4-1/4	8
* **HPK27904**	R.03	**1**	1	4-1/8	7	8
* **HPK27905**	R.06	**1**	1	4-1/8	7	8

Mill Dia. Tolerance (Inch)	Corner Radius Tolerance (Inch)	Shank Dia. Tolerance
0~-.0006"	±.0003"	h4 * Shank Dia.>ø1/4 : h5

* Mill Dia.Tolerance(Inch) for Long Type : 0~.0008"

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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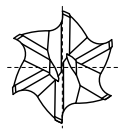
C-COATED SOLID CARBIDE END MILLS

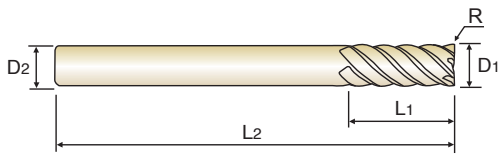
6 FLUTE CORNER RADIUS

SERIES
HPK18

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 6 | 45° | R ±0.008 | PLAIN | C Coating

P. 137

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D_1	D_2	L_1	L_2
HPK18060	R0.5	**6.0**	6	15	60
HPK18080	R0.5	**8.0**	8	20	75
HPK18100	R0.5	**10.0**	10	25	80
HPK18901	R1.0	**10.0**	10	25	80
HPK18120	R0.5	**12.0**	12	30	100
HPK18902	R1.0	**12.0**	12	30	100
HPK18160	R1.0	**16.0**	16	40	110
HPK18200	R1.0	**20.0**	20	45	125
HPK18903	R2.0	**20.0**	20	45	125

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.008	0~-0.015	h4 * Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

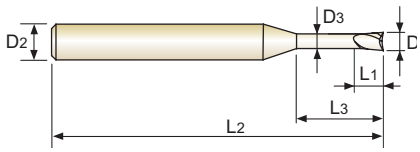
C-COATED SOLID CARBIDE END MILLS

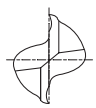
2 FLUTE SQUARE for RIB PROCESSING

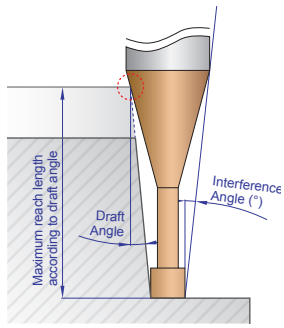
SERIES **HPI88**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 35° | PLAIN | C Coating

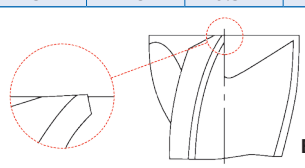
P. 138-145

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI88001	**0.1**	4	0.08	0.3	45	0.085	14.38	0.36	0.38	0.40	0.43	0.49
HPI88901	**0.1**	4	0.08	0.5	45	0.085	14.03	0.57	0.60	0.64	0.68	0.77
HPI88902	**0.1**	4	0.08	0.75	45	0.085	13.61	0.83	0.88	0.93	0.99	1.13
HPI88903	**0.1**	4	0.08	1	45	0.085	13.21	1.10	1.16	1.22	1.30	1.48
HPI880015	**0.15**	4	0.12	0.3	45	0.135	14.37	0.36	0.38	0.40	0.43	0.49
HPI88904	**0.15**	4	0.12	0.5	45	0.135	14.01	0.57	0.60	0.64	0.68	0.77
HPI88905	**0.15**	4	0.12	0.75	45	0.135	13.59	0.83	0.88	0.93	0.99	1.13
HPI88906	**0.15**	4	0.12	1	45	0.135	13.19	1.10	1.16	1.22	1.30	1.48
HPI88907	**0.15**	4	0.12	1.5	45	0.135	12.46	1.62	1.71	1.81	1.92	2.19
HPI88002	**0.2**	4	0.15	0.5	45	0.17	13.95	0.62	0.65	0.69	0.73	0.83
HPI88908	**0.2**	4	0.15	0.75	45	0.17	13.53	0.88	0.93	0.98	1.04	1.19
HPI88909	**0.2**	4	0.15	1	45	0.17	13.13	1.14	1.20	1.27	1.35	1.54
HPI88910	**0.2**	4	0.15	1.5	45	0.17	12.39	1.67	1.76	1.86	1.98	2.26
HPI88911	**0.2**	4	0.15	2	45	0.17	11.73	2.19	2.31	2.45	2.60	2.97
HPI88912	**0.2**	4	0.15	2.5	45	0.17	11.14	2.72	2.87	3.04	3.22	3.68
HPI88913	**0.2**	4	0.15	3	45	0.17	10.61	3.25	3.42	3.62	3.85	4.39
HPI88003	**0.3**	4	0.25	1	45	0.27	13.08	1.14	1.20	1.27	1.35	1.54
HPI88914	**0.3**	4	0.25	1.5	45	0.27	12.33	1.67	1.76	1.86	1.98	2.26
HPI88915	**0.3**	4	0.25	2	45	0.27	11.67	2.19	2.31	2.45	2.60	2.97
HPI88916	**0.3**	4	0.25	2.5	45	0.27	11.06	2.72	2.87	3.04	3.22	3.68
HPI88917	**0.3**	4	0.25	3	45	0.27	10.52	3.25	3.42	3.62	3.85	4.39
HPI88004	**0.4**	4	0.3	1	45	0.37	13.04	1.14	1.20	1.27	1.35	1.54
HPI88918	**0.4**	4	0.3	1.5	45	0.37	12.27	1.67	1.76	1.86	1.98	2.26
HPI88919	**0.4**	4	0.3	2	45	0.37	11.59	2.19	2.31	2.45	2.60	2.97
HPI88920	**0.4**	4	0.3	2.5	45	0.37	10.98	2.72	2.87	3.04	3.22	3.68
HPI88921	**0.4**	4	0.3	3	45	0.37	10.44	3.25	3.42	3.62	3.85	4.39

NEXT PAGE ▶

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0~-0.010	h4



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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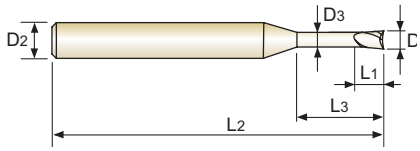
C-COATED SOLID CARBIDE END MILLS

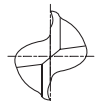
2 FLUTE SQUARE for RIB PROCESSING

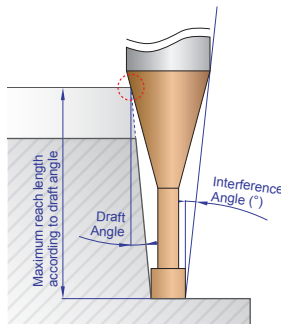
SERIES **HPI88**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 35° | PLAIN | C Coating

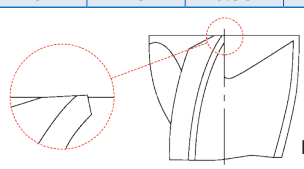
P. 138-145

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI88922	**0.4**	4	0.3	3.5	45	0.37	9.94	3.77	3.98	4.21	4.47	5.10
HPI88923	**0.4**	4	0.3	4	45	0.37	9.49	4.30	4.53	4.80	5.09	5.81
HPI88924	**0.4**	4	0.3	5	45	0.37	8.69	5.35	5.64	5.97	6.34	7.24
HPI88925	**0.4**	4	0.3	6	45	0.37	8.02	6.40	6.75	7.15	7.59	8.66
HPI88926	**0.4**	4	0.3	8	45	0.37	6.95	8.51	8.97	9.50	10.08	11.48
HPI88927	**0.4**	4	0.3	10	45	0.37	6.13	10.61	11.19	11.84	12.58	13.82
HPI88005	**0.5**	4	0.4	1	45	0.45	12.93	1.20	1.27	1.34	1.42	1.62
HPI88928	**0.5**	4	0.4	1.5	45	0.45	12.16	1.73	1.82	1.93	2.05	2.34
HPI88929	**0.5**	4	0.4	2	45	0.45	11.47	2.25	2.38	2.52	2.67	3.05
HPI88930	**0.5**	4	0.4	2.5	45	0.45	10.86	2.78	2.93	3.10	3.29	3.76
HPI88931	**0.5**	4	0.4	3	45	0.45	10.31	3.31	3.49	3.69	3.92	4.47
HPI88932	**0.5**	4	0.4	3.5	45	0.45	9.81	3.83	4.04	4.28	4.54	5.18
HPI88933	**0.5**	4	0.4	4	45	0.45	9.35	4.36	4.60	4.86	5.16	5.89
HPI88934	**0.5**	4	0.4	4.5	45	0.45	8.94	4.88	5.15	5.45	5.79	6.60
HPI88935	**0.5**	4	0.4	5	45	0.45	8.56	5.41	5.71	6.04	6.41	7.32
HPI88936	**0.5**	4	0.4	6	45	0.45	7.89	6.46	6.82	7.21	7.66	8.74
HPI88937	**0.5**	4	0.4	7	45	0.45	7.32	7.51	7.93	8.39	8.91	10.16
HPI88938	**0.5**	4	0.4	8	50	0.45	6.82	8.57	9.04	9.56	10.15	11.47
HPI88939	**0.5**	4	0.4	9	50	0.45	6.39	9.62	10.15	10.74	11.40	12.64
HPI88940	**0.5**	4	0.4	10	50	0.45	6.01	10.67	11.26	11.91	12.65	13.80
HPI88006	**0.6**	4	0.5	1.5	45	0.55	12.09	1.73	1.82	1.93	2.05	2.34
HPI88941	**0.6**	4	0.5	2	45	0.55	11.39	2.25	2.38	2.52	2.67	3.05
HPI88942	**0.6**	4	0.5	3	45	0.55	10.21	3.31	3.49	3.69	3.92	4.47
HPI88943	**0.6**	4	0.5	4	45	0.55	9.25	4.36	4.60	4.86	5.16	5.89
HPI88944	**0.6**	4	0.5	5	45	0.55	8.45	5.41	5.71	6.04	6.41	7.32
HPI88945	**0.6**	4	0.5	6	45	0.55	7.78	6.46	6.82	7.21	7.66	8.74

NEXT PAGE ▶

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0~-0.010	h4



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

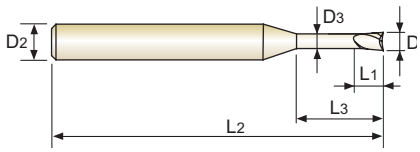
C-COATED SOLID CARBIDE END MILLS

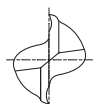
2 FLUTE SQUARE for RIB PROCESSING

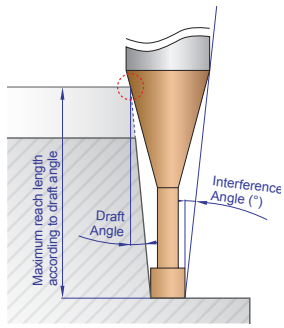
SERIES **HPI88**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 35° | PLAIN | C Coating

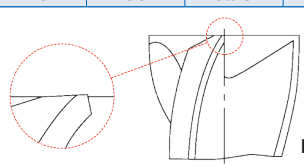
P. 138-145

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI88007	**0.7**	4	0.55	2	45	0.65	11.31	2.25	2.38	2.52	2.67	3.05
HPI88946	**0.7**	4	0.55	4	45	0.65	9.14	4.36	4.60	4.86	5.16	5.89
HPI88947	**0.7**	4	0.55	6	45	0.65	7.67	6.46	6.82	7.21	7.66	8.74
HPI88948	**0.7**	4	0.55	8	50	0.65	6.60	8.57	9.04	9.56	10.15	11.35
HPI88949	**0.7**	4	0.55	10	50	0.65	5.80	10.67	11.26	11.91	12.65	13.69
HPI88008	**0.8**	4	0.65	3	45	0.75	10.01	3.31	3.49	3.69	3.92	4.47
HPI88950	**0.8**	4	0.65	4	45	0.75	9.03	4.36	4.60	4.86	5.16	5.89
HPI88951	**0.8**	4	0.65	5	45	0.75	8.23	5.41	5.71	6.04	6.41	7.32
HPI88952	**0.8**	4	0.65	6	45	0.75	7.55	6.46	6.82	7.21	7.66	8.74
HPI88953	**0.8**	4	0.65	8	50	0.75	6.49	8.57	9.04	9.56	10.15	11.29
HPI88954	**0.8**	4	0.65	10	50	0.75	5.69	10.67	11.26	11.91	12.65	13.63
HPI88955	**0.8**	4	0.65	12	50	0.75	5.06	12.77	13.48	14.26	15.12	15.97
HPI88010	**1.0**	4	0.8	2	50	0.95	11.04	2.25	2.38	2.52	2.67	3.05
HPI88956	**1.0**	4	0.8	3	50	0.95	9.79	3.31	3.49	3.69	3.92	4.47
HPI88957	**1.0**	4	0.8	4	50	0.95	8.80	4.36	4.60	4.86	5.16	5.89
HPI88958	**1.0**	4	0.8	5	50	0.95	7.99	5.41	5.71	6.04	6.41	7.32
HPI88959	**1.0**	4	0.8	6	50	0.95	7.31	6.46	6.82	7.21	7.66	8.74
HPI88960	**1.0**	4	0.8	7	50	0.95	6.74	7.51	7.93	8.39	8.91	10.01
HPI88961	**1.0**	4	0.8	8	50	0.95	6.25	8.57	9.04	9.56	10.15	11.18
HPI88962	**1.0**	4	0.8	9	50	0.95	5.83	9.62	10.15	10.74	11.40	12.35
HPI88963	**1.0**	4	0.8	10	50	0.95	5.46	10.67	11.26	11.91	12.65	13.52
HPI88964	**1.0**	4	0.8	12	50	0.95	4.85	12.77	13.48	14.26	15.01	15.85
HPI88965	**1.0**	4	0.8	14	50	0.95	4.36	14.88	15.70	16.61	17.22	18.19
HPI88966	**1.0**	4	0.8	16	60	0.95	3.96	16.98	17.92	18.93	19.43	20.53
HPI88967	**1.0**	4	0.8	18	60	0.95	3.62	19.09	20.13	21.09	21.65	22.86
HPI88968	**1.0**	4	0.8	20	60	0.95	3.34	21.19	22.35	23.24	23.86	25.20

NEXT PAGE ▶

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0~-0.010	h4



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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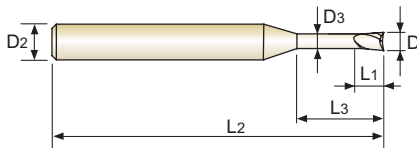
C-COATED SOLID CARBIDE END MILLS

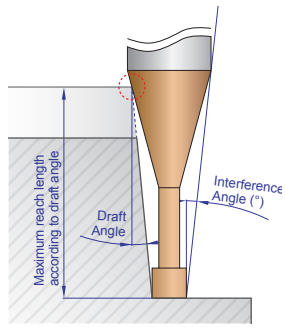
2 FLUTE SQUARE for RIB PROCESSING

SERIES **HPI88**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









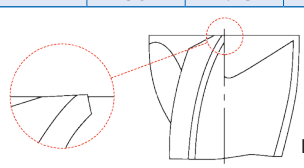
P. 138-145

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI88969	**1.0**	4	0.8	22	60	0.95	3.10	23.29	24.57	25.40	26.07	27.53
HPI88012	**1.2**	4	1	6	50	1.15	7.05	6.30	6.52	6.75	7.01	7.57
HPI88970	**1.2**	4	1	8	50	1.15	6.00	8.37	8.66	8.97	9.31	10.06
HPI88971	**1.2**	4	1	10	50	1.15	5.22	10.43	10.80	11.19	11.61	12.55
HPI88972	**1.2**	4	1	12	50	1.15	4.62	12.50	12.94	13.40	13.91	15.03
HPI88973	**1.2**	4	1	16	60	1.15	3.76	16.64	17.21	17.84	18.50	20.01
HPI88014	**1.4**	4	1.1	6	50	1.35	6.77	6.30	6.52	6.75	7.01	7.57
HPI88974	**1.4**	4	1.1	12	50	1.35	4.39	12.50	12.94	13.40	13.91	15.03
HPI88015	**1.5**	4	1.2	4	50	1.45	8.12	4.23	4.38	4.54	4.71	5.09
HPI88975	**1.5**	4	1.2	6	50	1.45	6.63	6.30	6.52	6.75	7.01	7.57
HPI88976	**1.5**	4	1.2	8	50	1.45	5.60	8.37	8.66	8.97	9.31	10.06
HPI88977	**1.5**	4	1.2	10	50	1.45	4.84	10.43	10.80	11.19	11.61	12.55
HPI88978	**1.5**	4	1.2	12	50	1.45	4.27	12.50	12.94	13.40	13.91	15.03
HPI88979	**1.5**	4	1.2	14	60	1.45	3.81	14.57	15.08	15.62	16.21	17.52
HPI88980	**1.5**	4	1.2	16	60	1.45	3.45	16.64	17.21	17.84	18.50	20.01
HPI88981	**1.5**	4	1.2	18	60	1.45	3.14	18.70	19.35	20.05	20.80	22.49
HPI88982	**1.5**	4	1.2	20	60	1.45	2.89	20.77	21.49	22.27	23.10	-
HPI88983	**1.5**	4	1.2	25	70	1.45	2.41	25.94	26.84	27.81	28.85	-
HPI88984	**1.5**	4	1.2	30	70	1.45	2.06	31.11	32.19	33.35	34.60	-
HPI88985	**1.5**	4	1.2	35	80	1.45	1.80	36.27	37.54	38.89	-	-
HPI88016	**1.6**	4	1.3	6	50	1.55	6.48	6.30	6.52	6.75	7.01	7.57
HPI88986	**1.6**	4	1.3	8	50	1.55	5.45	8.37	8.66	8.97	9.31	10.06
HPI88018	**1.8**	4	1.4	6	50	1.75	6.16	6.30	6.52	6.75	7.01	7.57
HPI88987	**1.8**	4	1.4	8	50	1.75	5.15	8.37	8.66	8.97	9.31	10.06
HPI88988	**1.8**	4	1.4	10	50	1.75	4.43	10.43	10.80	11.19	11.61	12.55
HPI88989	**1.8**	4	1.4	12	50	1.75	3.88	12.50	12.94	13.40	13.91	15.03

NEXT PAGE ▶

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0~-0.010	h4



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

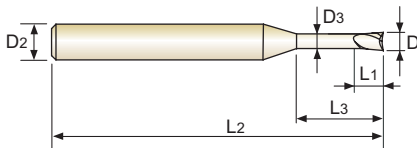
C-COATED SOLID CARBIDE END MILLS

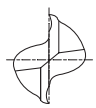
2 FLUTE SQUARE for RIB PROCESSING

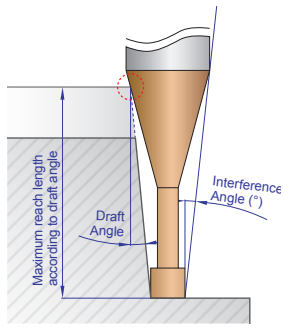
SERIES **HPI88**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 2 | 35° | PLAIN | C Coating

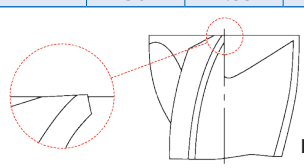
P. 138-145

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI88990	**1.8**	4	1.4	14	50	1.75	3.46	14.57	15.08	15.62	16.21	17.52
HPI88991	**1.8**	4	1.4	16	60	1.75	3.12	16.64	17.21	17.84	18.50	20.01
HPI88992	**1.8**	4	1.4	18	60	1.75	2.84	18.70	19.35	20.05	20.80	-
HPI88020	**2.0**	4	1.6	4	50	1.95	7.28	4.23	4.38	4.54	4.71	5.09
HPI88993	**2.0**	4	1.6	6	50	1.95	5.81	6.30	6.52	6.75	7.01	7.57
HPI88994	**2.0**	4	1.6	8	50	1.95	4.83	8.37	8.66	8.97	9.31	10.06
HPI88995	**2.0**	4	1.6	10	50	1.95	4.14	10.43	10.80	11.19	11.61	12.55
HPI88996	**2.0**	4	1.6	12	50	1.95	3.62	12.50	12.94	13.40	13.91	15.03
HPI88997	**2.0**	4	1.6	14	60	1.95	3.21	14.57	15.08	15.62	16.21	17.52
HPI88998	**2.0**	4	1.6	16	60	1.95	2.89	16.64	17.21	17.84	18.50	-
HPI88999	**2.0**	4	1.6	18	60	1.95	2.62	18.70	19.35	20.05	20.80	-
HPI88801	**2.0**	4	1.6	20	60	1.95	2.40	20.77	21.49	22.27	23.10	-
HPI88802	**2.0**	4	1.6	25	70	1.95	1.99	25.94	26.84	27.81	-	-
HPI88803	**2.0**	4	1.6	30	70	1.95	1.69	31.11	32.19	33.35	-	-
HPI88804	**2.0**	4	1.6	35	80	1.95	1.48	36.27	37.54	-	-	-
HPI88805	**2.0**	4	1.6	40	90	1.95	1.31	41.44	42.89	-	-	-
HPI88806	**2.0**	4	1.6	50	100	1.95	1.06	51.78	53.58	-	-	-
HPI88025	**2.5**	4	2	8	50	2.4	3.91	8.46	8.76	9.07	9.41	10.18
HPI88807	**2.5**	4	2	12	50	2.4	2.87	12.60	13.04	13.51	14.01	-
HPI88808	**2.5**	4	2	16	60	2.4	2.26	16.73	17.31	17.94	18.61	-
HPI88809	**2.5**	4	2	20	60	2.4	1.87	20.87	21.59	22.37	-	-
HPI88810	**2.5**	4	2	30	70	2.4	1.30	31.20	32.29	-	-	-
HPI88811	**2.5**	4	2	40	90	2.4	1.00	41.54	-	-	-	-
HPI88812	**2.5**	4	2	50	100	2.4	0.81	51.88	-	-	-	-
HPI88030	**3.0**	6	4.5	8	50	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPI88813	**3.0**	6	4.5	12	50	2.85	4.80	12.69	13.14	13.61	14.12	15.27

NEXT PAGE ▶

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0~-0.010	h4



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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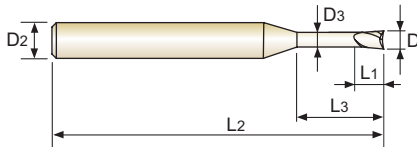
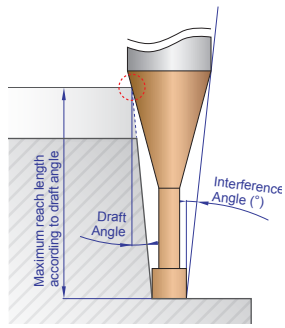




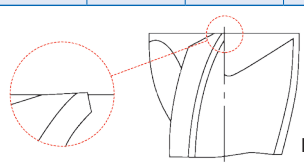


P. 138-145

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPI88814	**3.0**	6	4.5	16	60	2.85	3.92	16.83	17.41	18.04	18.72	20.24
HPI88815	**3.0**	6	4.5	20	60	2.85	3.32	20.96	21.69	22.48	23.32	25.21
HPI88816	**3.0**	6	4.5	25	70	2.85	2.78	26.13	27.04	28.02	29.07	-
HPI88817	**3.0**	6	4.5	30	70	2.85	2.39	31.30	32.39	33.56	34.82	-
HPI88040	**4.0**	6	6	12	60	3.85	3.57	12.69	13.14	13.61	14.12	15.27
HPI88818	**4.0**	6	6	16	60	3.85	2.86	16.83	17.41	18.04	18.72	-
HPI88819	**4.0**	6	6	20	70	3.85	2.38	20.96	21.69	22.48	23.32	-
HPI88820	**4.0**	6	6	30	80	3.85	1.68	31.30	32.39	33.56	-	-
HPI88821	**4.0**	6	6	40	90	3.85	1.30	41.64	43.09	-	-	-
HPI88822	**4.0**	6	6	50	100	3.85	1.06	51.97	53.78	-	-	-
HPI88050	**5.0**	6	7.5	20	70	4.85	1.29	20.96	21.69	-	-	-
HPI88823	**5.0**	6	7.5	30	80	4.85	0.89	31.30	-	-	-	-
HPI88824	**5.0**	6	7.5	40	90	4.85	0.68	41.64	-	-	-	-
HPI88825	**5.0**	6	7.5	50	100	4.85	0.55	51.97	-	-	-	-
HPI88060	**6.0**	6	9	20	70	5.85	0.00	-	-	-	-	-
HPI88826	**6.0**	6	9	30	80	5.85	0.00	-	-	-	-	-
HPI88827	**6.0**	6	9	40	90	5.85	0.00	-	-	-	-	-
HPI88828	**6.0**	6	9	50	100	5.85	0.00	-	-	-	-	-

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0~-0.010	h4



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

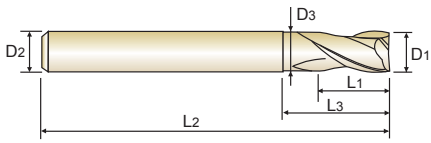
C-COATED SOLID CARBIDE END MILLS

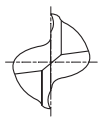
2 FLUTE SQUARE with EXTENDED NECK

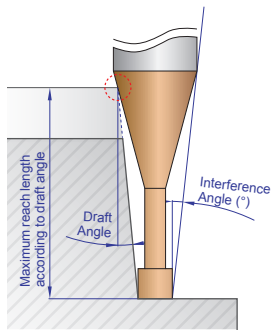
SERIES **HPK19**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









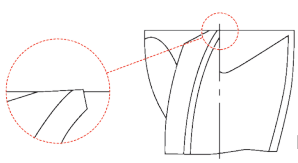
CARBIDE | 2 | 35° | PLAIN | C Coating

P. 138-145

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK19001	**0.1**	4	0.2	0.3	40	0.085	14.38	0.36	0.38	0.40	0.43	0.49
HPK19002	**0.2**	4	0.4	0.5	40	0.17	13.95	0.62	0.65	0.69	0.73	0.83
HPK19003	**0.3**	4	0.6	1	40	0.27	13.08	1.14	1.20	1.27	1.35	1.54
HPK19004	**0.4**	4	0.8	1	40	0.37	13.04	1.14	1.20	1.27	1.35	1.54
HPK19005	**0.5**	4	1	1.5	40	0.45	12.16	1.73	1.82	1.93	2.05	2.34
HPK19006	**0.6**	4	1.2	2	40	0.55	11.39	2.25	2.38	2.52	2.67	3.05
HPK19007	**0.7**	4	1.4	2	40	0.65	11.31	2.25	2.38	2.52	2.67	3.05
HPK19008	**0.8**	4	1.6	2	40	0.75	11.22	2.25	2.38	2.52	2.67	3.05
HPK19009	**0.9**	4	2	3	40	0.85	9.90	3.31	3.49	3.69	3.92	4.47
HPK19010	**1.0**	4	1.5	3	50	0.95	9.79	3.31	3.49	3.69	3.92	4.47
HPK19901	**1.0**	6	1.5	3	50	0.95	11.38	3.31	3.49	3.69	3.92	4.47
HPK19015	**1.5**	4	1.7	4	50	1.45	8.12	4.23	4.38	4.54	4.71	5.09
HPK19902	**1.5**	6	1.7	4	50	1.45	10.21	4.23	4.38	4.54	4.71	5.09
HPK19020	**2.0**	4	2	5	50	1.95	6.46	5.26	5.45	5.64	5.86	6.33
HPK19903	**2.0**	6	2	5	50	1.95	9.05	5.26	5.45	5.64	5.86	6.33
HPK19025	**2.5**	4	2.5	6	55	2.40	4.77	6.39	6.62	6.86	7.11	7.69
HPK19904	**2.5**	6	2.5	6	55	2.40	7.83	6.39	6.62	6.86	7.11	7.69
HPK19030	**3.0**	6	3	8	55	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPK19035	**3.5**	6	3.5	9	55	3.35	5.12	9.59	9.93	10.29	10.67	11.54
HPK19040	**4.0**	6	4	10	55	3.85	4.08	10.63	11.00	11.39	11.82	12.78
HPK19050	**5.0**	6	5	13	55	4.85	1.89	13.73	14.21	14.72	-	-
HPK19060	**6.0**	6	6	15	55	5.85	0.00	-	-	-	-	-
HPK19080	**8.0**	8	8	20	65	7.70	0.00	-	-	-	-	-
HPK19100	**10.0**	10	10	25	75	9.70	0.00	-	-	-	-	-
HPK19120	**12.0**	12	12	28	85	11.70	0.00	-	-	-	-	-
HPK19160	**16.0**	16	16	32	90	15.70	0.00	-	-	-	-	-
HPK19200	**20.0**	20	20	40	105	19.70	0.00	-	-	-	-	-

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø12	0~-0.010	h4
over Ø12	0~-0.012	* Shank Dia.>ø6 : h5



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S					H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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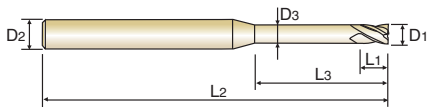
C-COATED SOLID CARBIDE END MILLS

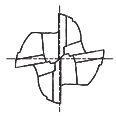
4 FLUTE SQUARE for RIB PROCESSING

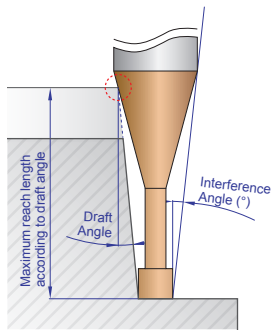
SERIES
HPK20

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









CARBIDE | 4 | 30° | 27°/30° | PLAIN | C Coating

up to Ø3 Over Ø3

P. 146

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK20010	**1.0**	4	0.8	4	50	0.95	8.80	4.36	4.60	4.86	5.16	5.89
HPK20901	**1.0**	4	0.8	10	50	0.95	5.46	10.67	11.26	11.91	12.65	13.52
HPK20012	**1.2**	4	1	6	50	1.15	7.05	6.30	6.52	6.75	7.01	7.57
HPK20902	**1.2**	4	1	12	50	1.15	4.62	12.50	12.94	13.40	13.91	15.03
HPK20015	**1.5**	4	1.2	6	50	1.45	6.63	6.30	6.52	6.75	7.01	7.57
HPK20903	**1.5**	4	1.2	10	50	1.45	4.84	10.43	10.80	11.19	11.61	12.55
HPK20904	**1.5**	4	1.2	16	60	1.45	3.45	16.64	17.21	17.84	18.50	20.01
HPK20018	**1.8**	4	1.4	6	50	1.75	6.16	6.30	6.52	6.75	7.01	7.57
HPK20905	**1.8**	4	1.4	12	50	1.75	3.88	12.50	12.94	13.40	13.91	15.03
HPK20906	**1.8**	4	1.4	18	60	1.75	2.84	18.70	19.35	20.05	20.80	-
HPK20020	**2.0**	4	1.6	6	50	1.95	5.81	6.30	6.52	6.75	7.01	7.57
HPK20907	**2.0**	4	1.6	14	60	1.95	3.21	14.57	15.08	15.62	16.21	17.52
HPK20908	**2.0**	4	1.6	20	60	1.95	2.40	20.77	21.49	22.27	23.10	-
HPK20025	**2.5**	4	2	8	50	2.4	3.91	8.46	8.76	9.07	9.41	10.18
HPK20909	**2.5**	4	2	16	60	2.4	2.26	16.73	17.31	17.94	18.61	-
HPK20910	**2.5**	4	2	25	70	2.4	1.54	26.03	26.94	27.91	-	-
HPK20030	**3.0**	6	4.5	8	50	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPK20911	**3.0**	6	4.5	16	60	2.85	3.92	16.83	17.41	18.04	18.72	20.24
HPK20912	**3.0**	6	4.5	30	70	2.85	2.39	31.30	32.39	33.56	34.82	-
HPK20040	**4.0**	6	6	12	50	3.85	3.57	12.69	13.14	13.61	14.12	15.27
HPK20913	**4.0**	6	6	25	70	3.85	1.97	26.13	27.04	28.02	-	-
HPK20914	**4.0**	6	6	40	90	3.85	1.30	41.64	43.09	-	-	-
HPK20050	**5.0**	6	7.5	16	60	4.85	1.58	16.83	17.41	18.04	-	-
HPK20915	**5.0**	6	7.5	50	110	4.85	0.55	51.97	-	-	-	-
HPK20060	**6.0**	6	9	20	80	5.85	0.00	-	-	-	-	-
HPK20916	**6.0**	6	9	50	110	5.85	0.00	-	-	-	-	-

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø12	0~-0.010	h4
over Ø12	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

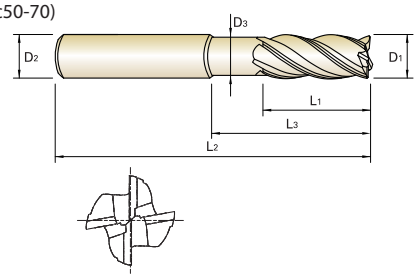
C-COATED SOLID CARBIDE END MILLS

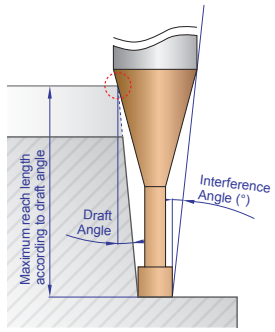
4 FLUTE SQUARE with EXTENDED NECK

SERIES **HPK21**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4 | 30° | 27°/30° | PLAIN | C Coating

up to Ø3 Over Ø3

P. 146

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK21010	**1.0**	6	1.5	3	50	0.95	11.38	3.31	3.49	3.69	3.92	4.47
HPK21020	**2.0**	6	2	5	50	1.95	9.05	5.26	5.45	5.64	5.86	6.33
HPK21030	**3.0**	6	3	8	55	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPK21040	**4.0**	6	4	10	55	3.85	4.08	10.63	11.00	11.39	11.82	12.78
HPK21050	**5.0**	6	5	13	55	4.85	1.89	13.73	14.21	14.72	-	-
HPK21060	**6.0**	6	6	15	55	5.85	0.00	-	-	-	-	-
HPK21080	**8.0**	8	8	20	65	7.70	0.00	-	-	-	-	-
HPK21100	**10.0**	10	10	25	75	9.70	0.00	-	-	-	-	-
HPK21120	**12.0**	12	12	28	85	11.70	0.00	-	-	-	-	-
HPK21160	**16.0**	16	16	32	90	15.70	0.00	-	-	-	-	-
HPK21200	**20.0**	20	20	40	105	19.70	0.00	-	-	-	-	-

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø12	0~-0.010	h4
over Ø12	0~-0.012	* Shank Dia.>ø6 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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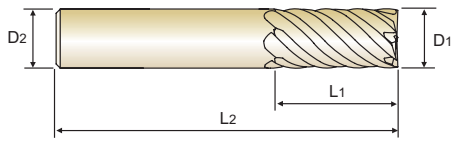
C-COATED SOLID CARBIDE END MILLS

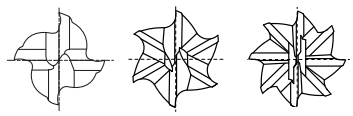
MULTI FLUTE SQUARE

SERIES
HPK23

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4&6&8 | 45° | PLAIN | C Coating

P. 147-148

Unit : mm

EDP No.	Mill Diameter D_1	Shank Diameter D_2	Length of Cut L_1	Overall Length L_2	No. of Flute
HPK23010	1.0	6	2	60	4
* HPK23901	1.0	6	3.5	60	4
HPK23020	2.0	6	4	60	4
* HPK23902	2.0	6	7	60	4
HPK23030	3.0	6	6	60	4
* HPK23903	3.0	6	10	60	4
* HPK23904	3.0	6	15	60	4
HPK23040	4.0	6	8	60	4
* HPK23905	4.0	6	12	60	4
* HPK23906	4.0	6	20	65	4
HPK23050	5.0	6	10	60	4
* HPK23907	5.0	6	15	60	4
* HPK23908	5.0	6	25	70	4
HPK23060	6.0	6	15	60	6
* HPK23909	6.0	6	24	70	6
HPK23080	8.0	8	20	75	6
* HPK23910	8.0	8	35	90	6
HPK23100	10.0	10	25	80	6
* HPK23911	10.0	10	45	100	6
HPK23120	12.0	12	30	100	6
* HPK23912	12.0	12	55	120	6
HPK23140	14.0	16	35	105	6
HPK23160	16.0	16	40	105	6
* HPK23913	16.0	16	65	135	6
HPK23180	18.0	20	40	120	8
HPK23200	20.0	20	45	125	8
* HPK23914	20.0	20	75	155	8
HPK23250	25.0	25	50	140	8
* HPK23915	25.0	25	90	180	8

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0~-0.015	h4 * Shank Dia.>ø6 : h5

* Mill Dia. Tolerance(mm) for Long Type : 0~-0.02

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

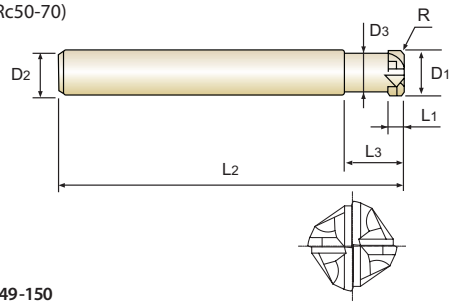
C-COATED SOLID CARBIDE END MILLS

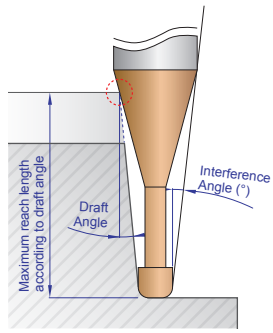
4 FLUTE CORNER RADIUS - HIGH FEED

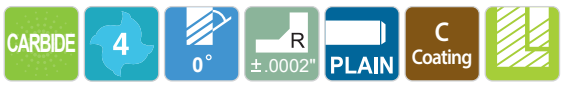
SERIES **HPK25**

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)









P. 149-150

Unit : Inch

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	The effective under-neck length for the various draft angles				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK25008	R1/32	**1/8**	1/4	.050	3/8	2-1/4	.110	5.61	10.58	10.95	11.34	11.77	12.72
HPK25012	R1/16	**3/16**	1/4	.075	3/8	2-1/4	.180	3.54	10.21	10.57	10.95	11.36	12.28
HPK25016	R1/16	**1/4**	1/4	.100	1/2	2-1/2	.220	0.00	-	-	-	-	-
HPK25020	R3/32	**5/16**	5/16	.130	5/8	2-1/2	.280	0.00	-	-	-	-	-
HPK25024	R3/32	**3/8**	3/8	.150	3/4	2-3/4	.330	0.00	-	-	-	-	-
HPK25032	R1/8	**1/2**	1/2	.200	1	3-1/4	.460	0.00	-	-	-	-	-

Corner Radius Tolerance (Inch)	Mill Dia. Tolerance (Inch)	Shank Dia. Tolerance
±.0002"	0~-.0006"	h4 * Shank Dia.>ø1/4 : h5

◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

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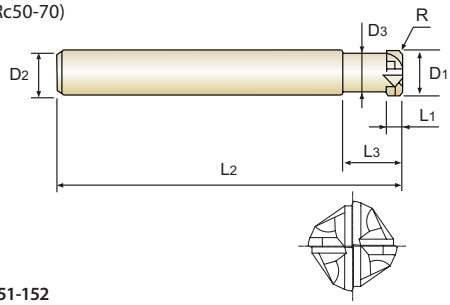
C-COATED SOLID CARBIDE END MILLS

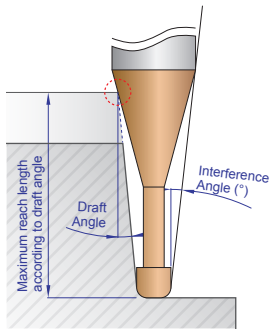
4 FLUTE CORNER RADIUS - HIGH FEED

SERIES
HPK22

- Improvement of tool life by applying new coating
- Application of tight tolerances for precision machining
- Highly Accurate Fine-Finishing End Mill For High-Hardened Steel (HRc50-70)







CARBIDE | 4 | 0° | R ±0.005 | PLAIN | C Coating

P. 151-152

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Interference Angle (°)	Maximum reach lengths according to draft angle				
	R	D_1	D_2	L_1	L_3	L_2	D_3		0.5°	1°	1.5°	2°	3°
HPK22020	R0.5	**2.0**	6	1	6	50	1.95	8.39	6.30	6.52	6.75	7.01	7.57
HPK22901	R0.5	**2.0**	6	1	6	70	1.95	8.39	6.30	6.52	6.75	7.01	7.57
HPK22030	R0.5	**3.0**	6	1.2	8	50	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPK22902	R0.5	**3.0**	6	1.2	8	70	2.85	6.17	8.56	8.86	9.18	9.52	10.29
HPK22040	R0.5	**4.0**	6	1.5	10	50	3.85	4.08	10.63	11.00	11.39	11.82	12.78
HPK22903	R0.5	**4.0**	6	1.5	10	70	3.85	4.08	10.63	11.00	11.39	11.82	12.78
HPK22050	R0.5	**5.0**	6	2	10	70	4.85	2.36	10.63	11.00	11.39	11.82	-
HPK22060	R0.5	**6.0**	6	2.5	12	60	5.85	0.00	-	-	-	-	-
HPK22904	R0.5	**6.0**	6	2.5	12	90	5.85	0.00	-	-	-	-	-
HPK22905	R1.0	**6.0**	6	2.5	12	60	5.85	0.00	-	-	-	-	-
HPK22906	R1.0	**6.0**	6	2.5	12	90	5.85	0.00	-	-	-	-	-
HPK22907	R1.0	**8.0**	8	3.5	16	60	7.70	0.00	-	-	-	-	-
HPK22080	R1.0	**8.0**	8	3.5	16	100	7.70	0.00	-	-	-	-	-
HPK22908	R2.0	**8.0**	8	3.5	16	60	7.70	0.00	-	-	-	-	-
HPK22909	R2.0	**8.0**	8	3.5	16	100	7.70	0.00	-	-	-	-	-
HPK22100	R1.0	**10.0**	10	4	20	70	9.70	0.00	-	-	-	-	-
HPK22910	R1.0	**10.0**	10	4	20	100	9.70	0.00	-	-	-	-	-
HPK22911	R2.0	**10.0**	10	4	20	70	9.70	0.00	-	-	-	-	-
HPK22912	R2.0	**10.0**	10	4	20	100	9.70	0.00	-	-	-	-	-
HPK22120	R2.0	**12.0**	12	5	25	80	11.70	0.00	-	-	-	-	-
HPK22913	R2.0	**12.0**	12	5	25	110	11.70	0.00	-	-	-	-	-
HPK22914	R3.0	**12.0**	12	5	25	80	11.70	0.00	-	-	-	-	-
HPK22915	R3.0	**12.0**	12	5	25	110	11.70	0.00	-	-	-	-	-
HPK22160	R3.0	**16.0**	16	6.5	30	130	15.70	0.00	-	-	-	-	-

Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
±0.005	0~-0.015	h4 * Shank Dia.>ø6 : h5

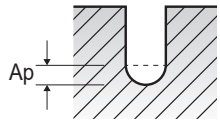
◎ : Excellent ○ : Good

ISO	P												M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11.1	11.2	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	44	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	409	200	240	180	180	260	160	250	130	230
Recommended					○			○	○		○	○									

ISO	N										S							H						
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel					Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38.1	38.2	39.1	39.2	39.3	40	41
HRc											15	30	25	38	34			45-49	50-55	56-60	61-65	66-70	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	421-469	481-560	577-654	670-739		400	550
Recommended																		◎	◎	◎	◎	◎	○	◎

HPI91, HPI92, HPK10 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Para-meter	Diameter (Ø)																			
				0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
			LBS	0.3	0.5	0.75	1	1.25	1.5	1.75	2	2.5	3	5	0.5	0.6	0.75	1	1.25	1.5	1.75	2	2.25
P	5	Non-alloy steel	SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006
			RPM	49180	49180	49180	49180	44260	44260	44260	44260	39340	39340	14750	49180	49180	49180	49180	49180	49180	44260	44260	44260
			IPM	46	46	46	46	38	38	38	38	31	31	8	58	58	58	58	58	58	49	49	49
			Ap	.0002	.0002	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	8	Low alloy steel	SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006
			RPM	49180	49180	49180	49180	44260	44260	44260	44260	39340	39340	14750	49180	49180	49180	49180	49180	49180	44260	44260	44260
			IPM	46	46	46	46	38	38	38	38	31	31	8	58	58	58	58	58	58	49	49	49
			Ap	.0002	.0002	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	9		SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006
			RPM	49180	49180	49180	49180	44260	44260	44260	44260	39340	39340	14750	49180	49180	49180	49180	49180	49180	44260	44260	44260
			IPM	46	46	46	46	38	38	38	38	31	31	8	58	58	58	58	58	58	49	49	49
			Ap	.0002	.0002	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	11.1	High alloyed steel, and tool steel	SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006
			RPM	49180	49180	49180	49180	44260	44260	44260	44260	39340	39340	14750	49180	49180	49180	49180	49180	49180	44260	44260	44260
			IPM	46	46	46	46	38	38	38	38	31	31	8	58	58	58	58	58	58	49	49	49
			Ap	.0002	.0002	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	11.2		SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
			RPM	49180	49180	49180	49180	44260	44260	44260	44260	39340	39340	14750	49180	49180	49180	49180	49180	49180	44260	44260	44260
			IPM	43	43	43	43	35	35	35	35	28	28	8	54	54	54	54	54	54	45	45	45
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
H	38.1	Hardened steel	SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
			RPM	49180	49180	49180	49180	44260	44260	44260	44260	39340	39340	14750	49180	49180	49180	49180	49180	49180	44260	44260	44260
			IPM	43	43	43	43	35	35	35	35	28	28	8	54	54	54	54	54	54	45	45	45
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	38.2		SFM	95	95	95	95	85	85	85	85	75	75	30	135	135	135	135	135	135	120	120	120
			IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0002	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005
			RPM	45900	45900	45900	45900	41310	41310	41310	41310	36720	36720	13770	43710	43710	43710	43710	43710	43710	39340	39340	39340
			IPM	36	36	36	36	29	29	29	29	23	23	6	45	45	45	45	45	45	37	37	37
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	39.1		SFM	85	85	85	85	75	75	75	75	70	70	25	135	135	135	135	135	135	120	120	120
			IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0002	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004
			RPM	40980	40980	40980	40980	36890	36890	36890	36890	32790	32790	12300	43710	43710	43710	43710	43710	43710	39340	39340	39340
			IPM	32	32	32	32	26	26	26	26	21	21	6	41	41	41	41	41	41	34	34	34
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	39.2		SFM	70	70	70	70	60	60	60	60	55	55	20	120	120	120	120	120	120	105	105	105
			IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0002	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004
			RPM	32790	32790	32790	32790	29510	29510	29510	29510	26230	26230	9840	38250	38250	38250	38250	38250	38250	34430	34430	34430
			IPM	26	26	26	26	21	21	21	21	17	17	5	36	36	36	36	36	36	30	30	30
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	39.3		SFM	70	70	70	70	60	60	60	60	55	55	20	100	100	100	100	100	100	90	90	90
			IPT	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
			RPM	32790	32790	32790	32790	29510	29510	29510	29510	26230	26230	9840	32790	32790	32790	32790	32790	32790	29510	29510	29510
			IPM	23	23	23	23	19	19	19	19	14	14	4	28	28	28	28	28	28	23	23	23
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0001	.0001	.0001	.0001	.0001	.0001
	40	Chilled Cast Iron	SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
			RPM	49180	49180	49180	49180	44260	44260	44260	44260	39340	39340	14750	49180	49180	49180	49180	49180	49180	44260	44260	44260
			IPM	43	43	43	43	35	35	35	35	28	28	8	54	54	54	54	54	54	45	45	45
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
	41	Hardened Cast Iron	SFM	95	95	95	95	85	85	85	85	75	75	30	135	135	135	135	135	135	120	120	120
			IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0002	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005
			RPM	45900	45900	45900	45900	41310	41310	41310	41310	36720	36720	13770	43710	43710	43710	43710	43710	43710	39340	39340	39340
			IPM	36	36	36	36	29	29	29	29	23	23	6	45	45	45	45	45	45	37	37	37
			Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002

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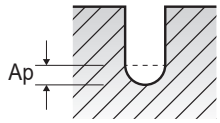
HPI91, HPI92, HPK10 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5
			LBS	2.5	3	3.5	4	5	7	0.5	0.8	1	1.5	2	2.5	3	3.5	4	4.5	5	6	7	1	1.25	1.5
P	5	SFM	135	135	120	120	90	45	220	220	220	220	220	200	200	200	200	175	175	175	130	270	270	270
		IPT	.0006	.0006	.0005	.0005	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0009	.0009	.0009
		RPM	44260	44260	39340	39340	29510	14750	53280	53280	53280	53280	53280	47950	47950	47950	47950	42620	42620	42620	31970	52460	52460	52460
		IPM	49	49	37	37	26	10	80	80	80	80	80	64	64	64	64	50	50	50	33	99	99	99
		Ap	.0002	.0002	.0002	.0002	.0001	.0001	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004
	8	SFM	135	135	120	120	90	45	220	220	220	220	220	200	200	200	200	175	175	175	130	270	270	270
		IPT	.0006	.0006	.0005	.0005	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0009	.0009	.0009
		RPM	44260	44260	39340	39340	29510	14750	53280	53280	53280	53280	53280	47950	47950	47950	47950	42620	42620	42620	31970	52460	52460	52460
		IPM	49	49	37	37	26	10	80	80	80	80	80	64	64	64	64	50	50	50	33	99	99	99
		Ap	.0002	.0002	.0002	.0002	.0001	.0001	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004
	9	SFM	135	135	120	120	90	45	220	220	220	220	220	200	200	200	200	175	175	175	130	270	270	270
		IPT	.0006	.0006	.0005	.0005	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0009	.0009	.0009
		RPM	44260	44260	39340	39340	29510	14750	53280	53280	53280	53280	53280	47950	47950	47950	47950	42620	42620	42620	31970	52460	52460	52460
		IPM	49	49	37	37	26	10	80	80	80	80	80	64	64	64	64	50	50	50	33	99	99	99
		Ap	.0002	.0002	.0002	.0002	.0001	.0001	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004
	11.1	SFM	135	135	120	120	90	45	220	220	220	220	220	200	200	200	200	175	175	175	130	270	270	270
		IPT	.0006	.0006	.0005	.0005	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0009	.0009	.0009
		RPM	44260	44260	39340	39340	29510	14750	53280	53280	53280	53280	53280	47950	47950	47950	47950	42620	42620	42620	31970	52460	52460	52460
		IPM	49	49	37	37	26	10	80	80	80	80	80	64	64	64	64	50	50	50	33	99	99	99
		Ap	.0002	.0002	.0002	.0002	.0001	.0001	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004
	11.2	SFM	135	135	120	120	90	45	220	220	220	220	220	200	200	200	200	175	175	175	130	270	270	270
		IPT	.0005	.0005	.0004	.0004	.0004	.0003	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0008	.0008	.0008
		RPM	44260	44260	39340	39340	29510	14750	53280	53280	53280	53280	53280	47950	47950	47950	47950	42620	42620	42620	31970	52460	52460	52460
		IPM	45	45	34	34	23	9	71	71	71	71	71	57	57	57	57	47	47	47	30	87	87	87
		Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
H	38.1	SFM	135	135	120	120	90	45	220	220	220	220	220	200	200	200	200	175	175	175	130	270	270	270
		IPT	.0005	.0005	.0004	.0004	.0004	.0003	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0008	.0008	.0008
		RPM	44260	44260	39340	39340	29510	14750	53280	53280	53280	53280	53280	47950	47950	47950	47950	42620	42620	42620	31970	52460	52460	52460
		IPM	45	45	34	34	23	9	71	71	71	71	71	57	57	57	57	47	47	47	30	87	87	87
		Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
	38.2	SFM	120	120	110	110	80	40	185	185	185	185	185	165	165	165	165	150	150	150	110	235	235	235
		IPT	.0005	.0005	.0004	.0004	.0004	.0003	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0008	.0008	.0008
		RPM	39340	39340	34970	34970	26230	13110	45080	45080	45080	45080	45080	40570	40570	40570	40570	36070	36070	36070	27050	45900	45900	45900
		IPM	37	37	28	28	19	8	60	60	60	60	60	48	48	48	48	40	40	40	26	76	76	76
		Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
	39.1	SFM	120	120	110	110	80	40	170	170	170	170	170	150	150	150	150	135	135	135	100	220	220	220
		IPT	.0004	.0004	.0004	.0004	.0003	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0004	.0007	.0007	.0007
		RPM	39340	39340	34970	34970	26230	13110	40980	40980	40980	40980	40980	36890	36890	36890	36890	32790	32790	32790	24590	42620	42620	42620
		IPM	34	34	28	28	17	7	48	48	48	48	48	41	41	41	41	31	31	31	21	64	64	64
		Ap	.0001	.0001	.0001	.0001	.0001	.0000	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
	39.2	SFM	105	105	95	95	70	35	150	150	150	150	150	135	135	135	135	120	120	120	90	185	185	185
		IPT	.0004	.0004	.0004	.0004	.0003	.0003	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0004	.0007	.0007	.0007
		RPM	34430	34430	30600	30600	22950	11480	36880	36880	36880	36880	36880	33200	33200	33200	33200	29510	29510	29510	22130	36060	36060	36060
		IPM	30	30	24	24	14	6	44	44	44	44	44	37	37	37	37	28	28	28	19	54	54	54
		Ap	.0001	.0001	.0001	.0001	.0001	.0000	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
	39.3	SFM	90	90	80	80	60	30	135	135	135	135	135	120	120	120	120	110	110	110	80	170	170	170
		IPT	.0004	.0004	.0004	.0004	.0003	.0003	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0007	.0007	.0007
		RPM	29510	29510	26230	26230	19670	9840	32790	32790	32790	32790	32790	29510	29510	29510	29510	26230	26230	26230	19670	32790	32790	32790
		IPM	23	23	19	19	12	5	36	36	36	36	36	30	30	30	30	23	23	23	15	44	44	44
		Ap	.0001	.0001	.0001	.0001	.0001	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0001	.0001	.0001	.0003	.0003	.0003
	40	SFM	135	135	120	120	90	45	220	220	220	220	220	200	200	200	200	175	175	175	130	270	270	270
		IPT	.0005	.0005	.0004	.0004	.0004	.0003	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0008	.0008	.0008
		RPM	44260	44260	39340	39340	29510	14750	53280	53280	53280	53280	53280	47950	47950	47950	47950	42620	42620	42620	31970	52460	52460	52460
		IPM	45	45	34	34	23	9	71	71	71	71	71	57	57	57	57	47	47	47	30	87	87	87
		Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
	41	SFM	120	120	110	110	80	40	185	185	185	185	185	165	165	165	165	150	150	150	110	235	235	235
		IPT	.0005	.0005	.0004	.0004	.0004	.0003	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0008	.0008	.0008
		RPM	39340	39340	34970	34970	26230	13110	45080	45080	45080	45080	45080	40570	40570	40570	40570	36070	36070	36070	27050	45900	45900	45900
		IPM	37	37	28	28	19	8	60	60	60	60	60	48	48	48	48	40	40	40	26	76	76	76
		Ap	.0001	.0001	.0001	.0001	.0001	.0001	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003

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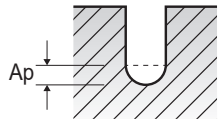
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																						
			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
			LBS	2	2.5	3	3.5	4	4.5	5	5.5	6	8	10	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
P	5	SFM	270	270	245	245	245	245	245	215	215	160	160	320	320	320	320	320	290	290	290	290	290	290	
		IPT	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0007	.0007	.0007	.0007	.0011	.0011	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0010	.0010	
		RPM	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	51910	51910	51910	51910	51910	46720	46720	46720	46720	46720	46720	
		IPM	99	99	82	82	82	82	82	63	63	42	42	119	119	119	119	119	96	96	96	96	96	96	
		Ap	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	
	8	SFM	270	270	245	245	245	245	245	215	215	160	160	320	320	320	320	320	290	290	290	290	290	290	
		IPT	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0007	.0007	.0007	.0007	.0011	.0011	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0010	.0010	
		RPM	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	51910	51910	51910	51910	51910	46720	46720	46720	46720	46720	46720	
		IPM	99	99	82	82	82	82	82	63	63	42	42	119	119	119	119	119	96	96	96	96	96	96	
		Ap	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	
	9	SFM	270	270	245	245	245	245	245	215	215	160	160	320	320	320	320	320	290	290	290	290	290	290	
		IPT	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0007	.0007	.0007	.0007	.0011	.0011	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0010	.0010	
		RPM	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	51910	51910	51910	51910	51910	46720	46720	46720	46720	46720	46720	
		IPM	99	99	82	82	82	82	82	63	63	42	42	119	119	119	119	119	96	96	96	96	96	96	
		Ap	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	
	11.1	SFM	270	270	245	245	245	245	245	215	215	160	160	320	320	320	320	320	290	290	290	290	290	290	
		IPT	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0007	.0007	.0007	.0007	.0011	.0011	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0010	.0010	
		RPM	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	51910	51910	51910	51910	51910	46720	46720	46720	46720	46720	46720	
		IPM	99	99	82	82	82	82	82	63	63	42	42	119	119	119	119	119	96	96	96	96	96	96	
		Ap	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	
	11.2	SFM	270	270	245	245	245	245	245	215	215	160	160	320	320	320	320	320	290	290	290	290	290	290	
		IPT	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0009	.0009	
		RPM	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	51910	51910	51910	51910	51910	46720	46720	46720	46720	46720	46720	
		IPM	87	87	71	71	71	71	71	56	56	37	37	102	102	102	102	102	85	85	85	85	85	85	
		Ap	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	
H	38.1	SFM	270	270	245	245	245	245	245	215	215	160	160	320	320	320	320	320	290	290	290	290	290	290	
		IPT	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0009	.0009	
		RPM	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	51910	51910	51910	51910	51910	46720	46720	46720	46720	46720	46720	
		IPM	87	87	71	71	71	71	71	56	56	37	37	102	102	102	102	102	85	85	85	85	85	85	
		Ap	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	
	38.2	SFM	235	235	215	215	215	215	215	190	190	140	140	285	285	285	285	285	260	260	260	260	260	260	
		IPT	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	
		RPM	45900	45900	41310	41310	41310	41310	41310	36720	36720	27540	27540	46450	46450	46450	46450	46450	41800	41800	41800	41800	41800	41800	
		IPM	76	76	62	62	62	62	62	49	49	33	33	88	88	88	88	88	72	72	72	72	72	72	
		Ap	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	
	39.1	SFM	220	220	200	200	200	200	200	175	175	130	130	255	255	255	255	255	230	230	230	230	230	230	
		IPT	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0005	.0005	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0008	
		RPM	42620	42620	38360	38360	38360	38360	38360	34100	34100	25570	25570	40980	40980	40980	40980	40980	36890	36890	36890	36890	36890	36890	
		IPM	64	64	51	51	51	51	51	40	40	26	26	74	74	74	74	74	61	61	61	61	61	61	
		Ap	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	
	39.2	SFM	185	185	165	165	165	165	165	150	150	110	110	220	220	220	220	220	200	200	200	200	200	200	
		IPT	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0005	.0005	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0008	
		RPM	36060	36060	32460	32460	32460	32460	32460	28850	28850	21640	21640	35520	35520	35520	35520	35520	31970	31970	31970	31970	31970	31970	
		IPM	54	54	43	43	43	43	43	34	34	22	22	64	64	64	64	64	53	53	53	53	53	53	
		Ap	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	
	39.3	SFM	170	170	150	150	150	150	150	135	135	100	100	205	205	205	205	205	180	180	180	180	180	180	
		IPT	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0008	
		RPM	32790	32790	29510	29510	29510	29510	29510	26230	26230	19670	19670	32790	32790	32790	32790	32790	29510	29510	29510	29510	29510	29510	
		IPM	44	44	35	35	35	35	35	29	29	19	19	57	57	57	57	57	46	46	46	46	46	46	
		Ap	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	
	40	SFM	270	270	245	245	245	245	245	215	215	160	160	320	320	320	320	320	290	290	290	290	290	290	
		IPT	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0009	.0009	
		RPM	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	51910	51910	51910	51910	51910	46720	46720	46720	46720	46720	46720	
		IPM	87	87	71	71	71	71	71	56	56	37	37	102	102	102	102	102	85	85	85	85	85	85	
		Ap	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	
	41	SFM	235	235	215	215	215	215	215	190	190	140	140	285	285	285	285	285	260	260	260	260	260	260	
		IPT	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	
		RPM	45900	45900	41310	41310	41310	41310	41310	36720	36720	27540	27540	46450	46450	46450	46450	46450	41800	41800	41800	41800	41800	41800	
		IPM	76	76	62	62	62	62	62	49	49	33	33	88	88	88	88	88	72	72	72	72	72	72	
		Ap	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	

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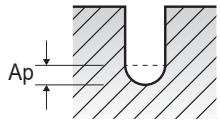
HPI91, HPI92, HPK10 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9
		LBS	7	8	9	10	12	2	4	6	8	2	3	4	5	6	7	8	10	12	2	4	6	8
P	5	SFM	255	255	255	195	195	375	335	335	300	420	420	420	380	380	380	380	340	340	475	475	430	430
		IPT	.0009	.0009	.0009	.0008	.0008	.0011	.0010	.0010	.0009	.0015	.0015	.0015	.0014	.0014	.0014	.0014	.0012	.0012	.0015	.0015	.0014	.0014
		RPM	41530	41530	41530	31150	31150	51910	46720	46720	41530	51230	51230	51230	46110	46110	46110	46110	40980	40980	51230	51230	46110	46110
		IPM	75	75	75	49	49	119	96	96	75	157	157	157	127	127	127	127	100	100	157	157	127	127
		Ap	.0003	.0003	.0003	.0002	.0002	.0006	.0004	.0004	.0004	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0004	.0004	.0007	.0006	.0006	.0005
	8	SFM	255	255	255	195	195	375	335	335	300	420	420	420	380	380	380	380	340	340	475	475	430	430
		IPT	.0009	.0009	.0009	.0008	.0008	.0011	.0010	.0010	.0009	.0015	.0015	.0015	.0014	.0014	.0014	.0014	.0012	.0012	.0015	.0015	.0014	.0014
		RPM	41530	41530	41530	31150	31150	51910	46720	46720	41530	51230	51230	51230	46110	46110	46110	46110	40980	40980	51230	51230	46110	46110
		IPM	75	75	75	49	49	119	96	96	75	157	157	157	127	127	127	127	100	100	157	157	127	127
		Ap	.0003	.0003	.0003	.0002	.0002	.0006	.0004	.0004	.0004	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0004	.0004	.0007	.0006	.0006	.0005
	9	SFM	255	255	255	195	195	375	335	335	300	420	420	420	380	380	380	380	340	340	475	475	430	430
		IPT	.0009	.0009	.0009	.0008	.0008	.0011	.0010	.0010	.0009	.0015	.0015	.0015	.0014	.0014	.0014	.0014	.0012	.0012	.0015	.0015	.0014	.0014
		RPM	41530	41530	41530	31150	31150	51910	46720	46720	41530	51230	51230	51230	46110	46110	46110	46110	40980	40980	51230	51230	46110	46110
		IPM	75	75	75	49	49	119	96	96	75	157	157	157	127	127	127	127	100	100	157	157	127	127
		Ap	.0003	.0003	.0003	.0002	.0002	.0006	.0004	.0004	.0004	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0004	.0004	.0007	.0006	.0006	.0005
	11.1	SFM	255	255	255	195	195	375	335	335	300	420	420	420	380	380	380	380	340	340	475	475	430	430
		IPT	.0009	.0009	.0009	.0008	.0008	.0011	.0010	.0010	.0009	.0015	.0015	.0015	.0014	.0014	.0014	.0014	.0012	.0012	.0015	.0015	.0014	.0014
		RPM	41530	41530	41530	31150	31150	51910	46720	46720	41530	51230	51230	51230	46110	46110	46110	46110	40980	40980	51230	51230	46110	46110
		IPM	75	75	75	49	49	119	96	96	75	157	157	157	127	127	127	127	100	100	157	157	127	127
		Ap	.0003	.0003	.0003	.0002	.0002	.0006	.0004	.0004	.0004	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0004	.0004	.0007	.0006	.0006	.0005
	11.2	SFM	255	255	255	195	195	375	335	335	300	420	420	420	380	380	380	380	340	340	475	475	430	430
		IPT	.0008	.0008	.0008	.0007	.0007	.0010	.0009	.0009	.0008	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0010	.0010	.0013	.0013	.0012	.0012
		RPM	41530	41530	41530	31150	31150	51910	46720	46720	41530	51230	51230	51230	46110	46110	46110	46110	40980	40980	51230	51230	46110	46110
		IPM	65	65	65	44	44	102	85	85	65	133	133	133	109	109	109	109	84	84	133	133	109	109
		Ap	.0003	.0003	.0003	.0002	.0002	.0005	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0005	.0005	.0004
H	38.1	SFM	255	255	255	195	195	375	335	335	300	420	420	420	380	380	380	380	340	340	475	475	430	430
		IPT	.0008	.0008	.0008	.0007	.0007	.0010	.0009	.0009	.0008	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0010	.0010	.0013	.0013	.0012	.0012
		RPM	41530	41530	41530	31150	31150	51910	46720	46720	41530	51230	51230	51230	46110	46110	46110	46110	40980	40980	51230	51230	46110	46110
		IPM	65	65	65	44	44	102	85	85	65	133	133	133	109	109	109	109	84	84	133	133	109	109
		Ap	.0003	.0003	.0003	.0002	.0002	.0005	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0005	.0005	.0004
	38.2	SFM	230	230	230	170	170	335	300	300	270	390	390	390	350	350	350	350	310	310	435	435	395	395
		IPT	.0007	.0007	.0007	.0007	.0007	.0009	.0009	.0009	.0007	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0010	.0010	.0013	.0013	.0012	.0012
		RPM	37160	37160	37160	27870	27870	46450	41800	41800	37160	47130	47130	47130	42420	42420	42420	42420	37700	37700	47130	47130	42420	42420
		IPM	56	56	56	37	37	88	72	72	56	122	122	122	100	100	100	100	77	77	122	122	100	100
		Ap	.0003	.0003	.0003	.0002	.0002	.0005	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0005	.0005	.0004
	39.1	SFM	205	205	205	150	150	295	265	265	235	340	340	340	305	305	305	305	270	270	380	380	340	340
		IPT	.0007	.0007	.0007	.0006	.0006	.0009	.0008	.0008	.0007	.0012	.0012	.0012	.0011	.0011	.0011	.0011	.0009	.0009	.0012	.0012	.0011	.0011
		RPM	32790	32790	32790	24590	24590	40980	36890	36890	32790	40980	40980	40980	36890	36890	36890	36890	32790	32790	40980	40980	36890	36890
		IPM	46	46	46	31	31	74	61	61	46	97	97	97	78	78	78	78	62	62	97	97	78	78
		Ap	.0003	.0002	.0002	.0002	.0002	.0004	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0005	.0005	.0004
	39.2	SFM	175	175	175	130	130	255	230	230	205	305	305	305	275	275	275	275	245	245	340	340	310	310
		IPT	.0007	.0007	.0007	.0006	.0006	.0009	.0008	.0008	.0007	.0012	.0012	.0012	.0011	.0011	.0011	.0011	.0009	.0009	.0012	.0012	.0011	.0011
		RPM	28420	28420	28420	21310	21310	35520	31970	31970	28420	36880	36880	36880	33200	33200	33200	33200	29510	29510	36880	36880	33200	33200
		IPM	40	40	40	27	27	64	53	53	40	87	87	87	71	71	71	71	56	56	87	87	71	71
		Ap	.0003	.0002	.0002	.0002	.0002	.0004	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0005	.0005	.0004
	39.3	SFM	160	160	160	120	120	235	215	215	190	270	270	270	245	245	245	245	215	215	305	305	275	275
		IPT	.0007	.0007	.0007	.0006	.0006	.0009	.0008	.0008	.0007	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0009	.0009	.0011	.0011	.0010	.0010
		RPM	26230	26230	26230	19670	19670	32790	29510	29510	26230	32790	32790	32790	29510	29510	29510	29510	26230	26230	32790	32790	29510	29510
		IPM	37	37	37	23	23	57	46	46	37	75	75	75	60	60	60	60	48	48	75	75	60	60
		Ap	.0002	.0002	.0002	.0002	.0002	.0004	.0003	.0003	.0003	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0005	.0004	.0004	.0003
	40	SFM	255	255	255	195	195	375	335	335	300	420	420	420	380	380	380	380	340	340	475	475	430	430
		IPT	.0008	.0008	.0008	.0007	.0007	.0010	.0009	.0009	.0008	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0010	.0010	.0013	.0013	.0012	.0012
		RPM	41530	41530	41530	31150	31150	51910	46720	46720	41530	51230	51230	51230	46110	46110	46110	46110	40980	40980	51230	51230	46110	46110
		IPM	65	65	65	44	44	102	85	85	65	133	133	133	109	109	109	109	84	84	133	133	109	109
		Ap	.0003	.0003	.0003	.0002	.0002	.0005	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0005	.0005	.0004
	41	SFM	230	230	230	170	170	335	300	300	270	390	390	390	350	350	350	350	310	310	435	435	395	395
		IPT	.0007	.0007	.0007	.0007	.0007	.0009	.0009	.0009	.0007	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0010	.0010	.0013	.0013	.0012	.0012
		RPM	37160	37160	37160	27870	27870	46450	41800	41800	37160	47130	47130	47130	42420	42420	42420	42420	37700	37700	47130	47130	42420	42420
		IPM	56	56	56	37	37	88	72	72	56	122	122	122	100	100	100	100	77	77	122	122	100	100
		Ap	.0003	.0003	.0003	.0002	.0002	.0005	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0006	.0005	.0005	.0004

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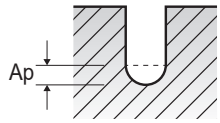
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1.2	1.2
		LBS	2	2.5	3	4	5	6	7	8	9	10	12	13	14	16	18	20	22	25	30	2.4	4	6
P	5	SFM	525	525	525	525	525	470	470	470	470	470	420	420	420	315	315	315	155	155	155	640	640	640
		IPT	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0020	.0020	.0020
		RPM	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	40650	40650	40650	30490	30490	30490	15250	15250	15250	51910	51910	51910
		IPM	192	192	192	192	192	155	155	155	155	155	122	122	122	82	82	82	35	35	35	208	208	208
		Ap	.0008	.0008	.0008	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0002	.0002	.0002	.0009	.0009	.0009
	8	SFM	525	525	525	525	525	470	470	470	470	470	420	420	420	315	315	315	155	155	155	640	640	640
		IPT	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0020	.0020	.0020
		RPM	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	40650	40650	40650	30490	30490	30490	15250	15250	15250	51910	51910	51910
		IPM	192	192	192	192	192	155	155	155	155	155	122	122	122	82	82	82	35	35	35	208	208	208
		Ap	.0008	.0008	.0008	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0002	.0002	.0002	.0009	.0009	.0009
	9	SFM	525	525	525	525	525	470	470	470	470	470	420	420	420	315	315	315	155	155	155	640	640	640
		IPT	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0020	.0020	.0020
		RPM	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	40650	40650	40650	30490	30490	30490	15250	15250	15250	51910	51910	51910
		IPM	192	192	192	192	192	155	155	155	155	155	122	122	122	82	82	82	35	35	35	208	208	208
		Ap	.0008	.0008	.0008	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0002	.0002	.0002	.0009	.0009	.0009
	11.1	SFM	525	525	525	525	525	470	470	470	470	470	420	420	420	315	315	315	155	155	155	640	640	640
		IPT	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0020	.0020	.0020
		RPM	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	40650	40650	40650	30490	30490	30490	15250	15250	15250	51910	51910	51910
		IPM	192	192	192	192	192	155	155	155	155	155	122	122	122	82	82	82	35	35	35	208	208	208
		Ap	.0008	.0008	.0008	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0004	.0004	.0002	.0002	.0002	.0009	.0009	.0009
	11.2	SFM	525	525	525	525	525	470	470	470	470	470	420	420	420	315	315	315	155	155	155	610	610	610
		IPT	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0010	.0010	.0010	.0018	.0018	.0018
		RPM	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	40650	40650	40650	30490	30490	30490	15250	15250	15250	49180	49180	49180
		IPM	168	168	168	168	168	137	137	137	137	137	109	109	109	70	70	70	30	30	30	174	174	174
		Ap	.0007	.0007	.0007	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0003	.0003	.0002	.0002	.0002	.0008	.0007	.0007
H	38.1	SFM	525	525	525	525	525	470	470	470	470	470	420	420	420	315	315	315	155	155	155	610	610	610
		IPT	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0010	.0010	.0010	.0018	.0018	.0018
		RPM	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	40650	40650	40650	30490	30490	30490	15250	15250	15250	49180	49180	49180
		IPM	168	168	168	168	168	137	137	137	137	137	109	109	109	70	70	70	30	30	30	174	174	174
		Ap	.0007	.0007	.0007	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0003	.0003	.0002	.0002	.0002	.0008	.0007	.0007
	38.2	SFM	475	475	475	475	475	425	425	425	425	425	380	380	380	285	285	285	140	140	140	540	540	540
		IPT	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0010	.0010	.0010	.0018	.0018	.0018
		RPM	45900	45900	45900	45900	45900	41310	41310	41310	41310	41310	36720	36720	36720	27540	27540	27540	13770	13770	13770	43710	43710	43710
		IPM	152	152	152	152	152	124	124	124	124	124	98	98	98	63	63	63	27	27	27	155	155	155
		Ap	.0007	.0007	.0007	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0003	.0003	.0002	.0002	.0002	.0008	.0007	.0007
	39.1	SFM	420	420	420	420	420	380	380	380	380	380	340	340	340	255	255	255	125	125	125	490	490	490
		IPT	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0013	.0013	.0012	.0012	.0012	.0011	.0011	.0011	.0009	.0009	.0009	.0015	.0015	.0015
		RPM	40980	40980	40980	40980	40980	36890	36890	36890	36890	36890	32790	32790	32790	24590	24590	24590	12300	12300	12300	39620	39620	39620
		IPM	123	123	123	123	123	99	99	99	99	99	77	77	77	52	52	52	22	22	22	122	122	122
		Ap	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0002	.0002	.0002	.0008	.0007	.0007
	39.2	SFM	370	370	370	370	370	335	335	335	335	335	295	295	295	225	225	225	110	110	110	440	440	440
		IPT	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0013	.0013	.0012	.0012	.0012	.0010	.0010	.0010	.0009	.0009	.0009	.0016	.0016	.0016
		RPM	36060	36060	36060	36060	36060	32460	32460	32460	32460	32460	28850	28850	28850	21640	21640	21640	10820	10820	10820	35520	35520	35520
		IPM	105	105	105	105	105	84	84	84	84	84	68	68	68	44	44	44	19	19	19	112	112	112
		Ap	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0002	.0002	.0002	.0008	.0007	.0007
	39.3	SFM	370	370	370	370	370	335	335	335	335	335	295	295	295	225	225	225	110	110	110	390	390	390
		IPT	.0013	.0013	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0012	.0010	.0010	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0015	.0015	.0015
		RPM	36060	36060	36060	36060	36060	32460	32460	32460	32460	32460	28850	28850	28850	21640	21640	21640	10820	10820	10820	31420	31420	31420
		IPM	94	94	94	94	94	77	77	77	77	77	59	59	59	39	39	39	17	17	17	94	94	94
		Ap	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0001	.0001	.0001	.0006	.0006	.0006
	40	SFM	525	525	525	525	525	470	470	470	470	470	420	420	420	315	315	315	155	155	155	610	610	610
		IPT	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0010	.0010	.0010	.0018	.0018	.0018
		RPM	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	40650	40650	40650	30490	30490	30490	15250	15250	15250	49180	49180	49180
		IPM	168	168	168	168	168	137	137	137	137	137	109	109	109	70	70	70	30	30	30	174	174	174
		Ap	.0007	.0007	.0007	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0003	.0003	.0002	.0002	.0002	.0008	.0007	.0007
	41	SFM	475	475	475	475	475	425	425	425	425	425	380	380	380	285	285	285	140	140	140	540	540	540
		IPT	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0011	.0011	.0011	.0010	.0010	.0010	.0018	.0018	.0018
		RPM	45900	45900	45900	45900	45900	41310	41310	41310	41310	41310	36720	36720	36720	27540	27540	27540	13770	13770	13770	43710	43710	43710
		IPM	152	152	152	152	152	124	124	124	124	124	98	98	98	63	63	63	27	27	27	155	155	155
		Ap	.0007	.0007	.0007	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0003	.0003	.0002	.0002	.0002	.0008	.0007	.0007

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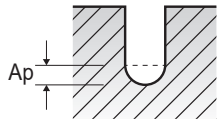
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			1.2	1.2	1.2	1.2	1.2	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
			LBS	8	10	12	14	16	8	12	16	3	3.75	3.8	4	6	8	10	12	14	15	16	18	20	22
P	5	SFM		580	580	580	515	515	645	645	575	795	795	795	795	795	715	715	715	715	715	635	635	635	635
		IPT		.0018	.0018	.0018	.0016	.0016	.0019	.0019	.0017	.0021	.0021	.0021	.0021	.0021	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017
		RPM		46720	46720	46720	41530	41530	44810	44810	39830	51370	51370	51370	51370	51370	46230	46230	46230	46230	46230	41090	41090	41090	41090
		IPM		169	169	169	134	134	169	169	132	218	218	218	218	218	178	178	178	178	178	139	139	139	139
		Ap		.0008	.0007	.0007	.0007	.0006	.0009	.0008	.0008	.0012	.0012	.0012	.0012	.0011	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0008
	8	SFM		580	580	580	515	515	645	645	575	795	795	795	795	795	715	715	715	715	715	635	635	635	635
		IPT		.0018	.0018	.0018	.0016	.0016	.0019	.0019	.0017	.0021	.0021	.0021	.0021	.0021	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017
		RPM		46720	46720	46720	41530	41530	44810	44810	39830	51370	51370	51370	51370	51370	46230	46230	46230	46230	46230	41090	41090	41090	41090
		IPM		169	169	169	134	134	169	169	132	218	218	218	218	218	178	178	178	178	178	139	139	139	139
		Ap		.0008	.0007	.0007	.0007	.0006	.0009	.0008	.0008	.0012	.0012	.0012	.0012	.0011	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0008
	9	SFM		580	580	580	515	515	645	645	575	795	795	795	795	795	715	715	715	715	715	635	635	635	635
		IPT		.0018	.0018	.0018	.0016	.0016	.0019	.0019	.0017	.0021	.0021	.0021	.0021	.0021	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017
		RPM		46720	46720	46720	41530	41530	44810	44810	39830	51370	51370	51370	51370	51370	46230	46230	46230	46230	46230	41090	41090	41090	41090
		IPM		169	169	169	134	134	169	169	132	218	218	218	218	218	178	178	178	178	178	139	139	139	139
		Ap		.0008	.0007	.0007	.0007	.0006	.0009	.0008	.0008	.0012	.0012	.0012	.0012	.0011	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0008
	11.1	SFM		580	580	580	515	515	645	645	575	795	795	795	795	795	715	715	715	715	715	635	635	635	635
		IPT		.0018	.0018	.0018	.0016	.0016	.0019	.0019	.0017	.0021	.0021	.0021	.0021	.0021	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017
		RPM		46720	46720	46720	41530	41530	44810	44810	39830	51370	51370	51370	51370	51370	46230	46230	46230	46230	46230	41090	41090	41090	41090
		IPM		169	169	169	134	134	169	169	132	218	218	218	218	218	178	178	178	178	178	139	139	139	139
		Ap		.0008	.0007	.0007	.0007	.0006	.0009	.0008	.0008	.0012	.0012	.0012	.0012	.0011	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0008
	11.2	SFM		545	545	545	485	485	620	620	550	760	760	760	760	760	685	685	685	685	685	610	610	610	610
		IPT		.0016	.0016	.0016	.0014	.0014	.0016	.0016	.0014	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015
		RPM		44260	44260	44260	39340	39340	42970	42970	38200	49180	49180	49180	49180	49180	44260	44260	44260	44260	44260	39340	39340	39340	39340
		IPM		141	141	141	112	112	140	140	111	182	182	182	182	182	146	146	146	146	146	118	118	118	118
		Ap		.0006	.0006	.0006	.0006	.0005	.0007	.0007	.0007	.0010	.0010	.0010	.0010	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007
H	38.1	SFM		545	545	545	485	485	620	620	550	760	760	760	760	760	685	685	685	685	685	610	610	610	610
		IPT		.0016	.0016	.0016	.0014	.0014	.0016	.0016	.0014	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015
		RPM		44260	44260	44260	39340	39340	42970	42970	38200	49180	49180	49180	49180	49180	44260	44260	44260	44260	44260	39340	39340	39340	39340
		IPM		141	141	141	112	112	140	140	111	182	182	182	182	182	146	146	146	146	146	118	118	118	118
		Ap		.0006	.0006	.0006	.0006	.0005	.0007	.0007	.0007	.0010	.0010	.0010	.0010	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007
	38.2	SFM		485	485	485	430	430	565	565	500	695	695	695	695	695	625	625	625	625	625	555	555	555	555
		IPT		.0016	.0016	.0016	.0014	.0014	.0016	.0016	.0015	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015
		RPM		39340	39340	39340	34970	34970	39080	39080	34740	44810	44810	44810	44810	44810	40330	40330	40330	40330	40330	35850	35850	35850	35850
		IPM		127	127	127	99	99	126	126	101	166	166	166	166	166	133	133	133	133	133	107	107	107	107
		Ap		.0006	.0006	.0006	.0006	.0005	.0007	.0007	.0007	.0010	.0010	.0010	.0010	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007
	39.1	SFM		440	440	440	390	390	480	480	430	590	590	590	590	590	530	530	530	530	530	475	475	475	475
		IPT		.0014	.0014	.0014	.0012	.0012	.0015	.0015	.0013	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0013
		RPM		35650	35650	35650	31690	31690	33350	33350	29650	38250	38250	38250	38250	38250	34430	34430	34430	34430	34430	30600	30600	30600	30600
		IPM		98	98	98	77	77	97	97	77	126	126	126	126	126	103	103	103	103	103	82	82	82	82
		Ap		.0006	.0005	.0005	.0005	.0005	.0007	.0006	.0006	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0006	.0006
	39.2	SFM		395	395	395	350	350	425	425	380	525	525	525	525	525	470	470	470	470	470	420	420	420	420
		IPT		.0014	.0014	.0014	.0013	.0013	.0015	.0015	.0013	.0016	.0016	.0016	.0016	.0016	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0013
		RPM		31970	31970	31970	28420	28420	29470	29470	26190	33880	33880	33880	33880	33880	30490	30490	30490	30490	30490	27100	27100	27100	27100
		IPM		91	91	91	72	72	86	86	68	109	109	109	109	109	89	89	89	89	89	70	70	70	70
		Ap		.0006	.0005	.0005	.0005	.0005	.0007	.0006	.0006	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0006	.0006
	39.3	SFM		350	350	350	310	310	385	385	340	475	475	475	475	475	425	425	425	425	425	380	380	380	380
		IPT		.0013	.0013	.0013	.0012	.0012	.0014	.0014	.0012	.0015	.0015	.0015	.0015	.0015	.0014	.0014	.0014	.0014	.0014	.0012	.0012	.0012	.0012
		RPM		28280	28280	28280	25140	25140	26600	26600	23650	30600	30600	30600	30600	30600	27540	27540	27540	27540	27540	24480	24480	24480	24480
		IPM		76	76	76	59	59	73	73	58	94	94	94	94	94	76	76	76	76	76	60	60	60	60
		Ap		.0005	.0004	.0004	.0004	.0004	.0006	.0005	.0005	.0008	.0008	.0008	.0008	.0007	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005
	40	SFM		545	545	545	485	485	620	620	550	760	760	760	760	760	685	685	685	685	685	610	610	610	610
		IPT		.0016	.0016	.0016	.0014	.0014	.0016	.0016	.0014	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015
		RPM		44260	44260	44260	39340	39340	42970	42970	38200	49180	49180	49180	49180	49180	44260	44260	44260	44260	44260	39340	39340	39340	39340
		IPM		141	141	141	112	112	140	140	111	182	182	182	182	182	146	146	146	146	146	118	118	118	118
		Ap		.0006	.0006	.0006	.0006	.0005	.0007	.0007	.0007	.0010	.0010	.0010	.0010	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007
	41	SFM		485	485	485	430	430	565	565	500	695	695	695	695	695	625	625	625	625	625	555	555	555	555
		IPT		.0016	.0016	.0016	.0014	.0014	.0016	.0016	.0015	.0019	.0019	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015
		RPM		39340	39340	39340	34970	34970	39080	39080	34740	44810	44810	44810	44810	44810	40330	40330	40330	40330	40330	35850	35850	35850	35850
		IPM		127	127	127	99	99	126	126	101	166	166	166	166	166	133	133	133	133	133	107	107	107	107
		Ap		.0006	.0006	.0006	.0006	.0005	.0007	.0007	.0007	.0010	.0010	.0010	.0010	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007

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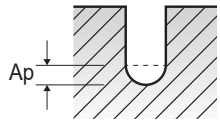
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			1.5	1.5	1.6	1.6	1.6	1.6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
		LBS	25	30	8	12	16	20	3	4	5	6	8	10	12	13	14	16	18	20	22	25	30	35
P	5	SFM	475	475	845	760	760	675	1050	1050	1050	1050	1050	1050	945	945	945	945	945	945	840	840	840	630
		IPT	.0015	.0015	.0022	.0020	.0020	.0017	.0022	.0022	.0022	.0022	.0022	.0022	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016
		RPM	30820	30820	51230	46110	46110	40980	50820	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	45740	40650	40650	40650	30490
		IPM	92	92	222	182	182	142	228	228	228	228	228	228	184	184	184	184	184	184	147	147	147	96
		Ap	.0006	.0006	.0011	.0010	.0009	.0009	.0016	.0016	.0016	.0016	.0014	.0014	.0013	.0013	.0013	.0013	.0011	.0011	.0011	.0011	.0010	.0008
	8	SFM	475	475	845	760	760	675	1050	1050	1050	1050	1050	1050	945	945	945	945	945	945	840	840	840	630
		IPT	.0015	.0015	.0022	.0020	.0020	.0017	.0022	.0022	.0022	.0022	.0022	.0022	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016
		RPM	30820	30820	51230	46110	46110	40980	50820	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	45740	40650	40650	40650	30490
		IPM	92	92	222	182	182	142	228	228	228	228	228	228	184	184	184	184	184	184	147	147	147	96
		Ap	.0006	.0006	.0011	.0010	.0009	.0009	.0016	.0016	.0016	.0016	.0014	.0014	.0013	.0013	.0013	.0013	.0011	.0011	.0011	.0011	.0010	.0008
	9	SFM	475	475	845	760	760	675	1050	1050	1050	1050	1050	1050	945	945	945	945	945	945	840	840	840	630
		IPT	.0015	.0015	.0022	.0020	.0020	.0017	.0022	.0022	.0022	.0022	.0022	.0022	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016
		RPM	30820	30820	51230	46110	46110	40980	50820	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	45740	40650	40650	40650	30490
		IPM	92	92	222	182	182	142	228	228	228	228	228	228	184	184	184	184	184	184	147	147	147	96
		Ap	.0006	.0006	.0011	.0010	.0009	.0009	.0016	.0016	.0016	.0016	.0014	.0014	.0013	.0013	.0013	.0013	.0011	.0011	.0011	.0011	.0010	.0008
	11.1	SFM	475	475	845	760	760	675	1050	1050	1050	1050	1050	1050	945	945	945	945	945	945	840	840	840	630
		IPT	.0015	.0015	.0022	.0020	.0020	.0017	.0022	.0022	.0022	.0022	.0022	.0022	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016
		RPM	30820	30820	51230	46110	46110	40980	50820	50820	50820	50820	50820	50820	45740	45740	45740	45740	45740	45740	40650	40650	40650	30490
		IPM	92	92	222	182	182	142	228	228	228	228	228	228	184	184	184	184	184	184	147	147	147	96
		Ap	.0006	.0006	.0011	.0010	.0009	.0009	.0016	.0016	.0016	.0016	.0014	.0014	.0013	.0013	.0013	.0013	.0011	.0011	.0011	.0011	.0010	.0008
	11.2	SFM	455	455	810	730	730	650	1015	1015	1015	1015	1015	1015	910	910	910	910	910	910	810	810	810	610
		IPT	.0013	.0013	.0019	.0017	.0017	.0015	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	29510	29510	49180	44260	44260	39340	49180	49180	49180	49180	49180	49180	44260	44260	44260	44260	44260	44260	39340	39340	39340	29510
		IPM	77	77	186	150	150	118	194	194	194	194	194	194	157	157	157	157	157	157	124	124	124	81
		Ap	.0005	.0005	.0010	.0009	.0007	.0007	.0013	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009	.0009	.0007
H	38.1	SFM	455	455	810	730	730	650	1015	1015	1015	1015	1015	1015	910	910	910	910	910	910	810	810	810	610
		IPT	.0013	.0013	.0019	.0017	.0017	.0015	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	29510	29510	49180	44260	44260	39340	49180	49180	49180	49180	49180	49180	44260	44260	44260	44260	44260	44260	39340	39340	39340	29510
		IPM	77	77	186	150	150	118	194	194	194	194	194	194	157	157	157	157	157	157	124	124	124	81
		Ap	.0005	.0005	.0010	.0009	.0007	.0007	.0013	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009	.0009	.0007
	38.2	SFM	415	415	735	665	665	590	845	845	845	845	845	845	760	760	760	760	760	760	675	675	675	505
		IPT	.0013	.0013	.0019	.0017	.0017	.0015	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	26880	26880	44670	40200	40200	35740	40980	40980	40980	40980	40980	40980	36890	36890	36890	36890	36890	36890	32790	32790	32790	24590
		IPM	70	70	169	136	136	107	161	161	161	161	161	161	131	131	131	131	131	131	103	103	103	68
		Ap	.0005	.0005	.0010	.0009	.0007	.0007	.0013	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009	.0009	.0007
	39.1	SFM	355	355	630	565	565	505	745	745	745	745	745	745	670	670	670	670	670	670	595	595	595	445
		IPT	.0011	.0011	.0017	.0015	.0015	.0013	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0016	.0016	.0016	.0014	.0014	.0014	.0013
		RPM	22950	22950	38110	34300	34300	30490	36060	36060	36060	36060	36060	36060	32460	32460	32460	32460	32460	32460	28850	28850	28850	21640
		IPM	52	52	129	105	105	82	128	128	128	128	128	128	105	105	105	105	105	105	82	82	82	55
		Ap	.0005	.0005	.0009	.0008	.0007	.0007	.0013	.0013	.0013	.0013	.0011	.0011	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0008	.0006
	39.2	SFM	315	315	560	500	500	445	675	675	675	675	675	675	610	610	610	610	610	610	540	540	540	405
		IPT	.0011	.0011	.0017	.0015	.0015	.0013	.0017	.0017	.0017	.0017	.0017	.0017	.0016	.0016	.0016	.0016	.0016	.0016	.0014	.0014	.0014	.0012
		RPM	20330	20330	33810	30430	30430	27050	32790	32790	32790	32790	32790	32790	29510	29510	29510	29510	29510	29510	26230	26230	26230	19670
		IPM	46	46	114	93	93	72	114	114	114	114	114	114	93	93	93	93	93	93	72	72	72	48
		Ap	.0005	.0005	.0009	.0008	.0007	.0007	.0013	.0013	.0013	.0013	.0011	.0011	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0008	.0006
	39.3	SFM	285	285	505	455	455	405	610	610	610	610	610	610	545	545	545	545	545	545	485	485	485	365
		IPT	.0011	.0011	.0015	.0014	.0014	.0012	.0016	.0016	.0016	.0016	.0016	.0016	.0014	.0014	.0014	.0014	.0014	.0014	.0013	.0013	.0013	.0011
		RPM	18360	18360	30530	27480	27480	24430	29510	29510	29510	29510	29510	29510	26560	26560	26560	26560	26560	26560	23610	23610	23610	17700
		IPM	39	39	94	76	76	60	93	93	93	93	93	93	75	75	75	75	75	75	59	59	59	39
		Ap	.0004	.0004	.0007	.0007	.0006	.0006	.0010	.0010	.0010	.0010	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0005
	40	SFM	455	455	810	730	730	650	1015	1015	1015	1015	1015	1015	910	910	910	910	910	910	810	810	810	610
		IPT	.0013	.0013	.0019	.0017	.0017	.0015	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	29510	29510	49180	44260	44260	39340	49180	49180	49180	49180	49180	49180	44260	44260	44260	44260	44260	44260	39340	39340	39340	29510
		IPM	77	77	186	150	150	118	194	194	194	194	194	194	157	157	157	157	157	157	124	124	124	81
		Ap	.0005	.0005	.0010	.0009	.0007	.0007	.0013	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009	.0009	.0007
	41	SFM	415	415	735	665	665	590	845	845	845	845	845	845	760	760	760	760	760	760	675	675	675	505
		IPT	.0013	.0013	.0019	.0017	.0017	.0015	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	26880	26880	44670	40200	40200	35740	40980	40980	40980	40980	40980	40980	36890	36890	36890	36890	36890	36890	32790	32790	32790	24590
		IPM	70	70	169	136	136	107	161	161	161	161	161	161	131	131	131	131	131	131	103	103	103	68
		Ap	.0005	.0005	.0010	.0009	.0007	.0007	.0013	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009	.0009	.0007

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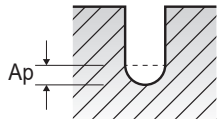
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																						
			2	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3	3	3	3	3	3	3	3	3	3	3	3
			LBS	40	50	6	6.25	8	10	15	20	25	30	35	6	7.5	8	10	12	14	15	16	20	25	30
P	5	SFM	630	315	1050	1050	1050	1050	945	945	945	840	840	1050	1050	1050	1050	1050	1050	1050	945	945	945	945
		IPT	.0016	.0013	.0029	.0029	.0029	.0029	.0026	.0026	.0026	.0023	.0023	.0036	.0036	.0036	.0036	.0036	.0036	.0036	.0032	.0032	.0032	.0032
		RPM	30490	15250	40690	40690	40690	40690	36620	36620	36620	32550	32550	33880	33880	33880	33880	33880	33880	33880	30490	30490	30490	30490
		IPM	96	41	237	237	237	237	190	190	190	151	151	243	243	243	243	243	243	243	197	197	197	197
		Ap	.0008	.0004	.0020	.0020	.0018	.0018	.0016	.0016	.0014	.0014	.0013	.0024	.0024	.0024	.0021	.0021	.0021	.0021	.0019	.0019	.0017	.0017
	8	SFM	630	315	1050	1050	1050	1050	945	945	945	840	840	1050	1050	1050	1050	1050	1050	1050	945	945	945	945
		IPT	.0016	.0013	.0029	.0029	.0029	.0029	.0026	.0026	.0026	.0023	.0023	.0036	.0036	.0036	.0036	.0036	.0036	.0036	.0032	.0032	.0032	.0032
		RPM	30490	15250	40690	40690	40690	40690	36620	36620	36620	32550	32550	33880	33880	33880	33880	33880	33880	33880	30490	30490	30490	30490
		IPM	96	41	237	237	237	237	190	190	190	151	151	243	243	243	243	243	243	243	197	197	197	197
		Ap	.0008	.0004	.0020	.0020	.0018	.0018	.0016	.0016	.0014	.0014	.0013	.0024	.0024	.0024	.0021	.0021	.0021	.0021	.0019	.0019	.0017	.0017
	9	SFM	630	315	1050	1050	1050	1050	945	945	945	840	840	1050	1050	1050	1050	1050	1050	1050	945	945	945	945
		IPT	.0016	.0013	.0029	.0029	.0029	.0029	.0026	.0026	.0026	.0023	.0023	.0036	.0036	.0036	.0036	.0036	.0036	.0036	.0032	.0032	.0032	.0032
		RPM	30490	15250	40690	40690	40690	40690	36620	36620	36620	32550	32550	33880	33880	33880	33880	33880	33880	33880	30490	30490	30490	30490
		IPM	96	41	237	237	237	237	190	190	190	151	151	243	243	243	243	243	243	243	197	197	197	197
		Ap	.0008	.0004	.0020	.0020	.0018	.0018	.0016	.0016	.0014	.0014	.0013	.0024	.0024	.0024	.0021	.0021	.0021	.0021	.0019	.0019	.0017	.0017
	11.1	SFM	630	315	1050	1050	1050	1050	945	945	945	840	840	1050	1050	1050	1050	1050	1050	1050	945	945	945	945
		IPT	.0016	.0013	.0029	.0029	.0029	.0029	.0026	.0026	.0026	.0023	.0023	.0036	.0036	.0036	.0036	.0036	.0036	.0036	.0032	.0032	.0032	.0032
		RPM	30490	15250	40690	40690	40690	40690	36620	36620	36620	32550	32550	33880	33880	33880	33880	33880	33880	33880	30490	30490	30490	30490
		IPM	96	41	237	237	237	237	190	190	190	151	151	243	243	243	243	243	243	243	197	197	197	197
		Ap	.0008	.0004	.0020	.0020	.0018	.0018	.0016	.0016	.0014	.0014	.0013	.0024	.0024	.0024	.0021	.0021	.0021	.0021	.0019	.0019	.0017	.0017
	11.2	SFM	610	305	1015	1015	1015	1015	910	910	910	810	810	1015	1015	1015	1015	1015	1015	1015	910	910	910	910
		IPT	.0014	.0012	.0026	.0026	.0026	.0026	.0023	.0023	.0023	.0021	.0021	.0033	.0033	.0033	.0033	.0033	.0033	.0033	.0030	.0030	.0030	.0030
		RPM	29510	14750	39300	39300	39300	39300	35370	35370	35370	31440	31440	32790	32790	32790	32790	32790	32790	32790	29510	29510	29510	29510
		IPM	81	35	204	204	204	204	164	164	164	131	131	214	214	214	214	214	214	214	174	174	174	174
		Ap	.0007	.0003	.0017	.0017	.0015	.0015	.0013	.0013	.0012	.0012	.0011	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0016	.0016	.0014	.0014
H	38.1	SFM	610	305	1015	1015	1015	1015	910	910	910	810	810	1015	1015	1015	1015	1015	1015	1015	910	910	910	910
		IPT	.0014	.0012	.0026	.0026	.0026	.0026	.0023	.0023	.0023	.0021	.0021	.0033	.0033	.0033	.0033	.0033	.0033	.0033	.0030	.0030	.0030	.0030
		RPM	29510	14750	39300	39300	39300	39300	35370	35370	35370	31440	31440	32790	32790	32790	32790	32790	32790	32790	29510	29510	29510	29510
		IPM	81	35	204	204	204	204	164	164	164	131	131	214	214	214	214	214	214	214	174	174	174	174
		Ap	.0007	.0003	.0017	.0017	.0015	.0015	.0013	.0013	.0012	.0012	.0011	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0016	.0016	.0014	.0014
	38.2	SFM	505	255	845	845	845	845	760	760	760	675	675	845	845	845	845	845	845	845	760	760	760	760
		IPT	.0014	.0012	.0025	.0025	.0025	.0025	.0022	.0022	.0022	.0020	.0020	.0030	.0030	.0030	.0030	.0030	.0030	.0030	.0027	.0027	.0027	.0027
		RPM	24590	12300	32750	32750	32750	32750	29480	29480	29480	26200	26200	27320	27320	27320	27320	27320	27320	27320	24590	24590	24590	24590
		IPM	68	29	162	162	162	162	130	130	130	103	103	161	161	161	161	161	161	161	132	132	132	132
		Ap	.0007	.0003	.0017	.0017	.0015	.0015	.0013	.0013	.0012	.0012	.0011	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0016	.0016	.0014	.0014
	39.1	SFM	445	225	745	745	745	745	670	670	670	595	595	745	745	745	745	745	745	745	670	670	670	670
		IPT	.0013	.0011	.0022	.0022	.0022	.0022	.0020	.0020	.0020	.0018	.0018	.0026	.0026	.0026	.0026	.0026	.0026	.0026	.0024	.0024	.0024	.0024
		RPM	21640	10820	28840	28840	28840	28840	25960	25960	25960	23070	23070	24040	24040	24040	24040	24040	24040	24040	21640	21640	21640	21640
		IPM	55	23	127	127	127	127	102	102	102	82	82	127	127	127	127	127	127	127	102	102	102	102
		Ap	.0006	.0003	.0016	.0016	.0014	.0014	.0013	.0013	.0011	.0011	.0010	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0015	.0015	.0013	.0013
	39.2	SFM	405	205	675	675	675	675	610	610	610	540	540	675	675	675	675	675	675	675	610	610	610	610
		IPT	.0012	.0010	.0022	.0022	.0022	.0022	.0020	.0020	.0020	.0017	.0017	.0026	.0026	.0026	.0026	.0026	.0026	.0026	.0024	.0024	.0024	.0024
		RPM	19670	9840	26270	26270	26270	26270	23640	23640	23640	21010	21010	21860	21860	21860	21860	21860	21860	21860	19670	19670	19670	19670
		IPM	48	20	114	114	114	114	93	93	93	73	73	115	115	115	115	115	115	115	93	93	93	93
		Ap	.0006	.0003	.0016	.0016	.0014	.0014	.0013	.0013	.0011	.0011	.0010	.0019	.0019	.0019	.0017	.0017	.0017	.0017	.0015	.0015	.0013	.0013
	39.3	SFM	365	180	610	610	610	610	545	545	545	485	485	610	610	610	610	610	610	610	550	550	550	550
		IPT	.0011	.0009	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016	.0016	.0024	.0024	.0024	.0024	.0024	.0024	.0024	.0022	.0022	.0022	.0022
		RPM	17700	8850	23590	23590	23590	23590	21230	21230	21230	18870	18870	19670	19670	19670	19670	19670	19670	19670	17710	17710	17710	17710
		IPM	39	17	95	95	95	95	75	75	75	59	59	94	94	94	94	94	94	94	77	77	77	77
		Ap	.0005	.0003	.0013	.0013	.0012	.0012	.0010	.0010	.0009	.0009	.0008	.0015	.0015	.0015	.0014	.0014	.0014	.0014	.0012	.0012	.0011	.0011
	40	SFM	610	305	1015	1015	1015	1015	910	910	910	810	810	1015	1015	1015	1015	1015	1015	1015	910	910	910	910
		IPT	.0014	.0012	.0026	.0026	.0026	.0026	.0023	.0023	.0023	.0021	.0021	.0033	.0033	.0033	.0033	.0033	.0033	.0033	.0030	.0030	.0030	.0030
		RPM	29510	14750	39300	39300	39300	39300	35370	35370	35370	31440	31440	32790	32790	32790	32790	32790	32790	32790	29510	29510	29510	29510
		IPM	81	35	204	204	204	204	164	164	164	131	131	214	214	214	214	214	214	214	174	174	174	174
		Ap	.0007	.0003	.0017	.0017	.0015	.0015	.0013	.0013	.0012	.0012	.0011	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0016	.0016	.0014	.0014
	41	SFM	505	255	845	845	845	845	760	760	760	675	675	845	845	845	845	845	845	845	760	760	760	760
		IPT	.0014	.0012	.0025	.0025	.0025	.0025	.0022	.0022	.0022	.0020	.0020	.0030	.0030	.0030	.0030	.0030	.0030	.0030	.0027	.0027	.0027	.0027
		RPM	24590	12300	32750	32750	32750	32750	29480	29480	29480	26200	26200	27320	27320	27320	27320	27320	27320	27320	24590	24590	24590	24590
		IPM	68	29	162	162	162	162	130	130	130	103	103	161	161	161	161	161	161	161	132	132	132	132
		Ap	.0007	.0003	.0017	.0017	.0015	.0015	.0013	.0013	.0012	.0012	.0011	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0016	.0016	.0014	.0014

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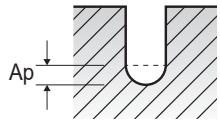
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4	4	4	4	4
		LBS	35	40	50	8.75	15	20	25	30	35	40	45	8	10	12	14	15	20	25	30	35	40	45
P	5	SFM	840	840	630	1065	1065	960	960	960	960	850	850	1065	1065	1065	1065	1065	1065	960	960	960	960	850
		IPT	.0029	.0029	.0025	.0041	.0041	.0037	.0037	.0037	.0037	.0033	.0033	.0047	.0047	.0047	.0047	.0047	.0047	.0043	.0043	.0043	.0043	.0038
		RPM	27100	27100	20330	29510	29510	26560	26560	26560	26560	23610	23610	25820	25820	25820	25820	25820	25820	23240	23240	23240	23240	20660
		IPM	156	156	102	244	244	197	197	197	197	156	156	244	244	244	244	244	244	198	198	198	198	156
		Ap	.0017	.0015	.0012	.0028	.0025	.0022	.0022	.0019	.0019	.0019	.0019	.0031	.0031	.0031	.0028	.0028	.0028	.0025	.0025	.0022	.0022	.0022
	8	SFM	840	840	630	1065	1065	960	960	960	960	850	850	1065	1065	1065	1065	1065	1065	960	960	960	960	850
		IPT	.0029	.0029	.0025	.0041	.0041	.0037	.0037	.0037	.0037	.0033	.0033	.0047	.0047	.0047	.0047	.0047	.0047	.0043	.0043	.0043	.0043	.0038
		RPM	27100	27100	20330	29510	29510	26560	26560	26560	26560	23610	23610	25820	25820	25820	25820	25820	25820	23240	23240	23240	23240	20660
		IPM	156	156	102	244	244	197	197	197	197	156	156	244	244	244	244	244	244	198	198	198	198	156
		Ap	.0017	.0015	.0012	.0028	.0025	.0022	.0022	.0019	.0019	.0019	.0019	.0031	.0031	.0031	.0028	.0028	.0028	.0025	.0025	.0022	.0022	.0022
	9	SFM	840	840	630	1065	1065	960	960	960	960	850	850	1065	1065	1065	1065	1065	1065	960	960	960	960	850
		IPT	.0029	.0029	.0025	.0041	.0041	.0037	.0037	.0037	.0037	.0033	.0033	.0047	.0047	.0047	.0047	.0047	.0047	.0043	.0043	.0043	.0043	.0038
		RPM	27100	27100	20330	29510	29510	26560	26560	26560	26560	23610	23610	25820	25820	25820	25820	25820	25820	23240	23240	23240	23240	20660
		IPM	156	156	102	244	244	197	197	197	197	156	156	244	244	244	244	244	244	198	198	198	198	156
		Ap	.0017	.0015	.0012	.0028	.0025	.0022	.0022	.0019	.0019	.0019	.0019	.0031	.0031	.0031	.0028	.0028	.0028	.0025	.0025	.0022	.0022	.0022
	11.1	SFM	840	840	630	1065	1065	960	960	960	960	850	850	1065	1065	1065	1065	1065	1065	960	960	960	960	850
		IPT	.0029	.0029	.0025	.0041	.0041	.0037	.0037	.0037	.0037	.0033	.0033	.0047	.0047	.0047	.0047	.0047	.0047	.0043	.0043	.0043	.0043	.0038
		RPM	27100	27100	20330	29510	29510	26560	26560	26560	26560	23610	23610	25820	25820	25820	25820	25820	25820	23240	23240	23240	23240	20660
		IPM	156	156	102	244	244	197	197	197	197	156	156	244	244	244	244	244	244	198	198	198	198	156
		Ap	.0017	.0015	.0012	.0028	.0025	.0022	.0022	.0019	.0019	.0019	.0019	.0031	.0031	.0031	.0028	.0028	.0028	.0025	.0025	.0022	.0022	.0022
	11.2	SFM	810	810	610	1015	1015	910	910	910	910	810	810	1015	1015	1015	1015	1015	1015	910	910	910	910	810
		IPT	.0026	.0026	.0023	.0038	.0038	.0034	.0034	.0034	.0034	.0031	.0031	.0044	.0044	.0044	.0044	.0044	.0044	.0039	.0039	.0039	.0039	.0035
		RPM	26230	26230	19670	28070	28070	25260	25260	25260	25260	22450	22450	24590	24590	24590	24590	24590	24590	22130	22130	22130	22130	19670
		IPM	136	136	90	214	214	173	173	173	173	138	138	215	215	215	215	215	215	174	174	174	174	138
		Ap	.0014	.0013	.0010	.0024	.0021	.0019	.0019	.0016	.0016	.0016	.0016	.0027	.0027	.0027	.0024	.0024	.0024	.0021	.0021	.0019	.0019	.0019
H	38.1	SFM	810	810	610	1015	1015	910	910	910	910	810	810	1015	1015	1015	1015	1015	1015	910	910	910	910	810
		IPT	.0026	.0026	.0023	.0038	.0038	.0034	.0034	.0034	.0034	.0031	.0031	.0044	.0044	.0044	.0044	.0044	.0044	.0039	.0039	.0039	.0039	.0035
		RPM	26230	26230	19670	28070	28070	25260	25260	25260	25260	22450	22450	24590	24590	24590	24590	24590	24590	22130	22130	22130	22130	19670
		IPM	136	136	90	214	214	173	173	173	173	138	138	215	215	215	215	215	215	174	174	174	174	138
		Ap	.0014	.0013	.0010	.0024	.0021	.0019	.0019	.0016	.0016	.0016	.0016	.0027	.0027	.0027	.0024	.0024	.0024	.0021	.0021	.0019	.0019	.0019
	38.2	SFM	675	675	505	845	845	760	760	760	760	675	675	845	845	845	845	845	845	760	760	760	760	675
		IPT	.0024	.0024	.0021	.0034	.0034	.0031	.0031	.0031	.0031	.0028	.0028	.0039	.0039	.0039	.0039	.0039	.0039	.0035	.0035	.0035	.0035	.0032
		RPM	21860	21860	16390	23430	23430	21090	21090	21090	21090	18750	18750	20490	20490	20490	20490	20490	20490	18440	18440	18440	18440	16390
		IPM	103	103	68	161	161	131	131	131	131	103	103	161	161	161	161	161	161	131	131	131	131	103
		Ap	.0014	.0013	.0010	.0024	.0021	.0019	.0019	.0016	.0016	.0016	.0016	.0027	.0027	.0027	.0024	.0024	.0024	.0021	.0021	.0019	.0019	.0019
	39.1	SFM	595	595	445	745	745	670	670	670	670	595	595	745	745	745	745	745	745	670	670	670	670	595
		IPT	.0021	.0021	.0018	.0031	.0031	.0028	.0028	.0028	.0028	.0025	.0025	.0035	.0035	.0035	.0035	.0035	.0035	.0032	.0032	.0032	.0032	.0028
		RPM	19230	19230	14430	20600	20600	18540	18540	18540	18540	16480	16480	18030	18030	18030	18030	18030	18030	16230	16230	16230	16230	14430
		IPM	82	82	53	128	128	104	104	104	104	82	82	128	128	128	128	128	128	104	104	104	104	82
		Ap	.0013	.0012	.0009	.0022	.0020	.0018	.0018	.0015	.0015	.0015	.0015	.0025	.0025	.0025	.0023	.0023	.0023	.0020	.0020	.0018	.0018	.0018
	39.2	SFM	540	540	405	675	675	610	610	610	610	540	540	675	675	675	675	675	675	610	610	610	610	540
		IPT	.0021	.0021	.0018	.0031	.0031	.0028	.0028	.0028	.0028	.0024	.0024	.0035	.0035	.0035	.0035	.0035	.0035	.0031	.0031	.0031	.0031	.0028
		RPM	17490	17490	13120	18750	18750	16870	16870	16870	16870	15000	15000	16390	16390	16390	16390	16390	16390	14750	14750	14750	14750	13110
		IPM	74	74	49	115	115	93	93	93	93	73	73	114	114	114	114	114	114	92	92	92	92	72
		Ap	.0013	.0012	.0009	.0022	.0020	.0018	.0018	.0015	.0015	.0015	.0015	.0025	.0025	.0025	.0023	.0023	.0023	.0020	.0020	.0018	.0018	.0018
	39.3	SFM	485	485	365	610	610	550	550	550	550	485	485	610	610	610	610	610	610	545	545	545	545	485
		IPT	.0019	.0019	.0017	.0028	.0028	.0025	.0025	.0025	.0025	.0022	.0022	.0031	.0031	.0031	.0031	.0031	.0031	.0028	.0028	.0028	.0028	.0025
		RPM	15740	15740	11800	16890	16890	15200	15200	15200	15200	13510	13510	14750	14750	14750	14750	14750	14750	13280	13280	13280	13280	11800
		IPM	61	61	40	93	93	75	75	75	75	60	60	92	92	92	92	92	92	74	74	74	74	59
		Ap	.0011	.0010	.0008	.0018	.0016	.0014	.0014	.0013	.0013	.0013	.0013	.0020	.0020	.0020	.0018	.0018	.0018	.0016	.0016	.0014	.0014	.0014
	40	SFM	810	810	610	1015	1015	910	910	910	910	810	810	1015	1015	1015	1015	1015	1015	910	910	910	910	810
		IPT	.0026	.0026	.0023	.0038	.0038	.0034	.0034	.0034	.0034	.0031	.0031	.0044	.0044	.0044	.0044	.0044	.0044	.0039	.0039	.0039	.0039	.0035
		RPM	26230	26230	19670	28070	28070	25260	25260	25260	25260	22450	22450	24590	24590	24590	24590	24590	24590	22130	22130	22130	22130	19670
		IPM	136	136	90	214	214	173	173	173	173	138	138	215	215	215	215	215	215	174	174	174	174	138
		Ap	.0014	.0013	.0010	.0024	.0021	.0019	.0019	.0016	.0016	.0016	.0016	.0027	.0027	.0027	.0024	.0024	.0024	.0021	.0021	.0019	.0019	.0019
	41	SFM	675	675	505	845	845	760	760	760	760	675	675	845	845	845	845	845	845	760	760	760	760	675
		IPT	.0024	.0024	.0021	.0034	.0034	.0031	.0031	.0031	.0031	.0028	.0028	.0039	.0039	.0039	.0039	.0039	.0039	.0035	.0035	.0035	.0035	.0032
		RPM	21860	21860	16390	23430	23430	21090	21090	21090	21090	18750	18750	20490	20490	20490	20490	20490	20490	18440	18440	18440	18440	16390
		IPM	103	103	68	161	161	131	131	131	131	103	103	161	161	161	161	161	161	131	131	131	131	103
		Ap	.0014	.0013	.0010	.0024	.0021	.0019	.0019	.0016	.0016	.0016	.0016	.0027	.0027	.0027	.0024	.0024	.0024	.0021	.0021	.0019	.0019	.0019

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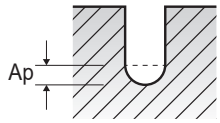
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																			
			4	4	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	7
		LBS	50	61.1	10	12	12.5	15	20	25	30	40	10	15	20	25	30	35	40	50	60	40
P	5	SFM	850	640	980	980	980	980	980	980	880	880	880	880	880	880	880	790	790	790	790	835
		IPT	.0038	.0033	.0061	.0061	.0061	.0061	.0061	.0061	.0055	.0055	.0068	.0068	.0068	.0068	.0068	.0062	.0062	.0062	.0062	.0064
		RPM	20660	15490	19020	19020	19020	19020	19020	19020	17110	17110	14210	14210	14210	14210	14210	12790	12790	12790	12790	11590
		IPM	156	102	234	234	234	234	234	234	189	189	195	195	195	195	195	158	158	158	158	148
		Ap	.0022	.0020	.0039	.0039	.0039	.0039	.0035	.0035	.0031	.0031	.0047	.0047	.0043	.0043	.0043	.0038	.0038	.0033	.0033	.0044
	8	SFM	850	640	980	980	980	980	980	980	880	880	880	880	880	880	880	790	790	790	790	835
		IPT	.0038	.0033	.0061	.0061	.0061	.0061	.0061	.0061	.0055	.0055	.0068	.0068	.0068	.0068	.0068	.0062	.0062	.0062	.0062	.0064
		RPM	20660	15490	19020	19020	19020	19020	19020	19020	17110	17110	14210	14210	14210	14210	14210	12790	12790	12790	12790	11590
		IPM	156	102	234	234	234	234	234	234	189	189	195	195	195	195	195	158	158	158	158	148
		Ap	.0022	.0020	.0039	.0039	.0039	.0039	.0035	.0035	.0031	.0031	.0047	.0047	.0043	.0043	.0043	.0038	.0038	.0033	.0033	.0044
	9	SFM	850	640	980	980	980	980	980	980	880	880	880	880	880	880	880	790	790	790	790	835
		IPT	.0038	.0033	.0061	.0061	.0061	.0061	.0061	.0061	.0055	.0055	.0068	.0068	.0068	.0068	.0068	.0062	.0062	.0062	.0062	.0064
		RPM	20660	15490	19020	19020	19020	19020	19020	19020	17110	17110	14210	14210	14210	14210	14210	12790	12790	12790	12790	11590
		IPM	156	102	234	234	234	234	234	234	189	189	195	195	195	195	195	158	158	158	158	148
		Ap	.0022	.0020	.0039	.0039	.0039	.0039	.0035	.0035	.0031	.0031	.0047	.0047	.0043	.0043	.0043	.0038	.0038	.0033	.0033	.0044
	11.1	SFM	850	640	980	980	980	980	980	980	880	880	880	880	880	880	880	790	790	790	790	835
		IPT	.0038	.0033	.0061	.0061	.0061	.0061	.0061	.0061	.0055	.0055	.0068	.0068	.0068	.0068	.0068	.0062	.0062	.0062	.0062	.0064
		RPM	20660	15490	19020	19020	19020	19020	19020	19020	17110	17110	14210	14210	14210	14210	14210	12790	12790	12790	12790	11590
		IPM	156	102	234	234	234	234	234	234	189	189	195	195	195	195	195	158	158	158	158	148
		Ap	.0022	.0020	.0039	.0039	.0039	.0039	.0035	.0035	.0031	.0031	.0047	.0047	.0043	.0043	.0043	.0038	.0038	.0033	.0033	.0044
	11.2	SFM	810	610	945	945	945	945	945	945	850	850	860	860	860	860	860	775	775	775	775	805
		IPT	.0035	.0031	.0054	.0054	.0054	.0054	.0054	.0054	.0049	.0049	.0060	.0060	.0060	.0060	.0060	.0054	.0054	.0054	.0054	.0056
		RPM	19670	14750	18360	18360	18360	18360	18360	18360	16520	16520	13930	13930	13930	13930	13930	12540	12540	12540	12540	11170
		IPM	138	91	199	199	199	199	199	199	161	161	168	168	168	168	168	136	136	136	136	126
		Ap	.0019	.0017	.0033	.0033	.0033	.0033	.0030	.0030	.0027	.0027	.0040	.0040	.0036	.0036	.0036	.0032	.0032	.0028	.0028	.0037
H	38.1	SFM	810	610	945	945	945	945	945	945	850	850	860	860	860	860	860	775	775	775	775	805
		IPT	.0035	.0031	.0054	.0054	.0054	.0054	.0054	.0054	.0049	.0049	.0060	.0060	.0060	.0060	.0060	.0054	.0054	.0054	.0054	.0056
		RPM	19670	14750	18360	18360	18360	18360	18360	18360	16520	16520	13930	13930	13930	13930	13930	12540	12540	12540	12540	11170
		IPM	138	91	199	199	199	199	199	199	161	161	168	168	168	168	168	136	136	136	136	126
		Ap	.0019	.0017	.0033	.0033	.0033	.0033	.0030	.0030	.0027	.0027	.0040	.0040	.0036	.0036	.0036	.0032	.0032	.0028	.0028	.0037
	38.2	SFM	675	505	795	795	795	795	795	795	715	715	695	695	695	695	695	625	625	625	625	655
		IPT	.0032	.0028	.0049	.0049	.0049	.0049	.0049	.0049	.0044	.0044	.0056	.0056	.0056	.0056	.0056	.0050	.0050	.0050	.0050	.0052
		RPM	16390	12300	15410	15410	15410	15410	15410	15410	13870	13870	11200	11200	11200	11200	11200	10080	10080	10080	10080	9050
		IPM	103	68	152	152	152	152	152	152	123	123	124	124	124	124	124	101	101	101	101	95
		Ap	.0019	.0017	.0033	.0033	.0033	.0033	.0030	.0030	.0027	.0027	.0040	.0040	.0036	.0036	.0036	.0032	.0032	.0028	.0028	.0037
	39.1	SFM	595	445	710	710	710	710	710	710	640	640	640	640	640	640	640	580	580	580	580	590
		IPT	.0028	.0025	.0044	.0044	.0044	.0044	.0044	.0044	.0040	.0040	.0049	.0049	.0049	.0049	.0049	.0045	.0045	.0045	.0045	.0046
		RPM	14430	10820	13770	13770	13770	13770	13770	13770	12390	12390	10380	10380	10380	10380	10380	9340	9340	9340	9340	8200
		IPM	82	54	123	123	123	123	123	123	100	100	102	102	102	102	102	83	83	83	83	76
		Ap	.0018	.0016	.0031	.0031	.0031	.0031	.0028	.0028	.0025	.0025	.0038	.0038	.0034	.0034	.0034	.0030	.0030	.0026	.0026	.0035
	39.2	SFM	540	405	610	610	610	610	610	610	545	545	560	560	560	560	560	500	500	500	500	520
		IPT	.0028	.0024	.0044	.0044	.0044	.0044	.0044	.0044	.0039	.0039	.0048	.0048	.0048	.0048	.0048	.0043	.0043	.0043	.0043	.0045
		RPM	13110	9840	11800	11800	11800	11800	11800	11800	10620	10620	9020	9020	9020	9020	9020	8120	8120	8120	8120	7190
		IPM	72	48	103	103	103	103	103	103	84	84	87	87	87	87	87	70	70	70	70	65
		Ap	.0018	.0016	.0031	.0031	.0031	.0031	.0028	.0028	.0025	.0025	.0038	.0038	.0034	.0034	.0034	.0030	.0030	.0026	.0026	.0035
	39.3	SFM	485	365	560	560	560	560	560	560	500	500	505	505	505	505	505	455	455	455	455	485
		IPT	.0025	.0022	.0039	.0039	.0039	.0039	.0039	.0039	.0035	.0035	.0043	.0043	.0043	.0043	.0043	.0039	.0039	.0039	.0039	.0040
		RPM	11800	8850	10820	10820	10820	10820	10820	10820	9740	9740	8200	8200	8200	8200	8200	7380	7380	7380	7380	6730
		IPM	59	38	85	85	85	85	85	85	69	69	70	70	70	70	70	57	57	57	57	54
		Ap	.0014	.0013	.0026	.0026	.0026	.0026	.0023	.0023	.0020	.0020	.0031	.0031	.0028	.0028	.0028	.0025	.0025	.0021	.0021	.0029
	40	SFM	810	610	945	945	945	945	945	945	850	850	860	860	860	860	860	775	775	775	775	805
		IPT	.0035	.0031	.0054	.0054	.0054	.0054	.0054	.0054	.0049	.0049	.0060	.0060	.0060	.0060	.0060	.0054	.0054	.0054	.0054	.0056
		RPM	19670	14750	18360	18360	18360	18360	18360	18360	16520	16520	13930	13930	13930	13930	13930	12540	12540	12540	12540	11170
		IPM	138	91	199	199	199	199	199	199	161	161	168	168	168	168	168	136	136	136	136	126
		Ap	.0019	.0017	.0033	.0033	.0033	.0033	.0030	.0030	.0027	.0027	.0040	.0040	.0036	.0036	.0036	.0032	.0032	.0028	.0028	.0037
	41	SFM	675	505	795	795	795	795	795	795	715	715	695	695	695	695	695	625	625	625	625	655
		IPT	.0032	.0028	.0049	.0049	.0049	.0049	.0049	.0049	.0044	.0044	.0056	.0056	.0056	.0056	.0056	.0050	.0050	.0050	.0050	.0052
		RPM	16390	12300	15410	15410	15410	15410	15410	15410	13870	13870	11200	11200	11200	11200	11200	10080	10080	10080	10080	9050
		IPM	103	68	152	152	152	152	152	152	123	123	124	124	124	124	124	101	101	101	101	95
		Ap	.0019	.0017	.0033	.0033	.0033	.0033	.0030	.0030	.0027	.0027	.0040	.0040	.0036	.0036	.0036	.0032	.0032	.0028	.0028	.0037

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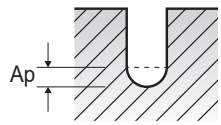
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)															
			7	7	8	8	8	8	8	8	8	8	8	8	10	10	10	10
		LBS	45	60	20	24	35	50	55	60	70	80	98	120	25	30	35	55
P	5	SFM	835	835	945	945	945	850	850	850	850	850	755	755	980	980	980	880
		IPT	.0064	.0064	.0074	.0074	.0074	.0067	.0067	.0067	.0067	.0067	.0059	.0059	.0078	.0078	.0078	.0070
		RPM	11590	11590	11480	11480	11480	10330	10330	10330	10330	10330	9180	9180	9510	9510	9510	8560
		IPM	148	148	171	171	171	138	138	138	138	138	109	109	149	149	149	121
		Ap	.0044	.0039	.0063	.0063	.0057	.0050	.0050	.0050	.0044	.0044	.0044	.0041	.0079	.0079	.0071	.0063
	8	SFM	835	835	945	945	945	850	850	850	850	850	755	755	980	980	980	880
		IPT	.0064	.0064	.0074	.0074	.0074	.0067	.0067	.0067	.0067	.0067	.0059	.0059	.0078	.0078	.0078	.0070
		RPM	11590	11590	11480	11480	11480	10330	10330	10330	10330	10330	9180	9180	9510	9510	9510	8560
		IPM	148	148	171	171	171	138	138	138	138	138	109	109	149	149	149	121
		Ap	.0044	.0039	.0063	.0063	.0057	.0050	.0050	.0050	.0044	.0044	.0044	.0041	.0079	.0079	.0071	.0063
	9	SFM	835	835	945	945	945	850	850	850	850	850	755	755	980	980	980	880
		IPT	.0064	.0064	.0074	.0074	.0074	.0067	.0067	.0067	.0067	.0067	.0059	.0059	.0078	.0078	.0078	.0070
		RPM	11590	11590	11480	11480	11480	10330	10330	10330	10330	10330	9180	9180	9510	9510	9510	8560
		IPM	148	148	171	171	171	138	138	138	138	138	109	109	149	149	149	121
		Ap	.0044	.0039	.0063	.0063	.0057	.0050	.0050	.0050	.0044	.0044	.0044	.0041	.0079	.0079	.0071	.0063
	11.1	SFM	835	835	945	945	945	850	850	850	850	850	755	755	980	980	980	880
		IPT	.0064	.0064	.0074	.0074	.0074	.0067	.0067	.0067	.0067	.0067	.0059	.0059	.0078	.0078	.0078	.0070
		RPM	11590	11590	11480	11480	11480	10330	10330	10330	10330	10330	9180	9180	9510	9510	9510	8560
		IPM	148	148	171	171	171	138	138	138	138	138	109	109	149	149	149	121
		Ap	.0044	.0039	.0063	.0063	.0057	.0050	.0050	.0050	.0044	.0044	.0044	.0041	.0079	.0079	.0071	.0063
	11.2	SFM	805	805	915	915	915	820	820	820	820	820	730	730	945	945	945	850
		IPT	.0056	.0056	.0065	.0065	.0065	.0058	.0058	.0058	.0058	.0058	.0052	.0052	.0069	.0069	.0069	.0062
		RPM	11170	11170	11070	11070	11070	9960	9960	9960	9960	9960	8850	8850	9180	9180	9180	8260
		IPM	126	126	143	143	143	116	116	116	116	116	91	91	126	126	126	102
		Ap	.0037	.0033	.0054	.0054	.0048	.0043	.0043	.0043	.0037	.0037	.0037	.0035	.0067	.0067	.0060	.0054
H	38.1	SFM	805	805	915	915	915	820	820	820	820	820	730	730	945	945	945	850
		IPT	.0056	.0056	.0065	.0065	.0065	.0058	.0058	.0058	.0058	.0058	.0052	.0052	.0069	.0069	.0069	.0062
		RPM	11170	11170	11070	11070	11070	9960	9960	9960	9960	9960	8850	8850	9180	9180	9180	8260
		IPM	126	126	143	143	143	116	116	116	116	116	91	91	126	126	126	102
		Ap	.0037	.0033	.0054	.0054	.0048	.0043	.0043	.0043	.0037	.0037	.0037	.0035	.0067	.0067	.0060	.0054
	38.2	SFM	655	655	760	760	760	685	685	685	685	685	610	610	795	795	795	715
		IPT	.0052	.0052	.0059	.0059	.0059	.0053	.0053	.0053	.0053	.0053	.0047	.0047	.0063	.0063	.0063	.0057
		RPM	9050	9050	9220	9220	9220	8300	8300	8300	8300	8300	7380	7380	7700	7700	7700	6930
		IPM	95	95	109	109	109	88	88	88	88	88	70	70	97	97	97	79
		Ap	.0037	.0033	.0054	.0054	.0048	.0043	.0043	.0043	.0037	.0037	.0037	.0035	.0067	.0067	.0060	.0054
	39.1	SFM	590	590	675	675	675	610	610	610	610	610	540	540	695	695	695	625
		IPT	.0046	.0046	.0053	.0053	.0053	.0048	.0048	.0048	.0048	.0048	.0042	.0042	.0057	.0057	.0057	.0051
		RPM	8200	8200	8200	8200	8200	7380	7380	7380	7380	7380	6560	6560	6720	6720	6720	6050
		IPM	76	76	86	86	86	70	70	70	70	70	55	55	76	76	76	62
		Ap	.0035	.0031	.0050	.0050	.0045	.0040	.0040	.0040	.0035	.0035	.0035	.0033	.0063	.0063	.0057	.0050
	39.2	SFM	520	520	590	590	590	535	535	535	535	535	475	475	610	610	610	545
		IPT	.0045	.0045	.0052	.0052	.0052	.0047	.0047	.0047	.0047	.0047	.0042	.0042	.0056	.0056	.0056	.0050
		RPM	7190	7190	7170	7170	7170	6460	6460	6460	6460	6460	5740	5740	5900	5900	5900	5310
		IPM	65	65	75	75	75	60	60	60	60	60	48	48	66	66	66	54
		Ap	.0035	.0031	.0050	.0050	.0045	.0040	.0040	.0040	.0035	.0035	.0035	.0033	.0063	.0063	.0057	.0050
	39.3	SFM	485	485	555	555	555	500	500	500	500	500	445	445	560	560	560	500
		IPT	.0040	.0040	.0047	.0047	.0047	.0042	.0042	.0042	.0042	.0042	.0037	.0037	.0051	.0051	.0051	.0046
		RPM	6730	6730	6760	6760	6760	6090	6090	6090	6090	6090	5410	5410	5410	5410	5410	4870
		IPM	54	54	63	63	63	51	51	51	51	51	40	40	55	55	55	45
		Ap	.0029	.0025	.0041	.0041	.0037	.0033	.0033	.0033	.0029	.0029	.0029	.0027	.0051	.0051	.0046	.0041
	40	SFM	805	805	915	915	915	820	820	820	820	820	730	730	945	945	945	850
		IPT	.0056	.0056	.0065	.0065	.0065	.0058	.0058	.0058	.0058	.0058	.0052	.0052	.0069	.0069	.0069	.0062
		RPM	11170	11170	11070	11070	11070	9960	9960	9960	9960	9960	8850	8850	9180	9180	9180	8260
		IPM	126	126	143	143	143	116	116	116	116	116	91	91	126	126	126	102
		Ap	.0037	.0033	.0054	.0054	.0048	.0043	.0043	.0043	.0037	.0037	.0037	.0035	.0067	.0067	.0060	.0054
	41	SFM	655	655	760	760	760	685	685	685	685	685	610	610	795	795	795	715
		IPT	.0052	.0052	.0059	.0059	.0059	.0053	.0053	.0053	.0053	.0053	.0047	.0047	.0063	.0063	.0063	.0057
		RPM	9050	9050	9220	9220	9220	8300	8300	8300	8300	8300	7380	7380	7700	7700	7700	6930
		IPM	95	95	109	109	109	88	88	88	88	88	70	70	97	97	97	79
		Ap	.0037	.0033	.0054	.0054	.0048	.0043	.0043	.0043	.0037	.0037	.0037	.0035	.0067	.0067	.0060	.0054

NEXT PAGE ▶

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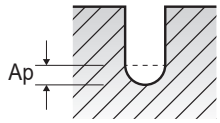
HPI91, HPI92, HPK10 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING

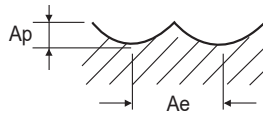


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)															
			10	10	10	10	10	12	12	12	12	12	12	14	16	18	20	25
			LBS	60	65	75	86	120	30	36	60	80	106	120	28	32	36	40	50
P	5	SFM	880	880	880	880	785	880	880	880	790	790	790	945	945	945	945	945
		IPT	.0070	.0070	.0070	.0070	.0063	.0084	.0084	.0084	.0075	.0075	.0075	.0086	.0094	.0099	.0104	.0110
		RPM	8560	8560	8560	8560	7610	7100	7100	7100	6390	6390	6390	6550	5740	5100	4590	3670
		IPM	121	121	121	121	95	119	119	119	96	96	96	113	108	101	95	81
		Ap	.0063	.0063	.0063	.0055	.0055	.0094	.0094	.0085	.0076	.0066	.0066	.0110	.0126	.0142	.0157	.0197
	8	SFM	880	880	880	880	785	880	880	880	790	790	790	945	945	945	945	945
		IPT	.0070	.0070	.0070	.0070	.0063	.0084	.0084	.0084	.0075	.0075	.0075	.0086	.0094	.0099	.0104	.0110
		RPM	8560	8560	8560	8560	7610	7100	7100	7100	6390	6390	6390	6550	5740	5100	4590	3670
		IPM	121	121	121	121	95	119	119	119	96	96	96	113	108	101	95	81
		Ap	.0063	.0063	.0063	.0055	.0055	.0094	.0094	.0085	.0076	.0066	.0066	.0110	.0126	.0142	.0157	.0197
	9	SFM	880	880	880	880	785	880	880	880	790	790	790	945	945	945	945	945
		IPT	.0070	.0070	.0070	.0070	.0063	.0084	.0084	.0084	.0075	.0075	.0075	.0086	.0094	.0099	.0104	.0110
		RPM	8560	8560	8560	8560	7610	7100	7100	7100	6390	6390	6390	6550	5740	5100	4590	3670
		IPM	121	121	121	121	95	119	119	119	96	96	96	113	108	101	95	81
		Ap	.0063	.0063	.0063	.0055	.0055	.0094	.0094	.0085	.0076	.0066	.0066	.0110	.0126	.0142	.0157	.0197
	11.1	SFM	880	880	880	880	785	880	880	880	790	790	790	945	945	945	945	945
		IPT	.0070	.0070	.0070	.0070	.0063	.0084	.0084	.0084	.0075	.0075	.0075	.0086	.0094	.0099	.0104	.0110
		RPM	8560	8560	8560	8560	7610	7100	7100	7100	6390	6390	6390	6550	5740	5100	4590	3670
		IPM	121	121	121	121	95	119	119	119	96	96	96	113	108	101	95	81
		Ap	.0063	.0063	.0063	.0055	.0055	.0094	.0094	.0085	.0076	.0066	.0066	.0110	.0126	.0142	.0157	.0197
	11.2	SFM	850	850	850	850	755	845	845	845	760	760	760	915	910	915	915	910
		IPT	.0062	.0062	.0062	.0062	.0055	.0074	.0074	.0074	.0066	.0066	.0066	.0075	.0081	.0086	.0089	.0097
		RPM	8260	8260	8260	8260	7340	6830	6830	6830	6150	6150	6150	6340	5530	4920	4430	3540
		IPM	102	102	102	102	80	101	101	101	81	81	81	95	90	84	79	69
		Ap	.0054	.0054	.0054	.0047	.0047	.0080	.0080	.0072	.0064	.0056	.0056	.0094	.0107	.0120	.0134	.0167
H	38.1	SFM	850	850	850	850	755	845	845	845	760	760	760	915	910	915	915	910
		IPT	.0062	.0062	.0062	.0062	.0055	.0074	.0074	.0074	.0066	.0066	.0066	.0075	.0081	.0086	.0089	.0097
		RPM	8260	8260	8260	8260	7340	6830	6830	6830	6150	6150	6150	6340	5530	4920	4430	3540
		IPM	102	102	102	102	80	101	101	101	81	81	81	95	90	84	79	69
		Ap	.0054	.0054	.0054	.0047	.0047	.0080	.0080	.0072	.0064	.0056	.0056	.0094	.0107	.0120	.0134	.0167
	38.2	SFM	715	715	715	715	635	710	710	710	640	640	640	745	760	760	760	760
		IPT	.0057	.0057	.0057	.0057	.0050	.0067	.0067	.0067	.0060	.0060	.0060	.0071	.0074	.0079	.0082	.0086
		RPM	6930	6930	6930	6930	6160	5740	5740	5740	5160	5160	5160	5150	4610	4100	3690	2950
		IPM	79	79	79	79	62	77	77	77	62	62	62	73	69	65	60	51
		Ap	.0054	.0054	.0054	.0047	.0047	.0080	.0080	.0072	.0064	.0056	.0056	.0094	.0107	.0120	.0134	.0167
	39.1	SFM	625	625	625	625	555	640	640	640	580	580	580	675	675	675	675	680
		IPT	.0051	.0051	.0051	.0051	.0045	.0061	.0061	.0061	.0055	.0055	.0055	.0063	.0066	.0071	.0074	.0077
		RPM	6050	6050	6050	6050	5380	5190	5190	5190	4670	4670	4670	4690	4100	3640	3280	2630
		IPM	62	62	62	62	49	63	63	63	51	51	51	59	55	52	49	41
		Ap	.0050	.0050	.0050	.0044	.0044	.0076	.0076	.0068	.0060	.0053	.0053	.0088	.0101	.0113	.0126	.0157
	39.2	SFM	545	545	545	545	485	560	560	560	500	500	500	595	590	590	590	595
		IPT	.0050	.0050	.0050	.0050	.0045	.0056	.0056	.0056	.0050	.0050	.0050	.0056	.0056	.0056	.0056	.0062
		RPM	5310	5310	5310	5310	4720	4510	4510	4510	4060	4060	4060	4110	3590	3190	2870	2300
		IPM	54	54	54	54	42	50	50	50	41	41	41	46	40	36	32	28
		Ap	.0050	.0050	.0050	.0044	.0044	.0076	.0076	.0068	.0060	.0053	.0053	.0088	.0101	.0113	.0126	.0157
	39.3	SFM	500	500	500	500	445	505	505	505	455	455	455	525	540	540	540	540
		IPT	.0046	.0046	.0046	.0046	.0041	.0052	.0052	.0052	.0046	.0046	.0046	.0052	.0052	.0052	.0051	.0055
		RPM	4870	4870	4870	4870	4330	4100	4100	4100	3690	3690	3690	3640	3280	2910	2620	2100
		IPM	45	45	45	45	35	42	42	42	34	34	34	38	34	31	27	23
		Ap	.0041	.0041	.0041	.0036	.0036	.0061	.0061	.0055	.0049	.0043	.0043	.0072	.0082	.0092	.0102	.0128
	40	SFM	850	850	850	850	755	845	845	845	760	760	760	915	910	915	915	910
		IPT	.0062	.0062	.0062	.0062	.0055	.0074	.0074	.0074	.0066	.0066	.0066	.0075	.0081	.0086	.0089	.0097
		RPM	8260	8260	8260	8260	7340	6830	6830	6830	6150	6150	6150	6340	5530	4920	4430	3540
		IPM	102	102	102	102	80	101	101	101	81	81	81	95	90	84	79	69
		Ap	.0054	.0054	.0054	.0047	.0047	.0080	.0080	.0072	.0064	.0056	.0056	.0094	.0107	.0120	.0134	.0167
	41	SFM	715	715	715	715	635	710	710	710	640	640	640	745	760	760	760	760
		IPT	.0057	.0057	.0057	.0057	.0050	.0067	.0067	.0067	.0060	.0060	.0060	.0071	.0074	.0079	.0082	.0086
		RPM	6930	6930	6930	6930	6160	5740	5740	5740	5160	5160	5160	5150	4610	4100	3690	2950
		IPM	79	79	79	79	62	77	77	77	62	62	62	73	69	65	60	51
		Ap	.0054	.0054	.0054	.0047	.0047	.0080	.0080	.0072	.0064	.0056	.0056	.0094	.0107	.0120	.0134	.0167

HPK24 SERIES

2 FLUTE BALL NOSE - PLANE



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Ae	Ap	Para-meter	Diameter (Ø)								
						1/32	1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2
P	5	Non-alloy steel	0.05D	0.02D	SFM	420	840	1255	1115	940	935	935	940	935
					IPT	.0019	.0023	.0023	.0036	.0061	.0069	.0074	.0078	.0083
					RPM	51500	51190	51190	34090	19160	14320	11430	9580	7160
					IPM	195	231	231	243	235	197	170	150	119
	8	Low alloy steel	0.05D	0.02D	SFM	420	840	1255	1115	940	935	935	940	935
					IPT	.0019	.0023	.0023	.0036	.0061	.0069	.0074	.0078	.0083
					RPM	51500	51190	51190	34090	19160	14320	11430	9580	7160
					IPM	195	231	231	243	235	197	170	150	119
	9		0.05D	0.02D	SFM	420	840	1255	1115	940	935	935	940	935
					IPT	.0019	.0023	.0023	.0036	.0061	.0069	.0074	.0078	.0083
					RPM	51500	51190	51190	34090	19160	14320	11430	9580	7160
					IPM	195	231	231	243	235	197	170	150	119
	11.1	High alloyed steel, and tool steel	0.05D	0.02D	SFM	420	840	1255	1115	940	935	935	940	935
					IPT	.0019	.0023	.0023	.0036	.0061	.0069	.0074	.0078	.0083
					RPM	51500	51190	51190	34090	19160	14320	11430	9580	7160
					IPM	195	231	231	243	235	197	170	150	119
	11.2		0.05D	0.02D	SFM	420	805	1210	1070	900	905	900	900	900
					IPT	.0017	.0020	.0020	.0033	.0054	.0060	.0064	.0069	.0073
					RPM	51500	49230	49230	32750	18330	13800	11020	9170	6880
					IPM	170	195	195	215	199	166	142	126	101
H	38.1	Hardened steel	0.05D	0.02D	SFM	420	805	1210	1070	900	905	900	900	900
					IPT	.0017	.0020	.0020	.0033	.0054	.0060	.0064	.0069	.0073
					RPM	51500	49230	49230	32750	18330	13800	11020	9170	6880
					IPM	170	195	195	215	199	166	142	126	101
	38.2		0.05D	0.02D	SFM	380	675	1010	895	760	740	760	760	755
					IPT	.0017	.0020	.0020	.0030	.0049	.0055	.0059	.0063	.0067
					RPM	46350	41200	41200	27300	15450	11330	9270	7730	5770
					IPM	155	163	163	163	152	126	109	98	77
	39.1		0.05D	0.02D	SFM	335	590	885	790	685	675	675	670	675
					IPT	.0015	.0018	.0018	.0026	.0044	.0049	.0053	.0057	.0061
					RPM	41200	36050	36050	24210	13910	10300	8240	6800	5150
					IPM	122	128	128	128	124	101	88	77	63
	39.2		0.05D	0.02D	SFM	295	540	810	710	580	595	590	585	595
					IPT	.0015	.0017	.0017	.0026	.0043	.0048	.0052	.0056	.0056
					RPM	36050	32960	32960	21630	11850	9060	7210	5970	4530
					IPM	105	113	113	113	103	88	75	67	50
	39.3		0.05D	0.02D	SFM	295	480	720	640	530	540	550	535	540
					IPT	.0013	.0016	.0016	.0024	.0040	.0043	.0047	.0051	.0051
					RPM	36050	29360	29360	19570	10820	8240	6700	5460	4120
					IPM	94	94	94	94	85	71	63	56	42
	40	Chilled Cast Iron	0.05D	0.02D	SFM	420	805	1210	1070	900	905	900	900	900
					IPT	.0017	.0020	.0020	.0033	.0054	.0060	.0064	.0069	.0073
					RPM	51500	49230	49230	32750	18330	13800	11020	9170	6880
					IPM	170	195	195	215	199	166	142	126	101
	41	Hardened Cast Iron	0.05D	0.02D	SFM	380	675	1010	895	760	740	760	760	755
					IPT	.0017	.0020	.0020	.0030	.0049	.0055	.0059	.0063	.0067
					RPM	46350	41200	41200	27300	15450	11330	9270	7730	5770
					IPM	155	163	163	163	152	126	109	98	77

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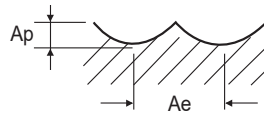
HPI90 SERIES

2 FLUTE BALL NOSE - PLANE



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Ae	Ap	Para-meter	Diameter (Ø)								
						0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.5
P	5	Non-alloy steel	0.05D	0.02D	SFM	100	150	220	270	320	420	525	640	795
					IPT	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0021
					RPM	49180	49180	53280	52460	51910	51230	50820	51910	51370
					IPM	46	58	80	99	119	157	192	208	218
	8	Low alloy steel	0.05D	0.02D	SFM	100	150	220	270	320	420	525	640	795
					IPT	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0021
					RPM	49180	49180	53280	52460	51910	51230	50820	51910	51370
					IPM	46	58	80	99	119	157	192	208	218
	9		0.05D	0.02D	SFM	100	150	220	270	320	420	525	640	795
					IPT	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0021
					RPM	49180	49180	53280	52460	51910	51230	50820	51910	51370
					IPM	46	58	80	99	119	157	192	208	218
	11.1	High alloyed steel, and tool steel	0.05D	0.02D	SFM	100	150	220	270	320	420	525	640	795
					IPT	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0021
					RPM	49180	49180	53280	52460	51910	51230	50820	51910	51370
					IPM	46	58	80	99	119	157	192	208	218
	11.2		0.05D	0.02D	SFM	100	150	220	270	320	420	525	610	760
					IPT	.0004	.0006	.0007	.0008	.0010	.0013	.0017	.0018	.0019
					RPM	49180	49180	53280	52460	51910	51230	50820	49180	49180
					IPM	43	54	71	87	102	133	168	174	182
H	38.1	Hardened steel	0.05D	0.02D	SFM	100	150	220	270	320	420	525	610	760
					IPT	.0004	.0006	.0007	.0008	.0010	.0013	.0017	.0018	.0019
					RPM	49180	49180	53280	52460	51910	51230	50820	49180	49180
					IPM	43	54	71	87	102	133	168	174	182
	38.2		0.05D	0.02D	SFM	95	135	185	235	285	390	475	540	695
					IPT	.0004	.0005	.0007	.0008	.0009	.0013	.0017	.0018	.0019
					RPM	45900	43710	45080	45900	46450	47130	45900	43710	44810
					IPM	36	45	60	76	88	122	152	155	166
	39.1		0.05D	0.02D	SFM	85	135	170	220	255	340	420	490	590
					IPT	.0004	.0005	.0006	.0007	.0009	.0012	.0015	.0015	.0017
					RPM	40980	43710	40980	42620	40980	40980	40980	39620	38250
					IPM	32	41	48	64	74	97	123	122	126
	39.2		0.05D	0.02D	SFM	70	120	150	185	220	305	370	440	525
					IPT	.0004	.0005	.0006	.0007	.0009	.0012	.0015	.0016	.0016
					RPM	32790	38250	36880	36060	35520	36880	36060	35520	33880
					IPM	26	36	44	54	64	87	105	112	109
	39.3		0.05D	0.02D	SFM	70	100	135	170	205	270	370	390	475
					IPT	.0004	.0004	.0006	.0007	.0009	.0011	.0013	.0015	.0015
					RPM	32790	32790	32790	32790	32790	32790	36060	31420	30600
					IPM	23	28	36	44	57	75	94	94	94
	40	Chilled Cast Iron	0.05D	0.02D	SFM	100	150	220	270	320	420	525	610	760
					IPT	.0004	.0006	.0007	.0008	.0010	.0013	.0017	.0018	.0019
					RPM	49180	49180	53280	52460	51910	51230	50820	49180	49180
					IPM	43	54	71	87	102	133	168	174	182
	41	Hardened Cast Iron	0.05D	0.02D	SFM	95	135	185	235	285	390	475	540	695
					IPT	.0004	.0005	.0007	.0008	.0009	.0013	.0017	.0018	.0019
					RPM	45900	43710	45080	45900	46450	47130	45900	43710	44810
					IPM	36	45	60	76	88	122	152	155	166

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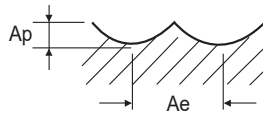
HPI90 SERIES

2 FLUTE BALL NOSE - PLANE



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)										
			2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0
P	5	SFM	1050	1050	1050	1065	980	880	945	980	880	945	945
		IPT	.0022	.0029	.0036	.0047	.0061	.0068	.0074	.0078	.0084	.0094	.0104
		RPM	50820	40690	33880	25820	19020	14210	11480	9510	7100	5740	4590
		IPM	228	235	243	244	234	195	171	149	119	108	95
	8	SFM	1050	1050	1050	1065	980	880	945	980	880	945	945
		IPT	.0022	.0029	.0036	.0047	.0061	.0068	.0074	.0078	.0084	.0094	.0104
		RPM	50820	40690	33880	25820	19020	14210	11480	9510	7100	5740	4590
		IPM	228	235	243	244	234	195	171	149	119	108	95
	9	SFM	1050	1050	1050	1065	980	880	945	980	880	945	945
		IPT	.0022	.0029	.0036	.0047	.0061	.0068	.0074	.0078	.0084	.0094	.0104
		RPM	50820	40690	33880	25820	19020	14210	11480	9510	7100	5740	4590
		IPM	228	235	243	244	234	195	171	149	119	108	95
	11.1	SFM	1050	1050	1050	1065	980	880	945	980	880	945	945
		IPT	.0022	.0029	.0036	.0047	.0061	.0068	.0074	.0078	.0084	.0094	.0104
		RPM	50820	40690	33880	25820	19020	14210	11480	9510	7100	5740	4590
		IPM	228	235	243	244	234	195	171	149	119	108	95
	11.2	SFM	1015	1015	1015	1015	945	860	915	945	845	910	915
		IPT	.0020	.0026	.0033	.0044	.0054	.0060	.0065	.0069	.0074	.0081	.0089
		RPM	49180	39300	32790	24590	18360	13930	11070	9180	6830	5530	4430
		IPM	194	204	214	215	200	168	143	126	101	90	79
H	38.1	SFM	1015	1015	1015	1015	945	860	915	945	845	910	915
		IPT	.0020	.0026	.0033	.0044	.0054	.0060	.0065	.0069	.0074	.0081	.0089
		RPM	49180	39300	32790	24590	18360	13930	11070	9180	6830	5530	4430
		IPM	194	204	214	215	200	168	143	126	101	90	79
	38.2	SFM	845	845	845	845	795	695	760	795	710	760	760
		IPT	.0020	.0025	.0030	.0039	.0049	.0056	.0059	.0063	.0067	.0074	.0082
		RPM	40980	32750	27320	20490	15410	11200	9220	7700	5740	4610	3690
		IPM	161	161	161	161	152	124	109	97	77	69	60
	39.1	SFM	745	745	745	745	710	640	675	695	640	675	675
		IPT	.0018	.0022	.0026	.0035	.0044	.0049	.0053	.0057	.0061	.0066	.0074
		RPM	36060	28840	24040	18030	13770	10380	8200	6720	5190	4100	3280
		IPM	128	127	127	128	123	102	86	76	63	55	49
	39.2	SFM	675	675	675	675	610	560	590	610	560	590	590
		IPT	.0017	.0022	.0026	.0035	.0044	.0048	.0052	.0056	.0056	.0056	.0056
		RPM	32790	26270	21860	16390	11800	9020	7170	5900	4510	3590	2870
		IPM	114	114	115	114	103	87	75	66	50	40	32
	39.3	SFM	610	610	610	610	560	505	555	560	505	540	540
		IPT	.0016	.0020	.0024	.0031	.0039	.0043	.0047	.0051	.0052	.0052	.0051
		RPM	29510	23590	19670	14750	10820	8200	6760	5410	4100	3280	2620
		IPM	93	94	94	92	85	70	63	55	42	34	27
	40	SFM	1015	1015	1015	1015	945	860	915	945	845	910	915
		IPT	.0020	.0026	.0033	.0044	.0054	.0060	.0065	.0069	.0074	.0081	.0089
		RPM	49180	39300	32790	24590	18360	13930	11070	9180	6830	5530	4430
		IPM	194	204	214	215	200	168	143	126	101	90	79
	41	SFM	845	845	845	845	795	695	760	795	710	760	760
		IPT	.0020	.0025	.0030	.0039	.0049	.0056	.0059	.0063	.0067	.0074	.0082
		RPM	40980	32750	27320	20490	15410	11200	9220	7700	5740	4610	3690
		IPM	161	161	161	161	152	124	109	97	77	69	60

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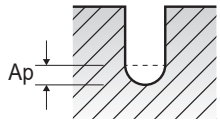
HPK45, HPK46, HPK47 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



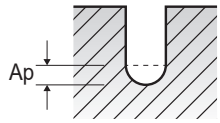
SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Para-meter	Diameter (Ø)																			
				0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
				LBS	0.3	0.5	0.75	1	1.25	1.5	1.75	2	2.5	3	5	0.5	0.6	0.75	1	1.25	1.5	1.75	2	2.25
P	5	Non-alloy steel	SFM	105	105	105	105	95	95	95	95	85	85	30	160	160	160	160	160	160	140	140	140
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
			RPM	50820	50820	50820	50820	45900	45900	45900	45900	40980	40650	15250	51370	51370	51370	51370	51370	51370	45900	45900	45900
			IPM	12	12	12	12	11	11	11	11	6	6	2	20	20	20	20	20	20	14	14	14
			Ap	.0007	.0007	.0005	.0005	.0003	.0003	.0002	.0002	.0002	.0001	.0000	.0011	.0011	.0011	.0008	.0008	.0008	.0004	.0004	.0004
	8	Low alloy steel	SFM	105	105	105	105	95	95	95	95	85	85	30	160	160	160	160	160	160	140	140	140
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
			RPM	50820	50820	50820	50820	45900	45900	45900	45900	40980	40650	15250	51370	51370	51370	51370	51370	51370	45900	45900	45900
			IPM	12	12	12	12	11	11	11	11	6	6	2	20	20	20	20	20	20	14	14	14
			Ap	.0007	.0007	.0005	.0005	.0003	.0003	.0002	.0002	.0002	.0001	.0000	.0011	.0011	.0011	.0008	.0008	.0008	.0004	.0004	.0004
	9		SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001
			RPM	48280	48280	48280	48280	43610	43610	43610	43610	38930	38620	14480	48800	48800	48800	48800	48800	48800	43610	43610	43610
			IPM	10	10	10	10	9	9	9	9	5	5	2	17	17	17	17	17	17	12	12	12
			Ap	.0006	.0006	.0004	.0004	.0002	.0002	.0002	.0002	.0002	.0001	.0000	.0008	.0008	.0008	.0006	.0006	.0006	.0003	.0003	.0003
	11.1	High alloyed steel, and tool steel	SFM	105	105	105	105	95	95	95	95	85	85	30	160	160	160	160	160	160	140	140	140
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
			RPM	50820	50820	50820	50820	45900	45900	45900	45900	40980	40650	15250	51370	51370	51370	51370	51370	51370	45900	45900	45900
			IPM	12	12	12	12	11	11	11	11	6	6	2	20	20	20	20	20	20	14	14	14
			Ap	.0007	.0007	.0005	.0005	.0003	.0003	.0002	.0002	.0002	.0001	.0000	.0011	.0011	.0011	.0008	.0008	.0008	.0004	.0004	.0004
	11.2		SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001
			RPM	48280	48280	48280	48280	43610	43610	43610	43610	38930	38620	14480	48800	48800	48800	48800	48800	48800	43610	43610	43610
			IPM	10	10	10	10	9	9	9	9	5	5	2	17	17	17	17	17	17	12	12	12
			Ap	.0006	.0006	.0004	.0004	.0002	.0002	.0002	.0002	.0002	.0001	.0000	.0008	.0008	.0008	.0006	.0006	.0006	.0003	.0003	.0003
H	38.1	Hardened steel	SFM	85	85	85	85	80	80	80	80	70	70	25	130	130	130	130	130	130	120	120	120
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001
			RPM	42180	42180	42180	42180	38100	38100	38100	38100	34020	33740	12650	42630	42630	42630	42630	42630	42630	38100	38100	38100
			IPM	8	8	8	8	8	8	8	8	5	4	2	14	14	14	14	14	14	10	10	10
			Ap	.0004	.0004	.0003	.0003	.0002	.0002	.0001	.0001	.0001	.0001	.0000	.0006	.0006	.0006	.0004	.0004	.0004	.0002	.0002	.0002
	38.2		SFM	85	85	85	85	80	80	80	80	70	70	25	130	130	130	130	130	130	120	120	120
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001
			RPM	42180	42180	42180	42180	38100	38100	38100	38100	34020	33740	12650	42630	42630	42630	42630	42630	42630	38100	38100	38100
			IPM	8	8	8	8	8	8	8	8	5	4	2	14	14	14	14	14	14	10	10	10
			Ap	.0004	.0004	.0003	.0003	.0002	.0002	.0001	.0001	.0001	.0001	.0000	.0006	.0006	.0006	.0004	.0004	.0004	.0002	.0002	.0002
	40	Chilled Cast Iron	SFM	100	100	100	100	90	90	90	90	80	80	30	150	150	150	150	150	150	135	135	135
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001
			RPM	48280	48280	48280	48280	43610	43610	43610	43610	38930	38620	14480	48800	48800	48800	48800	48800	48800	43610	43610	43610
			IPM	10	10	10	10	9	9	9	9	5	5	2	17	17	17	17	17	17	12	12	12
			Ap	.0006	.0006	.0004	.0004	.0002	.0002	.0002	.0002	.0002	.0001	.0000	.0008	.0008	.0008	.0006	.0006	.0006	.0003	.0003	.0003
	41	Hardened Cast Iron	SFM	85	85	85	85	80	80	80	80	70	70	25	130	130	130	130	130	130	120	120	120
			IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001
			RPM	42180	42180	42180	42180	38100	38100	38100	38100	34020	33740	12650	42630	42630	42630	42630	42630	42630	38100	38100	38100
			IPM	8	8	8	8	8	8	8	8	5	4	2	14	14	14	14	14	14	10	10	10
			Ap	.0004	.0004	.0003	.0003	.0002	.0002	.0001	.0001	.0001	.0001	.0000	.0006	.0006	.0006	.0004	.0004	.0004	.0002	.0002	.0002

NEXT PAGE ▶

HPK45, HPK46, HPK47 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5
			LBS	2.5	3	3.5	4	5	7	0.5	0.8	1	1.5	2	2.5	3	3.5	4	4.5	5	6	7	1	1.25	1.5
P	5	SFM	140	140	130	130	95	50	175	175	175	175	175	155	155	155	155	140	140	140	105	180	180	180
		IPT	.0002	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004
		RPM	45900	45900	41530	41530	30600	15410	42620	42620	42620	42620	42620	37700	37700	37700	37700	33610	33610	33610	25410	35410	35410	35410
		IPM	14	14	13	13	7	4	20	20	20	20	20	15	15	15	15	13	13	13	8	28	28	28
		Ap	.0003	.0003	.0003	.0002	.0001	.0001	.0014	.0014	.0014	.0010	.0010	.0006	.0006	.0004	.0004	.0004	.0004	.0002	.0002	.0018	.0018	.0018
	8	SFM	140	140	130	130	95	50	175	175	175	175	175	155	155	155	155	140	140	140	105	180	180	180
		IPT	.0002	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004
		RPM	45900	45900	41530	41530	30600	15410	42620	42620	42620	42620	42620	37700	37700	37700	37700	33610	33610	33610	25410	35410	35410	35410
		IPM	14	14	13	13	7	4	20	20	20	20	20	15	15	15	15	13	13	13	8	28	28	28
		Ap	.0003	.0003	.0003	.0002	.0001	.0001	.0014	.0014	.0014	.0010	.0010	.0006	.0006	.0004	.0004	.0004	.0004	.0002	.0002	.0018	.0018	.0018
	9	SFM	135	135	120	120	90	45	165	165	165	165	165	150	150	150	150	130	130	130	100	175	175	175
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0004	.0004	.0004
		RPM	43610	43610	39450	39450	29070	14640	40490	40490	40490	40490	40490	35820	35820	35820	35820	31930	31930	31930	24140	33640	33640	33640
		IPM	12	12	11	11	6	3	17	17	17	17	17	13	13	13	13	11	11	11	7	24	24	24
		Ap	.0002	.0002	.0002	.0001	.0001	.0000	.0011	.0011	.0011	.0008	.0008	.0004	.0004	.0003	.0003	.0003	.0003	.0002	.0001	.0014	.0014	.0014
	11.1	SFM	140	140	130	130	95	50	175	175	175	175	175	155	155	155	155	140	140	140	105	180	180	180
		IPT	.0002	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004
		RPM	45900	45900	41530	41530	30600	15410	42620	42620	42620	42620	42620	37700	37700	37700	37700	33610	33610	33610	25410	35410	35410	35410
		IPM	14	14	13	13	7	4	20	20	20	20	20	15	15	15	15	13	13	13	8	28	28	28
		Ap	.0003	.0003	.0003	.0002	.0001	.0001	.0014	.0014	.0014	.0010	.0010	.0006	.0006	.0004	.0004	.0004	.0004	.0002	.0002	.0018	.0018	.0018
	11.2	SFM	135	135	120	120	90	45	165	165	165	165	165	150	150	150	150	130	130	130	100	175	175	175
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0004	.0004	.0004
		RPM	43610	43610	39450	39450	29070	14640	40490	40490	40490	40490	40490	35820	35820	35820	35820	31930	31930	31930	24140	33640	33640	33640
		IPM	12	12	11	11	6	3	17	17	17	17	17	13	13	13	13	11	11	11	7	24	24	24
		Ap	.0002	.0002	.0002	.0001	.0001	.0000	.0011	.0011	.0011	.0008	.0008	.0004	.0004	.0003	.0003	.0003	.0003	.0002	.0001	.0014	.0014	.0014
H	38.1	SFM	120	120	105	105	80	40	145	145	145	145	145	130	130	130	130	115	115	115	85	150	150	150
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
		RPM	38100	38100	34470	34470	25400	12790	35380	35380	35380	35380	35380	31290	31290	31290	31290	27890	27890	27890	21090	29390	29390	29390
		IPM	10	10	9	9	5	3	14	14	14	14	14	10	10	10	10	9	9	9	6	20	20	20
		Ap	.0002	.0002	.0002	.0001	.0001	.0000	.0008	.0008	.0008	.0006	.0006	.0003	.0003	.0002	.0002	.0002	.0002	.0001	.0001	.0010	.0010	.0010
	38.2	SFM	120	120	105	105	80	40	145	145	145	145	145	130	130	130	130	115	115	115	85	150	150	150
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
		RPM	38100	38100	34470	34470	25400	12790	35380	35380	35380	35380	35380	31290	31290	31290	31290	27890	27890	27890	21090	29390	29390	29390
		IPM	10	10	9	9	5	3	14	14	14	14	14	10	10	10	10	9	9	9	6	20	20	20
		Ap	.0002	.0002	.0002	.0001	.0001	.0000	.0008	.0008	.0008	.0006	.0006	.0003	.0003	.0002	.0002	.0002	.0002	.0001	.0001	.0010	.0010	.0010
	40	SFM	135	135	120	120	90	45	165	165	165	165	165	150	150	150	150	130	130	130	100	175	175	175
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0004	.0004	.0004
		RPM	43610	43610	39450	39450	29070	14640	40490	40490	40490	40490	40490	35820	35820	35820	35820	31930	31930	31930	24140	33640	33640	33640
		IPM	12	12	11	11	6	3	17	17	17	17	17	13	13	13	13	11	11	11	7	24	24	24
		Ap	.0002	.0002	.0002	.0001	.0001	.0000	.0011	.0011	.0011	.0008	.0008	.0004	.0004	.0003	.0003	.0003	.0003	.0002	.0001	.0014	.0014	.0014
	41	SFM	120	120	105	105	80	40	145	145	145	145	145	130	130	130	130	115	115	115	85	150	150	150
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0003	.0003	.0003
		RPM	38100	38100	34470	34470	25400	12790	35380	35380	35380	35380	35380	31290	31290	31290	31290	27890	27890	27890	21090	29390	29390	29390
		IPM	10	10	9	9	5	3	14	14	14	14	14	10	10	10	10	9	9	9	6	20	20	20
		Ap	.0002	.0002	.0002	.0001	.0001	.0000	.0008	.0008	.0008	.0006	.0006	.0003	.0003	.0002	.0002	.0002	.0002	.0001	.0001	.0010	.0010	.0010

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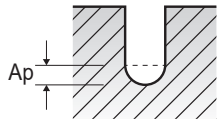
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																						
			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
			LBS	2	2.5	3	3.5	4	4.5	5	5.5	6	8	10	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
P	5	SFM	180	180	160	160	160	160	160	145	145	110	110	215	215	215	215	215	195	195	195	195	195	195	
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	
		RPM	35410	35410	31470	31470	31470	31480	31470	28200	28200	20980	20980	34970	34970	34970	34970	34970	31690	31690	31690	31690	31690	31690	
		IPM	28	28	22	22	22	22	22	18	18	12	12	41	41	41	41	41	32	32	32	32	32	32	
		Ap	.0013	.0013	.0007	.0007	.0007	.0005	.0005	.0005	.0005	.0003	.0002	.0021	.0021	.0015	.0015	.0015	.0008	.0008	.0008	.0006	.0006	.0006	
	8	SFM	180	180	160	160	160	160	160	145	145	110	110	215	215	215	215	215	195	195	195	195	195	195	
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	
		RPM	35410	35410	31470	31470	31470	31480	31470	28200	28200	20980	20980	34970	34970	34970	34970	34970	31690	31690	31690	31690	31690	31690	
		IPM	28	28	22	22	22	22	22	18	18	12	12	41	41	41	41	41	32	32	32	32	32	32	
		Ap	.0013	.0013	.0007	.0007	.0007	.0005	.0005	.0005	.0005	.0003	.0002	.0021	.0021	.0015	.0015	.0015	.0008	.0008	.0008	.0006	.0006	.0006	
	9	SFM	175	175	155	155	155	155	155	140	140	105	105	205	205	205	205	205	185	185	185	185	185	185	
		IPT	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	
		RPM	33640	33640	29900	29900	29900	29900	29900	26790	26790	19930	19930	33220	33220	33220	33220	33220	30110	30110	30110	30110	30110	30110	
		IPM	24	24	19	19	19	19	19	15	15	10	10	35	35	35	35	35	28	28	28	28	28	28	
		Ap	.0010	.0010	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0002	.0002	.0017	.0017	.0012	.0012	.0012	.0006	.0006	.0006	.0005	.0005	.0005	
	11.1	SFM	180	180	160	160	160	160	160	145	145	110	110	215	215	215	215	215	195	195	195	195	195	195	
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	
		RPM	35410	35410	31470	31470	31470	31480	31470	28200	28200	20980	20980	34970	34970	34970	34970	34970	31690	31690	31690	31690	31690	31690	
		IPM	28	28	22	22	22	22	22	18	18	12	12	41	41	41	41	41	32	32	32	32	32	32	
		Ap	.0013	.0013	.0007	.0007	.0007	.0005	.0005	.0005	.0005	.0003	.0002	.0021	.0021	.0015	.0015	.0015	.0008	.0008	.0008	.0006	.0006	.0006	
	11.2	SFM	175	175	155	155	155	155	155	140	140	105	105	205	205	205	205	205	185	185	185	185	185	185	
		IPT	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	
		RPM	33640	33640	29900	29900	29900	29900	29900	26790	26790	19930	19930	33220	33220	33220	33220	33220	30110	30110	30110	30110	30110	30110	
		IPM	24	24	19	19	19	19	19	15	15	10	10	35	35	35	35	35	28	28	28	28	28	28	
		Ap	.0010	.0010	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0002	.0002	.0017	.0017	.0012	.0012	.0012	.0006	.0006	.0006	.0005	.0005	.0005	
H	38.1	SFM	150	150	135	135	135	135	135	120	120	90	90	180	180	180	180	180	165	165	165	165	165	165	
		IPT	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	
		RPM	29390	29390	26120	26120	26120	26120	26120	23400	23400	17420	17420	29030	29030	29030	29030	29030	26310	26310	26310	26310	26310	26310	
		IPM	20	20	16	16	16	16	16	12	12	8	8	29	29	29	29	29	23	23	23	23	23	23	
		Ap	.0007	.0007	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0002	.0001	.0012	.0012	.0009	.0009	.0009	.0005	.0005	.0005	.0003	.0003	.0003	
	38.2	SFM	150	150	135	135	135	135	135	120	120	90	90	180	180	180	180	180	165	165	165	165	165	165	
		IPT	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	
		RPM	29390	29390	26120	26120	26120	26120	26120	23400	23400	17420	17420	29030	29030	29030	29030	29030	26310	26310	26310	26310	26310	26310	
		IPM	20	20	16	16	16	16	16	12	12	8	8	29	29	29	29	29	23	23	23	23	23	23	
		Ap	.0007	.0007	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0002	.0001	.0012	.0012	.0009	.0009	.0009	.0005	.0005	.0005	.0003	.0003	.0003	
	40	SFM	175	175	155	155	155	155	155	140	140	105	105	205	205	205	205	205	185	185	185	185	185	185	
		IPT	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	
		RPM	33640	33640	29900	29900	29900	29900	29900	26790	26790	19930	19930	33220	33220	33220	33220	33220	30110	30110	30110	30110	30110	30110	
		IPM	24	24	19	19	19	19	19	15	15	10	10	35	35	35	35	35	28	28	28	28	28	28	
		Ap	.0010	.0010	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0002	.0002	.0017	.0017	.0012	.0012	.0012	.0006	.0006	.0006	.0005	.0005	.0005	
	41	SFM	150	150	135	135	135	135	135	120	120	90	90	180	180	180	180	180	165	165	165	165	165	165	
		IPT	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	
		RPM	29390	29390	26120	26120	26120	26120	26120	23400	23400	17420	17420	29030	29030	29030	29030	29030	26310	26310	26310	26310	26310	26310	
		IPM	20	20	16	16	16	16	16	12	12	8	8	29	29	29	29	29	23	23	23	23	23	23	
		Ap	.0007	.0007	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0002	.0001	.0012	.0012	.0009	.0009	.0009	.0005	.0005	.0005	.0003	.0003	.0003	

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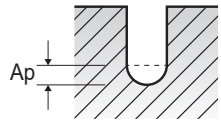
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9
			LBS	7	8	9	10	12	2	4	6	8	2	3	4	5	6	7	8	10	12	2	4	6	8
P	5	SFM	175	175	175	130	130	255	230	230	205	290	290	290	260	260	260	260	235	235	280	280	280	280
		IPT	.0005	.0005	.0005	.0004	.0004	.0007	.0006	.0006	.0005	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0007	.0007	.0007	.0007
		RPM	28420	28410	28420	21310	21310	35130	31850	31850	28100	35250	35250	35250	31560	31560	31560	31560	28280	28280	30240	30240	30240	30240
		IPM	27	27	27	17	17	47	38	38	29	50	50	50	40	40	40	40	31	31	45	45	45	45
		Ap	.0006	.0004	.0004	.0002	.0002	.0025	.0010	.0007	.0007	.0028	.0020	.0020	.0011	.0011	.0008	.0008	.0008	.0005	.0032	.0023	.0012	.0009
	8	SFM	175	175	175	130	130	255	230	230	205	290	290	290	260	260	260	260	235	235	280	280	280	280
		IPT	.0005	.0005	.0005	.0004	.0004	.0007	.0006	.0006	.0005	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0007	.0007	.0007	.0007
		RPM	28420	28410	28420	21310	21310	35130	31850	31850	28100	35250	35250	35250	31560	31560	31560	31560	28280	28280	30240	30240	30240	30240
		IPM	27	27	27	17	17	47	38	38	29	50	50	50	40	40	40	40	31	31	45	45	45	45
		Ap	.0006	.0004	.0004	.0002	.0002	.0025	.0010	.0007	.0007	.0028	.0020	.0020	.0011	.0011	.0008	.0008	.0008	.0005	.0032	.0023	.0012	.0009
	9	SFM	165	165	165	125	125	240	220	220	195	275	275	275	245	245	245	245	220	220	265	265	265	265
		IPT	.0004	.0004	.0004	.0004	.0004	.0006	.0005	.0005	.0005	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0007	.0007	.0007	.0007
		RPM	26990	26990	26990	20250	20250	33370	30260	30260	26700	33480	33480	33480	29980	29980	29980	29980	26860	26860	28720	28720	28720	28720
		IPM	23	23	23	14	14	40	32	32	24	42	42	42	34	34	34	34	27	27	38	38	38	38
		Ap	.0005	.0003	.0003	.0002	.0002	.0019	.0008	.0005	.0005	.0022	.0016	.0016	.0009	.0009	.0006	.0006	.0006	.0004	.0025	.0018	.0010	.0007
	11.1	SFM	175	175	175	130	130	255	230	230	205	290	290	290	260	260	260	260	235	235	280	280	280	280
		IPT	.0005	.0005	.0005	.0004	.0004	.0007	.0006	.0006	.0005	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0007	.0007	.0007	.0007
		RPM	28420	28410	28420	21310	21310	35130	31850	31850	28100	35250	35250	35250	31560	31560	31560	31560	28280	28280	30240	30240	30240	30240
		IPM	27	27	27	17	17	47	38	38	29	50	50	50	40	40	40	40	31	31	45	45	45	45
		Ap	.0006	.0004	.0004	.0002	.0002	.0025	.0010	.0007	.0007	.0028	.0020	.0020	.0011	.0011	.0008	.0008	.0008	.0005	.0032	.0023	.0012	.0009
	11.2	SFM	165	165	165	125	125	240	220	220	195	275	275	275	245	245	245	245	220	220	265	265	265	265
		IPT	.0004	.0004	.0004	.0004	.0004	.0006	.0005	.0005	.0005	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0007	.0007	.0007	.0007
		RPM	26990	26990	26990	20250	20250	33370	30260	30260	26700	33480	33480	33480	29980	29980	29980	29980	26860	26860	28720	28720	28720	28720
		IPM	23	23	23	14	14	40	32	32	24	42	42	42	34	34	34	34	27	27	38	38	38	38
		Ap	.0005	.0003	.0003	.0002	.0002	.0019	.0008	.0005	.0005	.0022	.0016	.0016	.0009	.0009	.0006	.0006	.0006	.0004	.0025	.0018	.0010	.0007
H	38.1	SFM	145	145	145	110	110	210	190	190	170	240	240	240	215	215	215	215	195	195	235	235	235	235
		IPT	.0004	.0004	.0004	.0003	.0003	.0006	.0005	.0005	.0004	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0006	.0006	.0006	.0006
		RPM	23580	23580	23580	17690	17690	29160	26430	26430	23320	29250	29250	29250	26190	26190	26190	26190	23470	23470	25100	25100	25100	25100
		IPM	19	19	19	12	12	33	26	26	20	35	35	35	28	28	28	28	22	22	32	32	32	32
		Ap	.0003	.0002	.0002	.0001	.0001	.0014	.0005	.0004	.0004	.0016	.0011	.0011	.0006	.0006	.0004	.0004	.0004	.0003	.0018	.0013	.0007	.0005
	38.2	SFM	145	145	145	110	110	210	190	190	170	240	240	240	215	215	215	215	195	195	235	235	235	235
		IPT	.0004	.0004	.0004	.0003	.0003	.0006	.0005	.0005	.0004	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0006	.0006	.0006	.0006
		RPM	23580	23580	23580	17690	17690	29160	26430	26430	23320	29250	29250	29250	26190	26190	26190	26190	23470	23470	25100	25100	25100	25100
		IPM	19	19	19	12	12	33	26	26	20	35	35	35	28	28	28	28	22	22	32	32	32	32
		Ap	.0003	.0002	.0002	.0001	.0001	.0014	.0005	.0004	.0004	.0016	.0011	.0011	.0006	.0006	.0004	.0004	.0004	.0003	.0018	.0013	.0007	.0005
	40	SFM	165	165	165	125	125	240	220	220	195	275	275	275	245	245	245	245	220	220	265	265	265	265
		IPT	.0004	.0004	.0004	.0004	.0004	.0006	.0005	.0005	.0005	.0006	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0007	.0007	.0007	.0007
		RPM	26990	26990	26990	20250	20250	33370	30260	30260	26700	33480	33480	33480	29980	29980	29980	29980	26860	26860	28720	28720	28720	28720
		IPM	23	23	23	14	14	40	32	32	24	42	42	42	34	34	34	34	27	27	38	38	38	38
		Ap	.0005	.0003	.0003	.0002	.0002	.0019	.0008	.0005	.0005	.0022	.0016	.0016	.0009	.0009	.0006	.0006	.0006	.0004	.0025	.0018	.0010	.0007
	41	SFM	145	145	145	110	110	210	190	190	170	240	240	240	215	215	215	215	195	195	235	235	235	235
		IPT	.0004	.0004	.0004	.0003	.0003	.0006	.0005	.0005	.0004	.0006	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0006	.0006	.0006	.0006
		RPM	23580	23580	23580	17690	17690	29160	26430	26430	23320	29250	29250	29250	26190	26190	26190	26190	23470	23470	25100	25100	25100	25100
		IPM	19	19	19	12	12	33	26	26	20	35	35	35	28	28	28	28	22	22	32	32	32	32
		Ap	.0003	.0002	.0002	.0001	.0001	.0014	.0005	.0004	.0004	.0016	.0011	.0011	.0006	.0006	.0004	.0004	.0004	.0003	.0018	.0013	.0007	.0005

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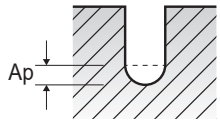
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1.2	1.2
		LBS	2	2.5	3	4	5	6	7	8	9	10	12	13	14	16	18	20	22	25	30	2.4	4	6
P	5	SFM	330	330	330	330	330	295	295	295	295	295	260	260	260	195	195	195	100	100	100	335	335	335
		IPT	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0010	.0010	.0010
		RPM	31800	31800	31800	31800	31800	28520	28520	28520	28520	28520	25250	25250	25250	19020	19020	19020	9510	9510	9510	27050	27050	27050
		IPM	63	63	63	63	63	49	49	49	49	49	40	40	40	25	25	25	11	11	11	55	55	55
		Ap	.0035	.0035	.0035	.0026	.0026	.0014	.0014	.0014	.0010	.0010	.0010	.0010	.0006	.0006	.0004	.0004	.0002	.0002	.0002	.0043	.0031	.0031
	8	SFM	330	330	330	330	330	295	295	295	295	295	260	260	260	195	195	195	100	100	100	335	335	335
		IPT	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0010	.0010	.0010
		RPM	31800	31800	31800	31800	31800	28520	28520	28520	28520	28520	25250	25250	25250	19020	19020	19020	9510	9510	9510	27050	27050	27050
		IPM	63	63	63	63	63	49	49	49	49	49	40	40	40	25	25	25	11	11	11	55	55	55
		Ap	.0035	.0035	.0035	.0026	.0026	.0014	.0014	.0014	.0010	.0010	.0010	.0010	.0006	.0006	.0004	.0004	.0002	.0002	.0002	.0043	.0031	.0031
	9	SFM	310	310	310	310	310	280	280	280	280	280	245	245	245	185	185	185	95	95	95	320	320	320
		IPT	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0005	.0009	.0009	.0009
		RPM	30210	30210	30210	30210	30210	27100	27100	27100	27100	27100	23980	23980	23980	18070	18070	18070	9030	9030	9030	25700	25700	25700
		IPM	53	53	53	53	53	42	42	42	42	42	34	34	34	22	22	22	10	10	10	47	47	47
		Ap	.0028	.0028	.0028	.0020	.0020	.0011	.0011	.0011	.0008	.0008	.0008	.0008	.0005	.0005	.0003	.0003	.0002	.0002	.0002	.0033	.0024	.0024
	11.1	SFM	330	330	330	330	330	295	295	295	295	295	260	260	260	195	195	195	100	100	100	335	335	335
		IPT	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0010	.0010	.0010
		RPM	31800	31800	31800	31800	31800	28520	28520	28520	28520	28520	25250	25250	25250	19020	19020	19020	9510	9510	9510	27050	27050	27050
		IPM	63	63	63	63	63	49	49	49	49	49	40	40	40	25	25	25	11	11	11	55	55	55
		Ap	.0035	.0035	.0035	.0026	.0026	.0014	.0014	.0014	.0010	.0010	.0010	.0010	.0006	.0006	.0004	.0004	.0002	.0002	.0002	.0043	.0031	.0031
	11.2	SFM	310	310	310	310	310	280	280	280	280	280	245	245	245	185	185	185	95	95	95	320	320	320
		IPT	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0005	.0009	.0009	.0009
		RPM	30210	30210	30210	30210	30210	27100	27100	27100	27100	27100	23980	23980	23980	18070	18070	18070	9030	9030	9030	25700	25700	25700
		IPM	53	53	53	53	53	42	42	42	42	42	34	34	34	22	22	22	10	10	10	47	47	47
		Ap	.0028	.0028	.0028	.0020	.0020	.0011	.0011	.0011	.0008	.0008	.0008	.0008	.0005	.0005	.0003	.0003	.0002	.0002	.0002	.0033	.0024	.0024
H	38.1	SFM	270	270	270	270	270	245	245	245	245	245	215	215	215	165	165	165	80	80	80	280	280	280
		IPT	.0008	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0005	.0009	.0009	.0009
		RPM	26400	26400	26400	26400	26400	23670	23670	23670	23670	23670	20950	20950	20950	15780	15780	15780	7890	7890	7890	22450	22450	22450
		IPM	44	44	44	44	44	35	35	35	35	35	28	28	28	18	18	18	8	8	8	39	39	39
		Ap	.0020	.0020	.0020	.0014	.0014	.0008	.0008	.0008	.0006	.0006	.0006	.0006	.0003	.0003	.0002	.0002	.0001	.0001	.0001	.0024	.0017	.0017
	38.2	SFM	270	270	270	270	270	245	245	245	245	245	215	215	215	165	165	165	80	80	80	280	280	280
		IPT	.0008	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0005	.0009	.0009	.0009
		RPM	26400	26400	26400	26400	26400	23670	23670	23670	23670	23670	20950	20950	20950	15780	15780	15780	7890	7890	7890	22450	22450	22450
		IPM	44	44	44	44	44	35	35	35	35	35	28	28	28	18	18	18	8	8	8	39	39	39
		Ap	.0020	.0020	.0020	.0014	.0014	.0008	.0008	.0008	.0006	.0006	.0006	.0006	.0003	.0003	.0002	.0002	.0001	.0001	.0001	.0024	.0017	.0017
	40	SFM	310	310	310	310	310	280	280	280	280	280	245	245	245	185	185	185	95	95	95	320	320	320
		IPT	.0009	.0009	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0005	.0009	.0009	.0009
		RPM	30210	30210	30210	30210	30210	27100	27100	27100	27100	27100	23980	23980	23980	18070	18070	18070	9030	9030	9030	25700	25700	25700
		IPM	53	53	53	53	53	42	42	42	42	42	34	34	34	22	22	22	10	10	10	47	47	47
		Ap	.0028	.0028	.0028	.0020	.0020	.0011	.0011	.0011	.0008	.0008	.0008	.0008	.0005	.0005	.0003	.0003	.0002	.0002	.0002	.0033	.0024	.0024
	41	SFM	270	270	270	270	270	245	245	245	245	245	215	215	215	165	165	165	80	80	80	280	280	280
		IPT	.0008	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0005	.0009	.0009	.0009
		RPM	26400	26400	26400	26400	26400	23670	23670	23670	23670	23670	20950	20950	20950	15780	15780	15780	7890	7890	7890	22450	22450	22450
		IPM	44	44	44	44	44	35	35	35	35	35	28	28	28	18	18	18	8	8	8	39	39	39
		Ap	.0020	.0020	.0020	.0014	.0014	.0008	.0008	.0008	.0006	.0006	.0006	.0006	.0003	.0003	.0002	.0002	.0001	.0001	.0001	.0024	.0017	.0017

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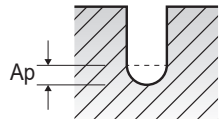
HPK45, HPK46, HPK47 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			1.2	1.2	1.2	1.2	1.2	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
			LBS	8	10	12	14	16	8	12	16	3	3.75	3.8	4	6	8	10	12	14	15	16	18	20	22
P	5	SFM	300	300	300	265	265	285	285	255	380	380	380	380	380	340	340	340	340	340	305	305	305	305
		IPT	.0009	.0009	.0009	.0008	.0008	.0011	.0011	.0009	.0013	.0013	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0012	.0010	.0010	.0010	.0010
		RPM	24320	24320	24320	21580	21580	19910	19910	17800	24700	24700	24700	24700	24700	22080	22080	22080	22080	22080	19670	19670	19670	19670
		IPM	46	46	46	36	36	42	42	34	64	64	64	64	64	52	52	52	52	52	40	40	40	40
		Ap	.0017	.0012	.0012	.0012	.0007	.0019	.0014	.0014	.0053	.0053	.0053	.0053	.0038	.0021	.0021	.0021	.0015	.0015	.0015	.0015	.0009	.0009
	8	SFM	300	300	300	265	265	285	285	255	380	380	380	380	380	340	340	340	340	340	305	305	305	305
		IPT	.0009	.0009	.0009	.0008	.0008	.0011	.0011	.0009	.0013	.0013	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0012	.0010	.0010	.0010	.0010
		RPM	24320	24320	24320	21580	21580	19910	19910	17800	24700	24700	24700	24700	24700	22080	22080	22080	22080	22080	19670	19670	19670	19670
		IPM	46	46	46	36	36	42	42	34	64	64	64	64	64	52	52	52	52	52	40	40	40	40
		Ap	.0017	.0012	.0012	.0012	.0007	.0019	.0014	.0014	.0053	.0053	.0053	.0053	.0038	.0021	.0021	.0021	.0015	.0015	.0015	.0015	.0009	.0009
	9	SFM	285	285	285	255	255	275	275	245	365	365	365	365	365	325	325	325	325	325	290	290	290	290
		IPT	.0008	.0008	.0008	.0007	.0007	.0010	.0010	.0008	.0012	.0012	.0012	.0012	.0012	.0011	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009
		RPM	23100	23100	23100	20500	20500	18910	18910	16910	23460	23460	23460	23460	23460	20970	20970	20970	20970	20970	18690	18690	18690	18690
		IPM	39	39	39	30	30	36	36	29	55	55	55	55	55	44	44	44	44	44	34	34	34	34
		Ap	.0013	.0009	.0009	.0009	.0006	.0015	.0011	.0011	.0041	.0041	.0041	.0041	.0030	.0016	.0016	.0016	.0012	.0012	.0012	.0012	.0007	.0007
	11.1	SFM	300	300	300	265	265	285	285	255	380	380	380	380	380	340	340	340	340	340	305	305	305	305
		IPT	.0009	.0009	.0009	.0008	.0008	.0011	.0011	.0009	.0013	.0013	.0013	.0013	.0013	.0012	.0012	.0012	.0012	.0012	.0010	.0010	.0010	.0010
		RPM	24320	24320	24320	21580	21580	19910	19910	17800	24700	24700	24700	24700	24700	22080	22080	22080	22080	22080	19670	19670	19670	19670
		IPM	46	46	46	36	36	42	42	34	64	64	64	64	64	52	52	52	52	52	40	40	40	40
		Ap	.0017	.0012	.0012	.0012	.0007	.0019	.0014	.0014	.0053	.0053	.0053	.0053	.0038	.0021	.0021	.0021	.0015	.0015	.0015	.0015	.0009	.0009
	11.2	SFM	285	285	285	255	255	275	275	245	365	365	365	365	365	325	325	325	325	325	290	290	290	290
		IPT	.0008	.0008	.0008	.0007	.0007	.0010	.0010	.0008	.0012	.0012	.0012	.0012	.0012	.0011	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009
		RPM	23100	23100	23100	20500	20500	18910	18910	16910	23460	23460	23460	23460	23460	20970	20970	20970	20970	20970	18690	18690	18690	18690
		IPM	39	39	39	30	30	36	36	29	55	55	55	55	55	44	44	44	44	44	34	34	34	34
		Ap	.0013	.0009	.0009	.0009	.0006	.0015	.0011	.0011	.0041	.0041	.0041	.0041	.0030	.0016	.0016	.0016	.0012	.0012	.0012	.0012	.0007	.0007
H	38.1	SFM	250	250	250	220	220	240	240	215	315	315	315	315	315	285	285	285	285	285	250	250	250	250
		IPT	.0008	.0008	.0008	.0007	.0007	.0009	.0009	.0008	.0011	.0011	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009
		RPM	20180	20180	20180	17910	17910	16520	16520	14770	20500	20500	20500	20500	20500	18320	18320	18320	18320	18320	16330	16330	16330	16330
		IPM	32	32	32	25	25	30	30	24	45	45	45	45	45	37	37	37	37	37	28	28	28	28
		Ap	.0009	.0007	.0007	.0007	.0004	.0011	.0008	.0008	.0030	.0030	.0030	.0030	.0021	.0012	.0012	.0012	.0008	.0008	.0008	.0008	.0005	.0005
	38.2	SFM	250	250	250	220	220	240	240	215	315	315	315	315	315	285	285	285	285	285	250	250	250	250
		IPT	.0008	.0008	.0008	.0007	.0007	.0009	.0009	.0008	.0011	.0011	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009
		RPM	20180	20180	20180	17910	17910	16520	16520	14770	20500	20500	20500	20500	20500	18320	18320	18320	18320	18320	16330	16330	16330	16330
		IPM	32	32	32	25	25	30	30	24	45	45	45	45	45	37	37	37	37	37	28	28	28	28
		Ap	.0009	.0007	.0007	.0007	.0004	.0011	.0008	.0008	.0030	.0030	.0030	.0030	.0021	.0012	.0012	.0012	.0008	.0008	.0008	.0008	.0005	.0005
	40	SFM	285	285	285	255	255	275	275	245	365	365	365	365	365	325	325	325	325	325	290	290	290	290
		IPT	.0008	.0008	.0008	.0007	.0007	.0010	.0010	.0008	.0012	.0012	.0012	.0012	.0012	.0011	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0009
		RPM	23100	23100	23100	20500	20500	18910	18910	16910	23460	23460	23460	23460	23460	20970	20970	20970	20970	20970	18690	18690	18690	18690
		IPM	39	39	39	30	30	36	36	29	55	55	55	55	55	44	44	44	44	44	34	34	34	34
		Ap	.0013	.0009	.0009	.0009	.0006	.0015	.0011	.0011	.0041	.0041	.0041	.0041	.0030	.0016	.0016	.0016	.0012	.0012	.0012	.0012	.0007	.0007
	41	SFM	250	250	250	220	220	240	240	215	315	315	315	315	315	285	285	285	285	285	250	250	250	250
		IPT	.0008	.0008	.0008	.0007	.0007	.0009	.0009	.0008	.0011	.0011	.0011	.0011	.0011	.0010	.0010	.0010	.0010	.0010	.0009	.0009	.0009	.0009
		RPM	20180	20180	20180	17910	17910	16520	16520	14770	20500	20500	20500	20500	20500	18320	18320	18320	18320	18320	16330	16330	16330	16330
		IPM	32	32	32	25	25	30	30	24	45	45	45	45	45	37	37	37	37	37	28	28	28	28
		Ap	.0009	.0007	.0007	.0007	.0004	.0011	.0008	.0008	.0030	.0030	.0030	.0030	.0021	.0012	.0012	.0012	.0008	.0008	.0008	.0008	.0005	.0005

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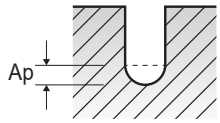
HPK45, HPK46, HPK47 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																						
			1.5	1.5	1.6	1.6	1.6	1.6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
			LBS	25	30	8	12	16	20	3	4	5	6	8	10	12	13	14	16	18	20	22	25	30	35
P	5	SFM	230	230	380	340	340	300	380	380	380	380	380	380	345	345	345	345	345	345	305	305	305	230
		IPT	.0009	.0009	.0014	.0013	.0013	.0011	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	14860	14860	22950	20490	20490	18240	18520	18520	18520	18520	18520	18520	16720	16720	16720	16720	16720	16720	14750	14750	14750	11150
		IPM	27	27	63	52	52	40	73	73	73	73	73	73	59	59	59	59	59	59	46	46	46	31
		Ap	.0006	.0006	.0041	.0022	.0016	.0016	.0071	.0071	.0071	.0071	.0051	.0051	.0028	.0028	.0028	.0028	.0020	.0020	.0020	.0020	.0012	.0008
	8	SFM	230	230	380	340	340	300	380	380	380	380	380	380	345	345	345	345	345	345	305	305	305	230
		IPT	.0009	.0009	.0014	.0013	.0013	.0011	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	14860	14860	22950	20490	20490	18240	18520	18520	18520	18520	18520	18520	16720	16720	16720	16720	16720	16720	14750	14750	14750	11150
		IPM	27	27	63	52	52	40	73	73	73	73	73	73	59	59	59	59	59	59	46	46	46	31
		Ap	.0006	.0006	.0041	.0022	.0016	.0016	.0071	.0071	.0071	.0071	.0051	.0051	.0028	.0028	.0028	.0028	.0020	.0020	.0020	.0020	.0012	.0008
	9	SFM	220	220	360	320	320	285	365	365	365	365	365	365	325	325	325	325	325	325	290	290	290	220
		IPT	.0008	.0008	.0012	.0011	.0011	.0010	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0016	.0016	.0016	.0014	.0014	.0014	.0012
		RPM	14120	14120	21800	19470	19470	17330	17600	17600	17600	17600	17600	17600	15880	15880	15880	15880	15880	15880	14020	14020	14020	10590
		IPM	23	23	54	44	44	34	62	62	62	62	62	62	50	50	50	50	50	50	39	39	39	26
		Ap	.0005	.0005	.0032	.0017	.0012	.0012	.0055	.0055	.0055	.0055	.0040	.0040	.0021	.0021	.0021	.0021	.0015	.0015	.0015	.0015	.0009	.0006
	11.1	SFM	230	230	380	340	340	300	380	380	380	380	380	380	345	345	345	345	345	345	305	305	305	230
		IPT	.0009	.0009	.0014	.0013	.0013	.0011	.0020	.0020	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0014
		RPM	14860	14860	22950	20490	20490	18240	18520	18520	18520	18520	18520	18520	16720	16720	16720	16720	16720	16720	14750	14750	14750	11150
		IPM	27	27	63	52	52	40	73	73	73	73	73	73	59	59	59	59	59	59	46	46	46	31
		Ap	.0006	.0006	.0041	.0022	.0016	.0016	.0071	.0071	.0071	.0071	.0051	.0051	.0028	.0028	.0028	.0028	.0020	.0020	.0020	.0020	.0012	.0008
	11.2	SFM	220	220	360	320	320	285	365	365	365	365	365	365	325	325	325	325	325	325	290	290	290	220
		IPT	.0008	.0008	.0012	.0011	.0011	.0010	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0016	.0016	.0016	.0014	.0014	.0014	.0012
		RPM	14120	14120	21800	19470	19470	17330	17600	17600	17600	17600	17600	17600	15880	15880	15880	15880	15880	15880	14020	14020	14020	10590
		IPM	23	23	54	44	44	34	62	62	62	62	62	62	50	50	50	50	50	50	39	39	39	26
		Ap	.0005	.0005	.0032	.0017	.0012	.0012	.0055	.0055	.0055	.0055	.0040	.0040	.0021	.0021	.0021	.0021	.0015	.0015	.0015	.0015	.0009	.0006
H	38.1	SFM	190	190	315	280	280	250	315	315	315	315	315	315	285	285	285	285	285	285	255	255	255	190
		IPT	.0008	.0008	.0012	.0011	.0011	.0009	.0017	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0012
		RPM	12340	12340	19050	17010	17010	15140	15370	15370	15370	15370	15370	15370	13880	13880	13880	13880	13880	13880	12250	12250	12250	9250
		IPM	19	19	44	36	36	28	51	51	51	51	51	51	41	41	41	41	41	41	33	33	33	21
		Ap	.0003	.0003	.0023	.0012	.0009	.0009	.0040	.0040	.0040	.0040	.0029	.0029	.0015	.0015	.0015	.0015	.0011	.0011	.0011	.0011	.0007	.0004
	38.2	SFM	190	190	315	280	280	250	315	315	315	315	315	315	285	285	285	285	285	285	255	255	255	190
		IPT	.0008	.0008	.0012	.0011	.0011	.0009	.0017	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0012
		RPM	12340	12340	19050	17010	17010	15140	15370	15370	15370	15370	15370	15370	13880	13880	13880	13880	13880	13880	12250	12250	12250	9250
		IPM	19	19	44	36	36	28	51	51	51	51	51	51	41	41	41	41	41	41	33	33	33	21
		Ap	.0003	.0003	.0023	.0012	.0009	.0009	.0040	.0040	.0040	.0040	.0029	.0029	.0015	.0015	.0015	.0015	.0011	.0011	.0011	.0011	.0007	.0004
	40	SFM	220	220	360	320	320	285	365	365	365	365	365	365	325	325	325	325	325	325	290	290	290	220
		IPT	.0008	.0008	.0012	.0011	.0011	.0010	.0018	.0018	.0018	.0018	.0018	.0018	.0016	.0016	.0016	.0016	.0016	.0016	.0014	.0014	.0014	.0012
		RPM	14120	14120	21800	19470	19470	17330	17600	17600	17600	17600	17600	17600	15880	15880	15880	15880	15880	15880	14020	14020	14020	10590
		IPM	23	23	54	44	44	34	62	62	62	62	62	62	50	50	50	50	50	50	39	39	39	26
		Ap	.0005	.0005	.0032	.0017	.0012	.0012	.0055	.0055	.0055	.0055	.0040	.0040	.0021	.0021	.0021	.0021	.0015	.0015	.0015	.0015	.0009	.0006
	41	SFM	190	190	315	280	280	250	315	315	315	315	315	315	285	285	285	285	285	285	255	255	255	190
		IPT	.0008	.0008	.0012	.0011	.0011	.0009	.0017	.0017	.0017	.0017	.0017	.0017	.0015	.0015	.0015	.0015	.0015	.0015	.0013	.0013	.0013	.0012
		RPM	12340	12340	19050	17010	17010	15140	15370	15370	15370	15370	15370	15370	13880	13880	13880	13880	13880	13880	12250	12250	12250	9250
		IPM	19	19	44	36	36	28	51	51	51	51	51	51	41	41	41	41	41	41	33	33	33	21
		Ap	.0003	.0003	.0023	.0012	.0009	.0009	.0040	.0040	.0040	.0040	.0029	.0029	.0015	.0015	.0015	.0015	.0011	.0011	.0011	.0011	.0007	.0004

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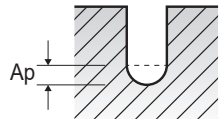
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																					
			2	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3	3	3	3	3	3	3	3	3	3	3
		LBS	40	50	6	6.25	8	10	15	20	25	30	35	6	7.5	8	10	12	14	15	16	20	25	30
P	5	SFM	230	115	420	420	420	420	380	380	380	335	335	435	435	435	435	435	435	435	390	390	390	390
		IPT	.0014	.0012	.0024	.0024	.0024	.0024	.0022	.0022	.0022	.0019	.0019	.0030	.0030	.0030	.0030	.0030	.0030	.0030	.0026	.0026	.0026	.0026
		RPM	11150	5570	16260	16260	16260	16260	14690	14690	14690	12980	12980	14100	14100	14100	14100	14100	14100	14100	12680	12680	12680	12680
		IPM	31	13	78	78	78	78	64	64	64	50	50	83	83	83	83	83	83	83	67	67	67	67
		Ap	.0008	.0004	.0089	.0089	.0064	.0064	.0034	.0034	.0025	.0025	.0015	.0106	.0106	.0106	.0077	.0077	.0077	.0077	.0041	.0041	.0030	.0030
	8	SFM	230	115	420	420	420	420	380	380	380	335	335	435	435	435	435	435	435	435	390	390	390	390
		IPT	.0014	.0012	.0024	.0024	.0024	.0024	.0022	.0022	.0022	.0019	.0019	.0030	.0030	.0030	.0030	.0030	.0030	.0030	.0026	.0026	.0026	.0026
		RPM	11150	5570	16260	16260	16260	16260	14690	14690	14690	12980	12980	14100	14100	14100	14100	14100	14100	14100	12680	12680	12680	12680
		IPM	31	13	78	78	78	78	64	64	64	50	50	83	83	83	83	83	83	83	67	67	67	67
		Ap	.0008	.0004	.0089	.0089	.0064	.0064	.0034	.0034	.0025	.0025	.0015	.0106	.0106	.0106	.0077	.0077	.0077	.0077	.0041	.0041	.0030	.0030
	9	SFM	220	110	400	400	400	400	360	360	360	320	320	415	415	415	415	415	415	415	370	370	370	370
		IPT	.0012	.0011	.0021	.0021	.0021	.0021	.0019	.0019	.0019	.0017	.0017	.0026	.0026	.0026	.0026	.0026	.0026	.0026	.0024	.0024	.0024	.0024
		RPM	10590	5300	15450	15450	15450	15450	13950	13950	13950	12330	12330	13390	13390	13390	13390	13390	13390	13390	12040	12040	12040	12040
		IPM	26	11	66	66	66	66	54	54	54	43	43	71	71	71	71	71	71	71	57	57	57	57
		Ap	.0006	.0003	.0069	.0069	.0050	.0050	.0027	.0027	.0019	.0019	.0012	.0083	.0083	.0083	.0060	.0060	.0060	.0060	.0032	.0032	.0023	.0023
	11.1	SFM	230	115	420	420	420	420	380	380	380	335	335	435	435	435	435	435	435	435	390	390	390	390
		IPT	.0014	.0012	.0024	.0024	.0024	.0024	.0022	.0022	.0022	.0019	.0019	.0030	.0030	.0030	.0030	.0030	.0030	.0030	.0026	.0026	.0026	.0026
		RPM	11150	5570	16260	16260	16260	16260	14690	14690	14690	12980	12980	14100	14100	14100	14100	14100	14100	14100	12680	12680	12680	12680
		IPM	31	13	78	78	78	78	64	64	64	50	50	83	83	83	83	83	83	83	67	67	67	67
		Ap	.0008	.0004	.0089	.0089	.0064	.0064	.0034	.0034	.0025	.0025	.0015	.0106	.0106	.0106	.0077	.0077	.0077	.0077	.0041	.0041	.0030	.0030
	11.2	SFM	220	110	400	400	400	400	360	360	360	320	320	415	415	415	415	415	415	415	370	370	370	370
		IPT	.0012	.0011	.0021	.0021	.0021	.0021	.0019	.0019	.0019	.0017	.0017	.0026	.0026	.0026	.0026	.0026	.0026	.0026	.0024	.0024	.0024	.0024
		RPM	10590	5300	15450	15450	15450	15450	13950	13950	13950	12330	12330	13390	13390	13390	13390	13390	13390	13390	12040	12040	12040	12040
		IPM	26	11	66	66	66	66	54	54	54	43	43	71	71	71	71	71	71	71	57	57	57	57
		Ap	.0006	.0003	.0069	.0069	.0050	.0050	.0027	.0027	.0019	.0019	.0012	.0083	.0083	.0083	.0060	.0060	.0060	.0060	.0032	.0032	.0023	.0023
H	38.1	SFM	190	95	350	350	350	350	315	315	315	280	280	360	360	360	360	360	360	360	325	325	325	325
		IPT	.0012	.0010	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016	.0016	.0025	.0025	.0025	.0025	.0025	.0025	.0025	.0022	.0022	.0022	.0022
		RPM	9250	4630	13500	13500	13500	13500	12190	12190	12190	10780	10780	11700	11700	11700	11700	11700	11700	11700	10520	10520	10520	10520
		IPM	21	9	55	55	55	55	45	45	45	35	35	58	58	58	58	58	58	58	47	47	47	47
		Ap	.0004	.0002	.0050	.0050	.0036	.0036	.0019	.0019	.0014	.0014	.0008	.0060	.0060	.0060	.0043	.0043	.0043	.0043	.0023	.0023	.0017	.0017
	38.2	SFM	190	95	350	350	350	350	315	315	315	280	280	360	360	360	360	360	360	360	325	325	325	325
		IPT	.0012	.0010	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016	.0016	.0025	.0025	.0025	.0025	.0025	.0025	.0025	.0022	.0022	.0022	.0022
		RPM	9250	4630	13500	13500	13500	13500	12190	12190	12190	10780	10780	11700	11700	11700	11700	11700	11700	11700	10520	10520	10520	10520
		IPM	21	9	55	55	55	55	45	45	45	35	35	58	58	58	58	58	58	58	47	47	47	47
		Ap	.0004	.0002	.0050	.0050	.0036	.0036	.0019	.0019	.0014	.0014	.0008	.0060	.0060	.0060	.0043	.0043	.0043	.0043	.0023	.0023	.0017	.0017
	40	SFM	220	110	400	400	400	400	360	360	360	320	320	415	415	415	415	415	415	415	370	370	370	370
		IPT	.0012	.0011	.0021	.0021	.0021	.0021	.0019	.0019	.0019	.0017	.0017	.0026	.0026	.0026	.0026	.0026	.0026	.0026	.0024	.0024	.0024	.0024
		RPM	10590	5300	15450	15450	15450	15450	13950	13950	13950	12330	12330	13390	13390	13390	13390	13390	13390	13390	12040	12040	12040	12040
		IPM	26	11	66	66	66	66	54	54	54	43	43	71	71	71	71	71	71	71	57	57	57	57
		Ap	.0006	.0003	.0069	.0069	.0050	.0050	.0027	.0027	.0019	.0019	.0012	.0083	.0083	.0083	.0060	.0060	.0060	.0060	.0032	.0032	.0023	.0023
	41	SFM	190	95	350	350	350	350	315	315	315	280	280	360	360	360	360	360	360	360	325	325	325	325
		IPT	.0012	.0010	.0020	.0020	.0020	.0020	.0018	.0018	.0018	.0016	.0016	.0025	.0025	.0025	.0025	.0025	.0025	.0025	.0022	.0022	.0022	.0022
		RPM	9250	4630	13500	13500	13500	13500	12190	12190	12190	10780	10780	11700	11700	11700	11700	11700	11700	11700	10520	10520	10520	10520
		IPM	21	9	55	55	55	55	45	45	45	35	35	58	58	58	58	58	58	58	47	47	47	47
		Ap	.0004	.0002	.0050	.0050	.0036	.0036	.0019	.0019	.0014	.0014	.0008	.0060	.0060	.0060	.0043	.0043	.0043	.0043	.0023	.0023	.0017	.0017

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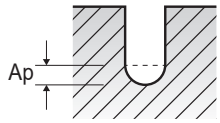
2 FLUTE BALL NOSE for RIB PROCESSING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																						
			3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4	4	4	4	4	4
			LBS	35	40	50	8.75	15	20	25	30	35	40	45	8	10	12	14	15	20	25	30	35	40	45
P	5	SFM	350	350	260	425	425	380	380	380	380	340	340	415	415	415	415	415	415	375	375	375	375	335
		IPT	.0024	.0024	.0020	.0035	.0035	.0031	.0031	.0028	.0028	.0028	.0028	.0039	.0039	.0039	.0039	.0039	.0039	.0035	.0035	.0035	.0035	.0031
		RPM	11260	11260	8420	11800	11800	10590	10590	10590	10590	9370	9370	10080	10080	10080	10080	10080	10080	9100	9100	9100	9100	8120
		IPM	53	53	34	82	82	66	66	59	59	52	52	79	79	79	79	79	79	64	64	64	64	51
		Ap	.0030	.0018	.0012	.0124	.0090	.0048	.0048	.0034	.0034	.0034	.0034	.0142	.0142	.0142	.0102	.0102	.0102	.0055	.0055	.0039	.0039	.0039
	8	SFM	350	350	260	425	425	380	380	380	380	340	340	415	415	415	415	415	415	375	375	375	375	335
		IPT	.0024	.0024	.0020	.0035	.0035	.0031	.0031	.0028	.0028	.0028	.0028	.0039	.0039	.0039	.0039	.0039	.0039	.0035	.0035	.0035	.0035	.0031
		RPM	11260	11260	8420	11800	11800	10590	10590	10590	10590	9370	9370	10080	10080	10080	10080	10080	10080	9100	9100	9100	9100	8120
		IPM	53	53	34	82	82	66	66	59	59	52	52	79	79	79	79	79	79	64	64	64	64	51
		Ap	.0030	.0018	.0012	.0124	.0090	.0048	.0048	.0034	.0034	.0034	.0034	.0142	.0142	.0142	.0102	.0102	.0102	.0055	.0055	.0039	.0039	.0039
	9	SFM	330	330	245	405	405	365	365	365	365	320	320	395	395	395	395	395	395	355	355	355	355	320
		IPT	.0021	.0021	.0018	.0031	.0031	.0028	.0028	.0025	.0025	.0025	.0025	.0035	.0035	.0035	.0035	.0035	.0035	.0032	.0032	.0032	.0032	.0028
		RPM	10690	10690	7990	11210	11210	10060	10060	10060	10060	8900	8900	9580	9580	9580	9580	9580	9580	8640	8640	8640	8640	7710
		IPM	45	45	29	70	70	56	56	50	50	44	44	67	67	67	67	67	67	55	55	55	55	43
		Ap	.0023	.0014	.0009	.0097	.0070	.0038	.0038	.0027	.0027	.0027	.0027	.0111	.0111	.0111	.0080	.0080	.0080	.0043	.0043	.0031	.0031	.0031
	11.1	SFM	350	350	260	425	425	380	380	380	380	340	340	415	415	415	415	415	415	375	375	375	375	335
		IPT	.0024	.0024	.0020	.0035	.0035	.0031	.0031	.0028	.0028	.0028	.0028	.0039	.0039	.0039	.0039	.0039	.0039	.0035	.0035	.0035	.0035	.0031
		RPM	11260	11260	8420	11800	11800	10590	10590	10590	10590	9370	9370	10080	10080	10080	10080	10080	10080	9100	9100	9100	9100	8120
		IPM	53	53	34	82	82	66	66	59	59	52	52	79	79	79	79	79	79	64	64	64	64	51
		Ap	.0030	.0018	.0012	.0124	.0090	.0048	.0048	.0034	.0034	.0034	.0034	.0142	.0142	.0142	.0102	.0102	.0102	.0055	.0055	.0039	.0039	.0039
	11.2	SFM	330	330	245	405	405	365	365	365	365	320	320	395	395	395	395	395	395	355	355	355	355	320
		IPT	.0021	.0021	.0018	.0031	.0031	.0028	.0028	.0025	.0025	.0025	.0025	.0035	.0035	.0035	.0035	.0035	.0035	.0032	.0032	.0032	.0032	.0028
		RPM	10690	10690	7990	11210	11210	10060	10060	10060	10060	8900	8900	9580	9580	9580	9580	9580	9580	8640	8640	8640	8640	7710
		IPM	45	45	29	70	70	56	56	50	50	44	44	67	67	67	67	67	67	55	55	55	55	43
		Ap	.0023	.0014	.0009	.0097	.0070	.0038	.0038	.0027	.0027	.0027	.0027	.0111	.0111	.0111	.0080	.0080	.0080	.0043	.0043	.0031	.0031	.0031
H	38.1	SFM	290	290	215	355	355	315	315	315	315	280	280	345	345	345	345	345	345	310	310	310	310	280
		IPT	.0020	.0020	.0017	.0029	.0029	.0026	.0026	.0024	.0024	.0023	.0023	.0033	.0033	.0033	.0033	.0033	.0033	.0030	.0030	.0030	.0030	.0027
		RPM	9340	9340	6980	9800	9800	8790	8790	8790	8790	7770	7770	8370	8370	8370	8370	8370	8370	7550	7550	7550	7550	6740
		IPM	37	37	24	57	57	46	46	42	42	36	36	56	56	56	56	56	56	45	45	45	45	36
		Ap	.0017	.0010	.0007	.0069	.0050	.0027	.0027	.0019	.0019	.0019	.0019	.0079	.0079	.0079	.0057	.0057	.0057	.0031	.0031	.0022	.0022	.0022
	38.2	SFM	290	290	215	355	355	315	315	315	315	280	280	345	345	345	345	345	345	310	310	310	310	280
		IPT	.0020	.0020	.0017	.0029	.0029	.0026	.0026	.0024	.0024	.0023	.0023	.0033	.0033	.0033	.0033	.0033	.0033	.0030	.0030	.0030	.0030	.0027
		RPM	9340	9340	6980	9800	9800	8790	8790	8790	8790	7770	7770	8370	8370	8370	8370	8370	8370	7550	7550	7550	7550	6740
		IPM	37	37	24	57	57	46	46	42	42	36	36	56	56	56	56	56	56	45	45	45	45	36
		Ap	.0017	.0010	.0007	.0069	.0050	.0027	.0027	.0019	.0019	.0019	.0019	.0079	.0079	.0079	.0057	.0057	.0057	.0031	.0031	.0022	.0022	.0022
	40	SFM	330	330	245	405	405	365	365	365	365	320	320	395	395	395	395	395	395	355	355	355	355	320
		IPT	.0021	.0021	.0018	.0031	.0031	.0028	.0028	.0025	.0025	.0025	.0025	.0035	.0035	.0035	.0035	.0035	.0035	.0032	.0032	.0032	.0032	.0028
		RPM	10690	10690	7990	11210	11210	10060	10060	10060	10060	8900	8900	9580	9580	9580	9580	9580	9580	8640	8640	8640	8640	7710
		IPM	45	45	29	70	70	56	56	50	50	44	44	67	67	67	67	67	67	55	55	55	55	43
		Ap	.0023	.0014	.0009	.0097	.0070	.0038	.0038	.0027	.0027	.0027	.0027	.0111	.0111	.0111	.0080	.0080	.0080	.0043	.0043	.0031	.0031	.0031
	41	SFM	290	290	215	355	355	315	315	315	315	280	280	345	345	345	345	345	345	310	310	310	310	280
		IPT	.0020	.0020	.0017	.0029	.0029	.0026	.0026	.0024	.0024	.0023	.0023	.0033	.0033	.0033	.0033	.0033	.0033	.0030	.0030	.0030	.0030	.0027
		RPM	9340	9340	6980	9800	9800	8790	8790	8790	8790	7770	7770	8370	8370	8370	8370	8370	8370	7550	7550	7550	7550	6740
		IPM	37	37	24	57	57	46	46	42	42	36	36	56	56	56	56	56	56	45	45	45	45	36
		Ap	.0017	.0010	.0007	.0069	.0050	.0027	.0027	.0019	.0019	.0019	.0019	.0079	.0079	.0079	.0057	.0057	.0057	.0031	.0031	.0022	.0022	.0022

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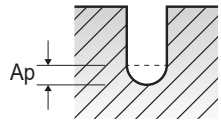
HPK45, HPK46, HPK47 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



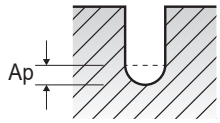
SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																			
			4	4	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	
		LBS	50	61.1	10	12	12.5	15	20	25	30	40	10	15	20	25	30	35	40	50	60	
P	5	SFM	335	250	410	410	410	410	410	410	370	370	415	415	415	415	415	375	375	375	375	
		IPT	.0031	.0028	.0047	.0047	.0047	.0047	.0047	.0047	.0043	.0043	.0058	.0058	.0058	.0058	.0058	.0052	.0052	.0052	.0052	
		RPM	8120	6050	7930	7930	7930	7930	7930	7930	7150	7150	6720	6720	6720	6720	6720	6050	6050	6050	6050	
		IPM	51	33	75	75	75	75	75	75	61	61	77	77	77	77	77	63	63	63	63	
		Ap	.0039	.0024	.0177	.0177	.0177	.0177	.0128	.0128	.0069	.0069	.0213	.0213	.0154	.0154	.0154	.0083	.0083	.0059	.0059	
	8	SFM	335	250	410	410	410	410	410	410	370	370	415	415	415	415	415	375	375	375	375	
		IPT	.0031	.0028	.0047	.0047	.0047	.0047	.0047	.0047	.0043	.0043	.0058	.0058	.0058	.0058	.0058	.0052	.0052	.0052	.0052	
		RPM	8120	6050	7930	7930	7930	7930	7930	7930	7150	7150	6720	6720	6720	6720	6720	6050	6050	6050	6050	
		IPM	51	33	75	75	75	75	75	75	61	61	77	77	77	77	77	63	63	63	63	
		Ap	.0039	.0024	.0177	.0177	.0177	.0177	.0128	.0128	.0069	.0069	.0213	.0213	.0154	.0154	.0154	.0083	.0083	.0059	.0059	
	9	SFM	320	235	390	390	390	390	390	390	350	350	395	395	395	395	395	355	355	355	355	
		IPT	.0028	.0025	.0042	.0042	.0042	.0042	.0042	.0042	.0038	.0038	.0051	.0051	.0051	.0051	.0051	.0046	.0046	.0046	.0046	
		RPM	7710	5750	7540	7540	7540	7540	7540	7540	6790	6790	6380	6380	6380	6380	6380	5750	5750	5750	5750	
		IPM	43	28	64	64	64	64	64	64	52	52	66	66	66	66	66	53	53	53	53	
		Ap	.0031	.0018	.0138	.0138	.0138	.0138	.0100	.0100	.0054	.0054	.0166	.0166	.0120	.0120	.0120	.0064	.0064	.0046	.0046	
	11.1	SFM	335	250	410	410	410	410	410	410	370	370	415	415	415	415	415	375	375	375	375	
		IPT	.0031	.0028	.0047	.0047	.0047	.0047	.0047	.0047	.0043	.0043	.0058	.0058	.0058	.0058	.0058	.0052	.0052	.0052	.0052	
		RPM	8120	6050	7930	7930	7930	7930	7930	7930	7150	7150	6720	6720	6720	6720	6720	6050	6050	6050	6050	
		IPM	51	33	75	75	75	75	75	75	61	61	77	77	77	77	77	63	63	63	63	
		Ap	.0039	.0024	.0177	.0177	.0177	.0177	.0128	.0128	.0069	.0069	.0213	.0213	.0154	.0154	.0154	.0083	.0083	.0059	.0059	
	11.2	SFM	320	235	390	390	390	390	390	390	350	350	395	395	395	395	395	355	355	355	355	
		IPT	.0028	.0025	.0042	.0042	.0042	.0042	.0042	.0042	.0038	.0038	.0051	.0051	.0051	.0051	.0051	.0046	.0046	.0046	.0046	
		RPM	7710	5750	7540	7540	7540	7540	7540	7540	6790	6790	6380	6380	6380	6380	6380	5750	5750	5750	5750	
		IPM	43	28	64	64	64	64	64	64	52	52	66	66	66	66	66	53	53	53	53	
		Ap	.0031	.0018	.0138	.0138	.0138	.0138	.0100	.0100	.0054	.0054	.0166	.0166	.0120	.0120	.0120	.0064	.0064	.0046	.0046	
H	38.1	SFM	280	205	340	340	340	340	340	340	305	305	345	345	345	345	345	310	310	310	310	
		IPT	.0027	.0023	.0040	.0040	.0040	.0040	.0040	.0040	.0036	.0036	.0048	.0048	.0048	.0048	.0048	.0044	.0044	.0044	.0044	
		RPM	6740	5020	6590	6590	6590	6590	6590	6590	5930	5930	5580	5580	5580	5580	5580	5020	5020	5020	5020	
		IPM	36	23	52	52	52	52	52	52	43	43	54	54	54	54	54	44	44	44	44	
		Ap	.0022	.0013	.0099	.0099	.0099	.0099	.0072	.0072	.0039	.0039	.0119	.0119	.0086	.0086	.0086	.0046	.0046	.0033	.0033	
	38.2	SFM	280	205	340	340	340	340	340	340	305	305	345	345	345	345	345	310	310	310	310	
		IPT	.0027	.0023	.0040	.0040	.0040	.0040	.0040	.0040	.0036	.0036	.0048	.0048	.0048	.0048	.0048	.0044	.0044	.0044	.0044	
		RPM	6740	5020	6590	6590	6590	6590	6590	6590	5930	5930	5580	5580	5580	5580	5580	5020	5020	5020	5020	
		IPM	36	23	52	52	52	52	52	52	43	43	54	54	54	54	54	44	44	44	44	
		Ap	.0022	.0013	.0099	.0099	.0099	.0099	.0072	.0072	.0039	.0039	.0119	.0119	.0086	.0086	.0086	.0046	.0046	.0033	.0033	
	40	SFM	320	235	390	390	390	390	390	390	350	350	395	395	395	395	395	355	355	355	355	
		IPT	.0028	.0025	.0042	.0042	.0042	.0042	.0042	.0042	.0038	.0038	.0051	.0051	.0051	.0051	.0051	.0046	.0046	.0046	.0046	
		RPM	7710	5750	7540	7540	7540	7540	7540	7540	6790	6790	6380	6380	6380	6380	6380	5750	5750	5750	5750	
		IPM	43	28	64	64	64	64	64	64	52	52	66	66	66	66	66	53	53	53	53	
		Ap	.0031	.0018	.0138	.0138	.0138	.0138	.0100	.0100	.0054	.0054	.0166	.0166	.0120	.0120	.0120	.0064	.0064	.0046	.0046	
	41	SFM	280	205	340	340	340	340	340	340	305	305	345	345	345	345	345	310	310	310	310	
		IPT	.0027	.0023	.0040	.0040	.0040	.0040	.0040	.0040	.0036	.0036	.0048	.0048	.0048	.0048	.0048	.0044	.0044	.0044	.0044	
		RPM	6740	5020	6590	6590	6590	6590	6590	6590	5930	5930	5580	5580	5580	5580	5580	5020	5020	5020	5020	
		IPM	36	23	52	52	52	52	52	52	43	43	54	54	54	54	54	44	44	44	44	
		Ap	.0022	.0013	.0099	.0099	.0099	.0099	.0072	.0072	.0039	.0039	.0119	.0119	.0086	.0086	.0086	.0046	.0046	.0033	.0033	

NEXT PAGE ▶

HPK45, HPK46, HPK47 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING



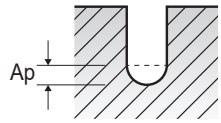
SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																		
			7	7	7	8	8	8	8	8	8	8	8	8	8	10	10	10	10	10	10
		LBS	40	45	60	20	24	35	50	55	60	70	80	98	120	25	30	35	55	60	65
P	5	SFM	370	370	370	410	410	410	370	370	370	370	370	330	330	410	410	410	370	370	370
		IPT	.0059	.0059	.0059	.0073	.0073	.0073	.0066	.0066	.0066	.0066	.0066	.0059	.0059	.0084	.0084	.0084	.0076	.0076	.0076
		RPM	5150	5150	5150	5000	5000	5000	4500	4500	4500	4500	4500	4000	4000	3970	3970	3970	3570	3570	3570
		IPM	60	60	60	73	73	73	59	59	59	59	59	47	47	67	67	67	54	54	54
		Ap	.0096	.0096	.0069	.0283	.0283	.0205	.0110	.0110	.0110	.0079	.0079	.0079	.0047	.0354	.0354	.0256	.0138	.0138	.0138
	8	SFM	370	370	370	410	410	410	370	370	370	370	370	330	330	410	410	410	370	370	370
		IPT	.0059	.0059	.0059	.0073	.0073	.0073	.0066	.0066	.0066	.0066	.0066	.0059	.0059	.0084	.0084	.0084	.0076	.0076	.0076
		RPM	5150	5150	5150	5000	5000	5000	4500	4500	4500	4500	4500	4000	4000	3970	3970	3970	3570	3570	3570
		IPM	60	60	60	73	73	73	59	59	59	59	59	47	47	67	67	67	54	54	54
		Ap	.0096	.0096	.0069	.0283	.0283	.0205	.0110	.0110	.0110	.0079	.0079	.0079	.0047	.0354	.0354	.0256	.0138	.0138	.0138
	9	SFM	355	355	355	390	390	390	355	355	355	355	355	315	315	390	390	390	350	350	350
		IPT	.0053	.0053	.0053	.0066	.0066	.0066	.0059	.0059	.0059	.0059	.0059	.0052	.0052	.0075	.0075	.0075	.0068	.0068	.0068
		RPM	4890	4890	4890	4750	4750	4750	4280	4280	4280	4280	4280	3800	3800	3770	3770	3770	3390	3390	3390
		IPM	51	51	51	62	62	62	50	50	50	50	50	40	40	57	57	57	46	46	46
		Ap	.0075	.0075	.0054	.0221	.0221	.0160	.0086	.0086	.0086	.0061	.0061	.0061	.0037	.0276	.0276	.0200	.0107	.0107	.0107
	11.1	SFM	370	370	370	410	410	410	370	370	370	370	370	330	330	410	410	410	370	370	370
		IPT	.0059	.0059	.0059	.0073	.0073	.0073	.0066	.0066	.0066	.0066	.0066	.0059	.0059	.0084	.0084	.0084	.0076	.0076	.0076
		RPM	5150	5150	5150	5000	5000	5000	4500	4500	4500	4500	4500	4000	4000	3970	3970	3970	3570	3570	3570
		IPM	60	60	60	73	73	73	59	59	59	59	59	47	47	67	67	67	54	54	54
		Ap	.0096	.0096	.0069	.0283	.0283	.0205	.0110	.0110	.0110	.0079	.0079	.0079	.0047	.0354	.0354	.0256	.0138	.0138	.0138
	11.2	SFM	355	355	355	390	390	390	355	355	355	355	355	315	315	390	390	390	350	350	350
		IPT	.0053	.0053	.0053	.0066	.0066	.0066	.0059	.0059	.0059	.0059	.0059	.0052	.0052	.0075	.0075	.0075	.0068	.0068	.0068
		RPM	4890	4890	4890	4750	4750	4750	4280	4280	4280	4280	4280	3800	3800	3770	3770	3770	3390	3390	3390
		IPM	51	51	51	62	62	62	50	50	50	50	50	40	40	57	57	57	46	46	46
		Ap	.0075	.0075	.0054	.0221	.0221	.0160	.0086	.0086	.0086	.0061	.0061	.0061	.0037	.0276	.0276	.0200	.0107	.0107	.0107
H	38.1	SFM	310	310	310	340	340	340	310	310	310	310	310	275	275	340	340	340	305	305	305
		IPT	.0049	.0049	.0049	.0062	.0062	.0062	.0056	.0056	.0056	.0056	.0056	.0049	.0049	.0071	.0071	.0071	.0064	.0064	.0064
		RPM	4280	4280	4280	4150	4150	4150	3740	3740	3740	3740	3740	3320	3320	3290	3290	3290	2960	2960	2960
		IPM	42	42	42	51	51	51	42	42	42	42	42	33	33	47	47	47	38	38	38
		Ap	.0054	.0054	.0039	.0159	.0159	.0115	.0062	.0062	.0062	.0044	.0044	.0044	.0026	.0198	.0198	.0143	.0077	.0077	.0077
	38.2	SFM	310	310	310	340	340	340	310	310	310	310	310	275	275	340	340	340	305	305	305
		IPT	.0049	.0049	.0049	.0062	.0062	.0062	.0056	.0056	.0056	.0056	.0056	.0049	.0049	.0071	.0071	.0071	.0064	.0064	.0064
		RPM	4280	4280	4280	4150	4150	4150	3740	3740	3740	3740	3740	3320	3320	3290	3290	3290	2960	2960	2960
		IPM	42	42	42	51	51	51	42	42	42	42	42	33	33	47	47	47	38	38	38
		Ap	.0054	.0054	.0039	.0159	.0159	.0115	.0062	.0062	.0062	.0044	.0044	.0044	.0026	.0198	.0198	.0143	.0077	.0077	.0077
	40	SFM	355	355	355	390	390	390	355	355	355	355	355	315	315	390	390	390	350	350	350
		IPT	.0053	.0053	.0053	.0066	.0066	.0066	.0059	.0059	.0059	.0059	.0059	.0052	.0052	.0075	.0075	.0075	.0068	.0068	.0068
		RPM	4890	4890	4890	4750	4750	4750	4280	4280	4280	4280	4280	3800	3800	3770	3770	3770	3390	3390	3390
		IPM	51	51	51	62	62	62	50	50	50	50	50	40	40	57	57	57	46	46	46
		Ap	.0075	.0075	.0054	.0221	.0221	.0160	.0086	.0086	.0086	.0061	.0061	.0061	.0037	.0276	.0276	.0200	.0107	.0107	.0107
	41	SFM	310	310	310	340	340	340	310	310	310	310	310	275	275	340	340	340	305	305	305
		IPT	.0049	.0049	.0049	.0062	.0062	.0062	.0056	.0056	.0056	.0056	.0056	.0049	.0049	.0071	.0071	.0071	.0064	.0064	.0064
		RPM	4280	4280	4280	4150	4150	4150	3740	3740	3740	3740	3740	3320	3320	3290	3290	3290	2960	2960	2960
		IPM	42	42	42	51	51	51	42	42	42	42	42	33	33	47	47	47	38	38	38
		Ap	.0054	.0054	.0039	.0159	.0159	.0115	.0062	.0062	.0062	.0044	.0044	.0044	.0026	.0198	.0198	.0143	.0077	.0077	.0077

NEXT PAGE ▶

HPK45, HPK46, HPK47 SERIES

2 FLUTE BALL NOSE for RIB PROCESSING

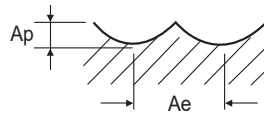


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)													
			10	10	10	12	12	12	12	12	12	14	16	18	20	25
		LBS	75	86	120	30	36	60	80	106	120	28	32	36	40	50
P	5	SFM	370	370	325	410	410	340	370	360	320	420	425	430	425	425
		IPT	.0076	.0076	.0068	.0094	.0094	.0059	.0084	.0094	.0094	.0094	.0094	.0099	.0104	.0106
		RPM	3570	3570	3170	3310	3310	2730	2980	2900	2580	2900	2580	2330	2070	1640
		IPM	54	54	43	62	62	32	50	54	48	54	48	46	43	35
		Ap	.0138	.0098	.0098	.0425	.0425	.0307	.0165	.0118	.0118	.0496	.0567	.0638	.0709	.0886
	8	SFM	370	370	325	410	410	340	370	360	320	420	425	430	425	425
		IPT	.0076	.0076	.0068	.0094	.0094	.0059	.0084	.0094	.0094	.0094	.0094	.0099	.0104	.0106
		RPM	3570	3570	3170	3310	3310	2730	2980	2900	2580	2900	2580	2330	2070	1640
		IPM	54	54	43	62	62	32	50	54	48	54	48	46	43	35
		Ap	.0138	.0098	.0098	.0425	.0425	.0307	.0165	.0118	.0118	.0496	.0567	.0638	.0709	.0886
	9	SFM	350	350	310	390	390	320	350	340	305	400	405	410	405	400
		IPT	.0068	.0068	.0060	.0084	.0084	.0053	.0075	.0084	.0084	.0084	.0084	.0088	.0093	.0095
		RPM	3390	3390	3020	3140	3140	2600	2830	2760	2450	2760	2450	2210	1960	1560
		IPM	46	46	36	53	53	28	43	46	41	46	41	39	37	30
		Ap	.0107	.0077	.0077	.0332	.0332	.0240	.0129	.0092	.0092	.0387	.0442	.0497	.0553	.0691
	11.1	SFM	370	370	325	410	410	340	370	360	320	420	425	430	425	425
		IPT	.0076	.0076	.0068	.0094	.0094	.0059	.0084	.0094	.0094	.0094	.0094	.0099	.0104	.0106
		RPM	3570	3570	3170	3310	3310	2730	2980	2900	2580	2900	2580	2330	2070	1640
		IPM	54	54	43	62	62	32	50	54	48	54	48	46	43	35
		Ap	.0138	.0098	.0098	.0425	.0425	.0307	.0165	.0118	.0118	.0496	.0567	.0638	.0709	.0886
	11.2	SFM	350	350	310	390	390	320	350	340	305	400	405	410	405	400
		IPT	.0068	.0068	.0060	.0084	.0084	.0053	.0075	.0084	.0084	.0084	.0084	.0088	.0093	.0095
		RPM	3390	3390	3020	3140	3140	2600	2830	2760	2450	2760	2450	2210	1960	1560
		IPM	46	46	36	53	53	28	43	46	41	46	41	39	37	30
		Ap	.0107	.0077	.0077	.0332	.0332	.0240	.0129	.0092	.0092	.0387	.0442	.0497	.0553	.0691
H	38.1	SFM	305	305	270	340	340	280	305	300	265	350	355	360	350	350
		IPT	.0064	.0064	.0057	.0079	.0079	.0050	.0071	.0079	.0079	.0079	.0079	.0083	.0088	.0090
		RPM	2960	2960	2630	2740	2740	2270	2470	2410	2140	2410	2140	1930	1710	1360
		IPM	38	38	30	43	43	23	35	38	34	38	34	32	30	24
		Ap	.0077	.0055	.0055	.0238	.0238	.0172	.0093	.0066	.0066	.0278	.0317	.0357	.0397	.0496
	38.2	SFM	305	305	270	340	340	280	305	300	265	350	355	360	350	350
		IPT	.0064	.0064	.0057	.0079	.0079	.0050	.0071	.0079	.0079	.0079	.0079	.0083	.0088	.0090
		RPM	2960	2960	2630	2740	2740	2270	2470	2410	2140	2410	2140	1930	1710	1360
		IPM	38	38	30	43	43	23	35	38	34	38	34	32	30	24
		Ap	.0077	.0055	.0055	.0238	.0238	.0172	.0093	.0066	.0066	.0278	.0317	.0357	.0397	.0496
	40	SFM	350	350	310	390	390	320	350	340	305	400	405	410	405	400
		IPT	.0068	.0068	.0060	.0084	.0084	.0053	.0075	.0084	.0084	.0084	.0084	.0088	.0093	.0095
		RPM	3390	3390	3020	3140	3140	2600	2830	2760	2450	2760	2450	2210	1960	1560
		IPM	46	46	36	53	53	28	43	46	41	46	41	39	37	30
		Ap	.0107	.0077	.0077	.0332	.0332	.0240	.0129	.0092	.0092	.0387	.0442	.0497	.0553	.0691
	41	SFM	305	305	270	340	340	280	305	300	265	350	355	360	350	350
		IPT	.0064	.0064	.0057	.0079	.0079	.0050	.0071	.0079	.0079	.0079	.0079	.0083	.0088	.0090
		RPM	2960	2960	2630	2740	2740	2270	2470	2410	2140	2410	2140	1930	1710	1360
		IPM	38	38	30	43	43	23	35	38	34	38	34	32	30	24
		Ap	.0077	.0055	.0055	.0238	.0238	.0172	.0093	.0066	.0066	.0278	.0317	.0357	.0397	.0496

HPK48 SERIES

2 FLUTE BALL NOSE - PLANE

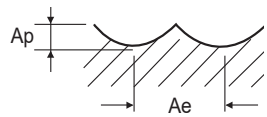


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Ae	Ap	Para-meter	Diameter (Ø)								
						1/32	1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2
P	5	Non-alloy steel	0.08D	0.05D	SFM	255	480	630	635	620	530	565	595	530
					IPT	.0015	.0021	.0029	.0036	.0054	.0068	.0075	.0078	.0084
					RPM	31390	29200	25740	19330	12680	8120	6910	6040	4060
					IPM	97	125	149	138	136	111	103	95	68
	8	Low alloy steel	0.08D	0.05D	SFM	255	480	630	635	620	530	565	595	530
					IPT	.0015	.0021	.0029	.0036	.0054	.0068	.0075	.0078	.0084
					RPM	31390	29200	25740	19330	12680	8120	6910	6040	4060
					IPM	97	125	149	138	136	111	103	95	68
	9		0.08D	0.05D	SFM	255	460	610	610	595	510	545	565	510
					IPT	.0013	.0018	.0026	.0033	.0048	.0061	.0064	.0069	.0074
					RPM	31390	28030	24760	18570	12170	7830	6660	5780	3890
					IPM	81	103	129	122	117	95	85	79	58
	11.1	High alloyed steel, and tool steel	0.08D	0.05D	SFM	255	480	630	635	620	530	565	595	530
					IPT	.0015	.0021	.0029	.0036	.0054	.0068	.0075	.0078	.0084
					RPM	31390	29200	25740	19330	12680	8120	6910	6040	4060
					IPM	97	125	149	138	136	111	103	95	68
	11.2		0.08D	0.05D	SFM	255	460	610	610	595	510	545	565	510
					IPT	.0013	.0018	.0026	.0033	.0048	.0061	.0064	.0069	.0074
					RPM	31390	28030	24760	18570	12170	7830	6660	5780	3890
					IPM	81	103	129	122	117	95	85	79	58
H	38.1	Hardened steel	0.08D	0.05D	SFM	230	410	510	510	500	420	460	475	430
					IPT	.0013	.0018	.0025	.0029	.0043	.0055	.0059	.0064	.0066
					RPM	28250	25110	20760	15570	10220	6430	5600	4860	3270
					IPM	74	92	102	92	89	71	66	62	43
	38.2		0.08D	0.05D	SFM	230	410	510	510	500	420	460	475	430
					IPT	.0013	.0018	.0025	.0029	.0043	.0055	.0059	.0064	.0066
					RPM	28250	25110	20760	15570	10220	6430	5600	4860	3270
					IPM	74	92	102	92	89	71	66	62	43
	40	Chilled Cast Iron	0.08D	0.05D	SFM	255	460	610	610	595	510	545	565	510
					IPT	.0013	.0018	.0026	.0033	.0048	.0061	.0064	.0069	.0074
					RPM	31390	28030	24760	18570	12170	7830	6660	5780	3890
					IPM	81	103	129	122	117	95	85	79	58
	41	Hardened Cast Iron	0.08D	0.05D	SFM	230	410	510	510	500	420	460	475	430
					IPT	.0013	.0018	.0025	.0029	.0043	.0055	.0059	.0064	.0066
					RPM	28250	25110	20760	15570	10220	6430	5600	4860	3270
					IPM	74	92	102	92	89	71	66	62	43

HPK44 SERIES

2 FLUTE BALL NOSE - PLANE



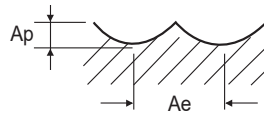
SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Ae	Ap	Para-meter	Diameter (Ø)								
						0.2	0.3	0.4	0.5	0.6	0.8	1	1.2	1.5
P	5	Non-alloy steel	0.08D	0.05D	SFM	65	95	130	160	195	255	320	380	475
					IPT	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0021
					RPM	31150	30600	31150	30820	31150	30740	30820	30870	30820
					IPM	29	36	47	58	71	94	116	124	131
	8	Low alloy steel	0.08D	0.05D	SFM	65	95	130	160	195	255	320	380	475
					IPT	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0021
					RPM	31150	30600	31150	30820	31150	30740	30820	30870	30820
					IPM	29	36	47	58	71	94	116	124	131
	9		0.08D	0.05D	SFM	65	95	130	160	195	255	320	370	460
					IPT	.0004	.0006	.0007	.0008	.0010	.0013	.0017	.0018	.0018
					RPM	31150	30600	31150	30820	31150	30740	30820	29780	29730
					IPM	27	34	42	51	61	80	102	106	110
	11.1	High alloyed steel, and tool steel	0.08D	0.05D	SFM	65	95	130	160	195	255	320	380	475
					IPT	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0021
					RPM	31150	30600	31150	30820	31150	30740	30820	30870	30820
					IPM	29	36	47	58	71	94	116	124	131
	11.2		0.08D	0.05D	SFM	65	95	130	160	195	255	320	370	460
					IPT	.0004	.0006	.0007	.0008	.0010	.0013	.0017	.0018	.0018
					RPM	31150	30600	31150	30820	31150	30740	30820	29780	29730
					IPM	27	34	42	51	61	80	102	106	110
H	38.1	Hardened steel	0.08D	0.05D	SFM	55	80	110	140	165	225	280	320	400
					IPT	.0004	.0005	.0007	.0008	.0009	.0013	.0017	.0018	.0019
					RPM	27060	26530	27060	26740	27060	27060	27060	25730	25890
					IPM	23	27	36	44	51	70	89	91	96
	38.2		0.08D	0.05D	SFM	55	80	110	140	165	225	280	320	400
					IPT	.0004	.0005	.0007	.0008	.0009	.0013	.0017	.0018	.0019
					RPM	27060	26530	27060	26740	27060	27060	27060	25730	25890
					IPM	23	27	36	44	51	70	89	91	96
	40	Chilled Cast Iron	0.08D	0.05D	SFM	65	95	130	160	195	255	320	370	460
					IPT	.0004	.0006	.0007	.0008	.0010	.0013	.0017	.0018	.0018
					RPM	31150	30600	31150	30820	31150	30740	30820	29780	29730
					IPM	27	34	42	51	61	80	102	106	110
	41	Hardened Cast Iron	0.08D	0.05D	SFM	55	80	110	140	165	225	280	320	400
					IPT	.0004	.0005	.0007	.0008	.0009	.0013	.0017	.0018	.0019
					RPM	27060	26530	27060	26740	27060	27060	27060	25730	25890
					IPM	23	27	36	44	51	70	89	91	96

NEXT PAGE ▶

HPK44 SERIES

2 FLUTE BALL NOSE - PLANE

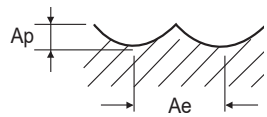


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)										
			2	2.5	3	4	5	6	8	10	12	16	20
P	5	SFM	630	630	630	630	590	530	565	590	530	565	565
		IPT	.0022	.0029	.0036	.0048	.0061	.0068	.0074	.0078	.0083	.0094	.0104
		RPM	30660	24520	20440	15330	11480	8580	6840	5740	4290	3440	2750
		IPM	138	143	146	146	141	118	102	90	72	65	57
	8	SFM	630	630	630	630	590	530	565	590	530	565	565
		IPT	.0022	.0029	.0036	.0048	.0061	.0068	.0074	.0078	.0083	.0094	.0104
		RPM	30660	24520	20440	15330	11480	8580	6840	5740	4290	3440	2750
		IPM	138	143	146	146	141	118	102	90	72	65	57
	9	SFM	610	610	610	610	570	515	545	570	510	545	550
		IPT	.0020	.0026	.0033	.0044	.0054	.0060	.0065	.0068	.0074	.0081	.0089
		RPM	29510	23610	19670	14750	11020	8310	6600	5510	4130	3300	2660
		IPM	116	123	129	129	120	100	85	75	61	54	47
	11.1	SFM	630	630	630	630	590	530	565	590	530	565	565
		IPT	.0022	.0029	.0036	.0048	.0061	.0068	.0074	.0078	.0083	.0094	.0104
		RPM	30660	24520	20440	15330	11480	8580	6840	5740	4290	3440	2750
		IPM	138	143	146	146	141	118	102	90	72	65	57
	11.2	SFM	610	610	610	610	570	515	545	570	510	545	550
		IPT	.0020	.0026	.0033	.0044	.0054	.0060	.0065	.0068	.0074	.0081	.0089
		RPM	29510	23610	19670	14750	11020	8310	6600	5510	4130	3300	2660
		IPM	116	123	129	129	120	100	85	75	61	54	47
H	38.1	SFM	495	495	495	495	465	405	445	465	415	445	445
		IPT	.0020	.0025	.0030	.0039	.0049	.0055	.0059	.0063	.0067	.0074	.0082
		RPM	24030	19230	16020	12020	8980	6580	5410	4490	3370	2710	2170
		IPM	95	95	95	95	88	73	64	57	45	40	35
	38.2	SFM	495	495	495	495	465	405	445	465	415	445	445
		IPT	.0020	.0025	.0030	.0039	.0049	.0055	.0059	.0063	.0067	.0074	.0082
		RPM	24030	19230	16020	12020	8980	6580	5410	4490	3370	2710	2170
		IPM	95	95	95	95	88	73	64	57	45	40	35
	40	SFM	610	610	610	610	570	515	545	570	510	545	550
		IPT	.0020	.0026	.0033	.0044	.0054	.0060	.0065	.0068	.0074	.0081	.0089
		RPM	29510	23610	19670	14750	11020	8310	6600	5510	4130	3300	2660
		IPM	116	123	129	129	120	100	85	75	61	54	47
	41	SFM	495	495	495	495	465	405	445	465	415	445	445
		IPT	.0020	.0025	.0030	.0039	.0049	.0055	.0059	.0063	.0067	.0074	.0082
		RPM	24030	19230	16020	12020	8980	6580	5410	4490	3370	2710	2170
		IPM	95	95	95	95	88	73	64	57	45	40	35

HPK11 SERIES

3 FLUTE BALL NOSE - PLANE



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Ae	Ap	Para-meter	Diameter (Ø)								
						3	4	5	6	8	10	12	16	20
P	5	Non-alloy steel	0.05D	0.02D	SFM	1015	1030	1065	1150	1150	1150	1150	1135	1150
					IPT	.0035	.0042	.0048	.0063	.0071	.0080	.0089	.0090	.0087
					RPM	32790	25000	20660	18580	13930	11150	9290	6870	5570
					IPM	349	316	295	349	298	266	247	186	146
	8	Low alloy steel	0.05D	0.02D	SFM	1015	1030	1065	1150	1150	1150	1150	1135	1150
					IPT	.0035	.0042	.0048	.0063	.0071	.0080	.0089	.0090	.0087
					RPM	32790	25000	20660	18580	13930	11150	9290	6870	5570
					IPM	349	316	295	349	298	266	247	186	146
	9		0.05D	0.02D	SFM	1015	1030	1065	1150	1150	1150	1150	1135	1150
					IPT	.0035	.0042	.0048	.0063	.0071	.0080	.0089	.0090	.0087
					RPM	32790	25000	20660	18580	13930	11150	9290	6870	5570
					IPM	349	316	295	349	298	266	247	186	146
	11.1	High alloyed steel, and tool steel	0.05D	0.02D	SFM	1015	1030	1065	1150	1150	1150	1150	1135	1150
					IPT	.0035	.0042	.0048	.0063	.0071	.0080	.0089	.0090	.0087
					RPM	32790	25000	20660	18580	13930	11150	9290	6870	5570
					IPM	349	316	295	349	298	266	247	186	146
	11.2		0.05D	0.02D	SFM	1015	1030	1065	1150	1150	1150	1150	1135	1150
					IPT	.0035	.0042	.0048	.0063	.0071	.0080	.0089	.0090	.0087
					RPM	32790	25000	20660	18580	13930	11150	9290	6870	5570
					IPM	349	316	295	349	298	266	247	186	146
H	38.1	Hardened steel	0.05D	0.02D	SFM	860	860	895	965	965	965	965	965	965
					IPT	.0028	.0035	.0043	.0054	.0061	.0066	.0074	.0075	.0076
					RPM	27870	20900	17380	15570	11680	9340	7790	5840	4670
					IPM	237	222	222	250	214	185	172	131	106
	38.2		0.05D	0.02D	SFM	860	860	895	965	965	965	965	965	965
					IPT	.0028	.0035	.0043	.0054	.0061	.0066	.0074	.0075	.0076
					RPM	27870	20900	17380	15570	11680	9340	7790	5840	4670
					IPM	237	222	222	250	214	185	172	131	106
	39.1		0.05D	0.02D	SFM	625	625	660	775	780	775	775	775	775
					IPT	.0028	.0034	.0039	.0048	.0057	.0061	.0068	.0071	.0071
					RPM	20220	15160	12790	12570	9430	7540	6280	4710	3770
					IPM	172	156	150	183	160	139	128	100	80
	39.2		0.05D	0.02D	SFM	590	610	625	710	710	710	710	710	695
					IPT	.0028	.0034	.0039	.0045	.0053	.0057	.0057	.0057	.0057
					RPM	19130	14750	12130	11480	8610	6890	5740	4300	3360
					IPM	163	150	142	156	136	117	98	73	58
	39.3		0.05D	0.02D	SFM	405	405	425	490	490	490	490	490	490
					IPT	.0028	.0034	.0039	.0043	.0049	.0057	.0057	.0057	.0056
					RPM	13110	9840	8200	7920	5940	4750	3960	2970	2380
					IPM	112	101	96	101	88	81	67	51	40
	40	Chilled Cast Iron	0.05D	0.02D	SFM	1015	1030	1065	1150	1150	1150	1150	1135	1150
					IPT	.0035	.0042	.0048	.0063	.0071	.0080	.0089	.0090	.0087
					RPM	32790	25000	20660	18580	13930	11150	9290	6870	5570
					IPM	349	316	295	349	298	266	247	186	146
	41	Hardened Cast Iron	0.05D	0.02D	SFM	860	860	895	965	965	965	965	965	965
					IPT	.0028	.0035	.0043	.0054	.0061	.0066	.0074	.0075	.0076
					RPM	27870	20900	17380	15570	11680	9340	7790	5840	4670
					IPM	237	222	222	250	214	185	172	131	106

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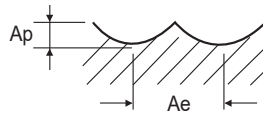
HPK12, HPK13 SERIES

4 FLUTE BALL NOSE - PLANE



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Ae	Ap	Para-meter	Diameter (Ø)												
						1	1.5	2	2.5	3	4	5	6	8	10	12	16	20
P	5	Non-alloy steel	0.05D	0.02D	SFM	620	930	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
					IPT	.0019	.0021	.0023	.0026	.0028	.0031	.0035	.0040	.0046	.0050	.0057	.0057	.0057
					RPM	60000	60000	55720	44600	37160	27870	22290	18580	13930	11150	9290	6970	5570
					IPM	454	501	518	457	415	351	316	296	255	225	212	158	126
	8	Low alloy steel	0.05D	0.02D	SFM	620	930	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
					IPT	.0019	.0021	.0023	.0026	.0028	.0031	.0035	.0040	.0046	.0050	.0057	.0057	.0057
					RPM	60000	60000	55720	44600	37160	27870	22290	18580	13930	11150	9290	6970	5570
					IPM	454	501	518	457	415	351	316	296	255	225	212	158	126
	9		0.05D	0.02D	SFM	620	930	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
					IPT	.0019	.0021	.0023	.0026	.0028	.0031	.0035	.0040	.0046	.0050	.0057	.0057	.0057
					RPM	60000	60000	55720	44600	37160	27870	22290	18580	13930	11150	9290	6970	5570
					IPM	454	501	518	457	415	351	316	296	255	225	212	158	126
	11.1	High alloyed steel, and tool steel	0.05D	0.02D	SFM	620	930	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
					IPT	.0019	.0021	.0023	.0026	.0028	.0031	.0035	.0040	.0046	.0050	.0057	.0057	.0057
					RPM	60000	60000	55720	44600	37160	27870	22290	18580	13930	11150	9290	6970	5570
					IPM	454	501	518	457	415	351	316	296	255	225	212	158	126
	11.2		0.05D	0.02D	SFM	620	930	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
					IPT	.0019	.0021	.0023	.0026	.0028	.0031	.0035	.0040	.0046	.0050	.0057	.0057	.0057
					RPM	60000	60000	55720	44600	37160	27870	22290	18580	13930	11150	9290	6970	5570
					IPM	454	501	518	457	415	351	316	296	255	225	212	158	126
H	38.1	Hardened steel	0.05D	0.02D	SFM	620	930	965	965	965	965	945	965	965	965	965	965	965
					IPT	.0017	.0019	.0020	.0022	.0024	.0028	.0032	.0036	.0041	.0044	.0049	.0051	.0050
					RPM	60000	60000	46760	37390	31150	23360	18360	15570	11680	9340	7790	5840	4670
					IPM	397	444	376	324	294	258	234	226	189	163	153	119	93
	38.2		0.05D	0.02D	SFM	620	930	965	965	965	965	945	965	965	965	965	965	965
					IPT	.0017	.0019	.0020	.0022	.0024	.0028	.0032	.0036	.0041	.0044	.0049	.0051	.0050
					RPM	60000	60000	46760	37390	31150	23360	18360	15570	11680	9340	7790	5840	4670
					IPM	397	444	376	324	294	258	234	226	189	163	153	119	93
	39.1		0.05D	0.02D	SFM	620	780	775	780	775	775	775	775	780	775	775	775	775
					IPT	.0015	.0016	.0017	.0019	.0020	.0024	.0028	.0032	.0038	.0041	.0045	.0047	.0047
					RPM	60000	50370	37700	30180	25140	18850	15080	12570	9430	7540	6280	4710	3770
					IPM	359	325	261	223	198	178	169	162	142	124	114	88	71
	39.2		0.05D	0.02D	SFM	620	710	710	710	710	710	710	710	710	710	710	710	695
					IPT	.0015	.0015	.0016	.0017	.0018	.0022	.0026	.0030	.0035	.0037	.0038	.0038	.0038
					RPM	60000	45840	34510	27500	22950	17210	13770	11480	8610	6890	5740	4300	3360
					IPM	350	281	223	186	163	149	145	139	121	103	88	65	51
	39.3		0.05D	0.02D	SFM	490	490	490	490	490	490	490	490	490	490	490	490	475
					IPT	.0013	.0014	.0014	.0015	.0016	.0020	.0024	.0028	.0032	.0038	.0037	.0038	.0038
					RPM	47380	31620	23690	19060	15850	11890	9510	7920	5940	4750	3960	2970	2300
					IPM	246	174	134	114	100	94	93	90	77	72	59	45	35
	40	Chilled Cast Iron	0.05D	0.02D	SFM	620	930	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
					IPT	.0019	.0021	.0023	.0026	.0028	.0031	.0035	.0040	.0046	.0050	.0057	.0057	.0057
					RPM	60000	60000	55720	44600	37160	27870	22290	18580	13930	11150	9290	6970	5570
					IPM	454	501	518	457	415	351	316	296	255	225	212	158	126
	41	Hardened Cast Iron	0.05D	0.02D	SFM	620	930	965	965	965	965	945	965	965	965	965	965	965
					IPT	.0017	.0019	.0020	.0022	.0024	.0028	.0032	.0036	.0041	.0044	.0049	.0051	.0050
					RPM	60000	60000	46760	37390	31150	23360	18360	15570	11680	9340	7790	5840	4670
					IPM	397	444	376	324	294	258	234	226	189	163	153	119	93

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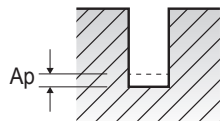
2 FLUTE CORNER RADIUS - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Slotting	Para-meter	Diameter (Ø)																
					0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
			Ae	LBS	0.5	1	1.5	2	1	1.5	2	2.5	3	1	1.5	2	2.5	3	4	1	1.5
P	5	Non-alloy steel	1.0D	SFM	100	100	90	90	150	150	135	135	135	220	220	220	200	200	200	270	270
				IPT	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002
				RPM	49180	49180	44260	44260	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950	47950	52460	52460
				IPM	4	4	4	4	8	8	7	7	7	8	8	8	8	8	8	17	17
				Ap	.0004	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006	.0006	.0010	.0010
	8	Low alloy steel	1.0D	SFM	100	100	90	90	150	150	135	135	135	220	220	220	200	200	200	270	270
				IPT	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002
				RPM	49180	49180	44260	44260	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950	47950	52460	52460
				IPM	4	4	4	4	8	8	7	7	7	8	8	8	8	8	8	17	17
				Ap	.0004	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006	.0006	.0010	.0010
	9		1.0D	SFM	100	100	90	90	150	150	135	135	135	220	220	220	200	200	200	270	270
				IPT	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002
				RPM	49180	49180	44260	44260	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950	47950	52460	52460
				IPM	4	4	4	4	8	8	7	7	7	8	8	8	8	8	8	17	17
				Ap	.0004	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006	.0006	.0010	.0010
	11.1	High alloyed steel, and tool steel	1.0D	SFM	100	100	90	90	150	150	135	135	135	220	220	220	200	200	200	270	270
				IPT	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002
				RPM	49180	49180	44260	44260	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950	47950	52460	52460
				IPM	4	4	4	4	8	8	7	7	7	8	8	8	8	8	8	17	17
				Ap	.0004	.0004	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006	.0006	.0010	.0010
	11.2		1.0D	SFM	100	100	90	90	135	135	120	120	120	185	185	185	165	165	165	235	235
				IPT	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	44260	44260	43710	43710	39340	39340	39340	45080	45080	45080	40570	40570	40570	45900	45900
				IPM	4	4	4	4	7	7	6	6	6	7	7	7	6	6	6	11	11
				Ap	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005	.0005	.0008	.0008
H	38.1	Hardened steel	1.0D	SFM	100	100	90	90	135	135	120	120	120	185	185	185	165	165	165	235	235
				IPT	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	44260	44260	43710	43710	39340	39340	39340	45080	45080	45080	40570	40570	40570	45900	45900
				IPM	4	4	4	4	7	7	6	6	6	7	7	7	6	6	6	11	11
				Ap	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005	.0005	.0008	.0008
	38.2		1.0D	SFM	85	85	75	75	135	135	120	120	120	170	170	170	150	150	150	220	220
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	40980	40980	36890	36890	43710	43710	39340	39340	39340	40980	40980	40980	36890	36890	36890	42620	42620
				IPM	3	3	3	3	3	3	3	3	3	6	6	6	6	6	6	10	10
				Ap	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005	.0005	.0008	.0008
	39.1		1.0D	SFM	70	70	60	60	100	100	90	90	90	135	135	135	120	120	120	170	170
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001
				RPM	32790	32790	29510	29510	32790	32790	29510	29510	29510	32790	32790	32790	29510	29510	29510	32790	32790
				IPM	3	3	2	2	3	3	2	2	2	3	3	3	2	2	2	5	5
				Ap	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0003	.0003	.0006	.0006	.0006	.0005	.0005	.0004	.0008	.0008
	39.2		1.0D	SFM	70	70	60	60	85	85	75	75	75	100	100	100	90	90	90	135	135
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001
				RPM	32790	32790	29510	29510	27320	27320	24590	24590	24590	24590	24590	24590	22130	22130	22130	26230	26230
				IPM	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4
				Ap	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0003	.0003	.0006	.0006	.0006	.0005	.0005	.0004	.0008	.0008
	39.3		1.0D	SFM	50	50	45	45	70	70	60	60	60	85	85	85	75	75	75	100	100
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001
				RPM	24590	24590	22130	22130	21860	21860	19670	19670	19670	20490	20490	20490	18440	18440	18440	19670	19670
				IPM	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	3	3
				Ap	.0003	.0002	.0002	.0002	.0003	.0003	.0003	.0003	.0003	.0005	.0005	.0005	.0004	.0004	.0004	.0006	.0006
	40	Chilled Cast Iron	1.0D	SFM	100	100	90	90	135	135	120	120	120	185	185	185	165	165	165	235	235
				IPT	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	44260	44260	43710	43710	39340	39340	39340	45080	45080	45080	40570	40570	40570	45900	45900
				IPM	4	4	4	4	7	7	6	6	6	7	7	7	6	6	6	11	11
				Ap	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005	.0005	.0008	.0008
	41	Hardened Cast Iron	1.0D	SFM	85	85	75	75	135	135	120	120	120	170	170	170	150	150	150	220	220
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	40980	40980	36890	36890	43710	43710	39340	39340	39340	40980	40980	40980	36890	36890	36890	42620	42620
				IPM	3	3	3	3	3	3	3	3	3	6	6	6	6	6	6	10	10
				Ap	.0003	.0003	.0003	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005	.0005	.0008	.0008

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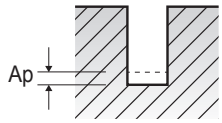
2 FLUTE CORNER RADIUS - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																
			0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8
		LBS	2	3	4	5	6	2	4	6	8	10	2	4	6	2	4	6	8
P	5	SFM	270	245	245	245	215	320	290	290	255	195	370	335	335	420	420	380	380
		IPT	.0002	.0002	.0002	.0002	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	52460	47210	47210	47210	41970	51910	46720	46720	41530	31150	51570	46410	46410	51230	51230	46110	46110
		IPM	17	15	15	15	10	20	18	18	13	10	24	18	18	24	24	18	18
		Ap	.0009	.0008	.0008	.0007	.0007	.0011	.0009	.0008	.0007	.0006	.0014	.0011	.0010	.0016	.0014	.0013	.0011
	8	SFM	270	245	245	245	215	320	290	290	255	195	370	335	335	420	420	380	380
		IPT	.0002	.0002	.0002	.0002	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	52460	47210	47210	47210	41970	51910	46720	46720	41530	31150	51570	46410	46410	51230	51230	46110	46110
		IPM	17	15	15	15	10	20	18	18	13	10	24	18	18	24	24	18	18
		Ap	.0009	.0008	.0008	.0007	.0007	.0011	.0009	.0008	.0007	.0006	.0014	.0011	.0010	.0016	.0014	.0013	.0011
	9	SFM	270	245	245	245	215	320	290	290	255	195	370	335	335	420	420	380	380
		IPT	.0002	.0002	.0002	.0002	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	52460	47210	47210	47210	41970	51910	46720	46720	41530	31150	51570	46410	46410	51230	51230	46110	46110
		IPM	17	15	15	15	10	20	18	18	13	10	24	18	18	24	24	18	18
		Ap	.0009	.0008	.0008	.0007	.0007	.0011	.0009	.0008	.0007	.0006	.0014	.0011	.0010	.0016	.0014	.0013	.0011
	11.1	SFM	270	245	245	245	215	320	290	290	255	195	370	335	335	420	420	380	380
		IPT	.0002	.0002	.0002	.0002	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	52460	47210	47210	47210	41970	51910	46720	46720	41530	31150	51570	46410	46410	51230	51230	46110	46110
		IPM	17	15	15	15	10	20	18	18	13	10	24	18	18	24	24	18	18
		Ap	.0009	.0008	.0008	.0007	.0007	.0011	.0009	.0008	.0007	.0006	.0014	.0011	.0010	.0016	.0014	.0013	.0011
	11.2	SFM	235	215	215	215	190	285	260	260	230	170	305	275	275	340	340	305	305
		IPT	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	45900	41310	41310	41310	36720	46450	41800	41800	37160	27870	42230	38010	38010	40980	40980	36890	36890
		IPM	11	10	10	10	6	15	13	13	9	7	17	15	15	19	19	15	15
		Ap	.0008	.0007	.0007	.0006	.0006	.0009	.0008	.0007	.0006	.0005	.0012	.0009	.0008	.0013	.0012	.0011	.0009
H	38.1	SFM	235	215	215	215	190	285	260	260	230	170	305	275	275	340	340	305	305
		IPT	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	45900	41310	41310	41310	36720	46450	41800	41800	37160	27870	42230	38010	38010	40980	40980	36890	36890
		IPM	11	10	10	10	6	15	13	13	9	7	17	15	15	19	19	15	15
		Ap	.0008	.0007	.0007	.0006	.0006	.0009	.0008	.0007	.0006	.0005	.0012	.0009	.0008	.0013	.0012	.0011	.0009
	38.2	SFM	220	200	200	200	175	255	230	230	205	150	255	225	225	255	255	230	230
		IPT	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	42620	38360	38360	38360	34100	40980	36890	36890	32790	24590	35020	31520	31520	30740	30740	27660	27660
		IPM	10	9	9	9	5	13	12	12	8	6	14	10	10	12	12	11	11
		Ap	.0008	.0007	.0007	.0006	.0006	.0009	.0008	.0007	.0006	.0005	.0012	.0009	.0008	.0013	.0012	.0011	.0009
	39.1	SFM	170	150	150	150	135	185	165	165	150	110	205	185	185	220	220	200	200
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0001	.0001	.0002	.0002	.0002	.0002
		RPM	32790	29510	29510	29510	26230	30050	27050	27050	24040	18030	28340	25500	25500	26640	26640	23980	23980
		IPM	5	5	5	5	4	7	6	6	4	3	9	6	6	8	8	8	8
		Ap	.0007	.0006	.0006	.0006	.0006	.0009	.0008	.0007	.0006	.0005	.0011	.0009	.0008	.0013	.0011	.0010	.0009
	39.2	SFM	135	120	120	120	110	150	135	135	120	90	150	135	135	170	170	150	150
		IPT	.0001	.0001	.0001	.0001	.0000	.0001	.0001	.0001	.0001	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	26230	23610	23610	23610	20980	24590	22130	22130	19670	14750	21120	19000	19000	20490	20490	18440	18440
		IPM	4	4	4	4	2	4	4	4	3	1	5	3	3	5	5	4	4
		Ap	.0007	.0006	.0006	.0006	.0006	.0009	.0008	.0007	.0006	.0005	.0011	.0009	.0008	.0013	.0011	.0010	.0009
	39.3	SFM	100	90	90	90	80	135	120	120	110	80	135	125	125	135	135	120	120
		IPT	.0001	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0001	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	19670	17710	17710	17710	15740	21860	19670	19670	17490	13120	18950	17060	17060	16390	16390	14750	14750
		IPM	3	1	1	1	1	3	3	3	3	1	3	3	3	4	4	2	2
		Ap	.0006	.0005	.0005	.0004	.0004	.0007	.0006	.0005	.0005	.0004	.0009	.0007	.0006	.0010	.0009	.0008	.0007
	40	SFM	235	215	215	215	190	285	260	260	230	170	305	275	275	340	340	305	305
		IPT	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	45900	41310	41310	41310	36720	46450	41800	41800	37160	27870	42230	38010	38010	40980	40980	36890	36890
		IPM	11	10	10	10	6	15	13	13	9	7	17	15	15	19	19	15	15
		Ap	.0008	.0007	.0007	.0006	.0006	.0009	.0008	.0007	.0006	.0005	.0012	.0009	.0008	.0013	.0012	.0011	.0009
	41	SFM	220	200	200	200	175	255	230	230	205	150	255	225	225	255	255	230	230
		IPT	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	42620	38360	38360	38360	34100	40980	36890	36890	32790	24590	35020	31520	31520	30740	30740	27660	27660
		IPM	10	9	9	9	5	13	12	12	8	6	14	10	10	12	12	11	11
		Ap	.0008	.0007	.0007	.0006	.0006	.0009	.0008	.0007	.0006	.0005	.0012	.0009	.0008	.0013	.0012	.0011	.0009

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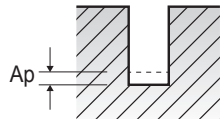
2 FLUTE CORNER RADIUS - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																
			0.8	0.9	0.9	0.9	1	1	1	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5
			LBS	12	3	4	8	3	4	6	8	10	12	16	20	4	8	12	15	20
P	5	SFM	340	475	475	425	505	505	455	455	455	405	305	305	645	580	580	580	515
		IPT	.0002	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0004	.0004	.0004	.0004	.0004
		RPM	40980	51000	51000	45900	49180	49180	44260	44260	44260	39340	29510	29510	41580	37420	37420	37420	33270
		IPM	16	28	28	22	39	39	31	31	31	25	16	16	36	29	29	29	24
		Ap	.0009	.0016	.0016	.0012	.0020	.0018	.0016	.0016	.0014	.0014	.0012	.0010	.0030	.0024	.0024	.0021	.0018
	8	SFM	340	475	475	425	505	505	455	455	455	405	305	305	645	580	580	580	515
		IPT	.0002	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0004	.0004	.0004	.0004	.0004
		RPM	40980	51000	51000	45900	49180	49180	44260	44260	44260	39340	29510	29510	41580	37420	37420	37420	33270
		IPM	16	28	28	22	39	39	31	31	31	25	16	16	36	29	29	29	24
		Ap	.0009	.0016	.0016	.0012	.0020	.0018	.0016	.0016	.0014	.0014	.0012	.0010	.0030	.0024	.0024	.0021	.0018
	9	SFM	340	475	475	425	505	505	455	455	455	405	305	305	645	580	580	580	515
		IPT	.0002	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0004	.0004	.0004	.0004	.0004
		RPM	40980	51000	51000	45900	49180	49180	44260	44260	44260	39340	29510	29510	41580	37420	37420	37420	33270
		IPM	16	28	28	22	39	39	31	31	31	25	16	16	36	29	29	29	24
		Ap	.0009	.0016	.0016	.0012	.0020	.0018	.0016	.0016	.0014	.0014	.0012	.0010	.0030	.0024	.0024	.0021	.0018
	11.1	SFM	340	475	475	425	505	505	455	455	455	405	305	305	645	580	580	580	515
		IPT	.0002	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0004	.0004	.0004	.0004	.0004
		RPM	40980	51000	51000	45900	49180	49180	44260	44260	44260	39340	29510	29510	41580	37420	37420	37420	33270
		IPM	16	28	28	22	39	39	31	31	31	25	16	16	36	29	29	29	24
		Ap	.0009	.0016	.0016	.0012	.0020	.0018	.0016	.0016	.0014	.0014	.0012	.0010	.0030	.0024	.0024	.0021	.0018
	11.2	SFM	270	370	370	335	405	405	365	365	365	325	245	245	505	455	455	455	405
		IPT	.0002	.0003	.0003	.0002	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0003
		RPM	32790	40070	40070	36070	39340	39340	35410	35410	35410	31470	23610	23610	32750	29480	29480	29480	26200
		IPM	13	22	22	17	25	25	20	20	20	15	11	11	26	21	21	21	16
		Ap	.0008	.0014	.0014	.0011	.0017	.0015	.0013	.0013	.0012	.0012	.0010	.0008	.0025	.0020	.0020	.0018	.0015
H	38.1	SFM	270	370	370	335	405	405	365	365	365	325	245	245	505	455	455	455	405
		IPT	.0002	.0003	.0003	.0002	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0003
		RPM	32790	40070	40070	36070	39340	39340	35410	35410	35410	31470	23610	23610	32750	29480	29480	29480	26200
		IPM	13	22	22	17	25	25	20	20	20	15	11	11	26	21	21	21	16
		Ap	.0008	.0014	.0014	.0011	.0017	.0015	.0013	.0013	.0012	.0012	.0010	.0008	.0025	.0020	.0020	.0018	.0015
	38.2	SFM	205	270	270	245	270	270	245	245	245	215	160	160	340	305	305	305	270
		IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0003	.0003	.0003	.0003
		RPM	24590	29140	29140	26230	26230	26230	23610	23610	23610	20980	15740	15740	21940	19750	19750	19750	17550
		IPM	8	14	14	10	14	14	11	11	11	10	6	6	16	12	12	12	10
		Ap	.0008	.0014	.0014	.0011	.0017	.0015	.0013	.0013	.0012	.0012	.0010	.0008	.0025	.0020	.0020	.0018	.0015
	39.1	SFM	175	220	220	200	220	220	200	200	200	175	130	130	270	245	245	245	215
		IPT	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0002	.0002	.0002	.0002
		RPM	21310	23680	23680	21310	21310	21310	19180	19180	19180	17050	12790	12790	17510	15760	15760	15760	14010
		IPM	5	9	9	8	8	8	8	8	8	5	4	4	10	7	7	7	6
		Ap	.0008	.0013	.0013	.0010	.0016	.0014	.0013	.0013	.0011	.0011	.0009	.0008	.0024	.0019	.0019	.0017	.0014
	39.2	SFM	135	170	170	150	170	170	150	150	150	135	100	100	205	185	185	185	165
		IPT	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002
		RPM	16390	18220	18220	16390	16390	16390	14750	14750	14750	13110	9840	9840	13180	11870	11870	11870	10550
		IPM	3	6	6	5	5	5	5	5	5	3	2	2	6	5	5	5	3
		Ap	.0008	.0013	.0013	.0010	.0016	.0014	.0013	.0013	.0011	.0011	.0009	.0008	.0024	.0019	.0019	.0017	.0014
	39.3	SFM	110	135	135	120	135	135	120	120	120	110	80	80	170	155	155	155	135
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002
		RPM	13110	14570	14570	13110	13110	13110	11800	11800	11800	10490	7870	7870	11020	9920	9920	9920	8820
		IPM	2	3	3	3	3	3	3	3	3	2	1	1	4	3	3	3	3
		Ap	.0006	.0010	.0010	.0008	.0013	.0012	.0010	.0010	.0009	.0009	.0008	.0006	.0019	.0015	.0015	.0013	.0012
	40	SFM	270	370	370	335	405	405	365	365	365	325	245	245	505	455	455	455	405
		IPT	.0002	.0003	.0003	.0002	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0003
		RPM	32790	40070	40070	36070	39340	39340	35410	35410	35410	31470	23610	23610	32750	29480	29480	29480	26200
		IPM	13	22	22	17	25	25	20	20	20	15	11	11	26	21	21	21	16
		Ap	.0008	.0014	.0014	.0011	.0017	.0015	.0013	.0013	.0012	.0012	.0010	.0008	.0025	.0020	.0020	.0018	.0015
	41	SFM	205	270	270	245	270	270	245	245	245	215	160	160	340	305	305	305	270
		IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0003	.0003	.0003	.0003
		RPM	24590	29140	29140	26230	26230	26230	23610	23610	23610	20980	15740	15740	21940	19750	19750	19750	17550
		IPM	8	14	14	10	14	14	11	11	11	10	6	6	16	12	12	12	10
		Ap	.0008	.0014	.0014	.0011	.0017	.0015	.0013	.0013	.0012	.0012	.0010	.0008	.0025	.0020	.0020	.0018	.0015

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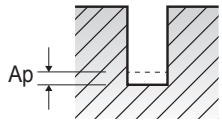
2 FLUTE CORNER RADIUS - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																
			2	2	2	2	2	2	2	2.5	3	3	3	3	3	3	3	3.5	4
			LBS	6	8	12	16	20	25	30	6	7	8	12	16	20	30	35	9	8
P	5	SFM	710	710	640	640	640	570	570	710	695	695	695	625	625	625	555	710	710
		IPT	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0006	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0009	.0010
		RPM	34430	34430	30980	30980	30980	27540	27540	27600	22400	22400	22400	20160	20160	20160	17920	19670	17210
		IPM	35	35	29	29	29	22	22	34	34	34	34	27	27	27	21	34	35
		Ap	.0039	.0035	.0031	.0031	.0028	.0028	.0024	.0049	.0059	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079
	8	SFM	710	710	640	640	640	570	570	710	695	695	695	625	625	625	555	710	710
		IPT	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0006	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0009	.0010
		RPM	34430	34430	30980	30980	30980	27540	27540	27600	22400	22400	22400	20160	20160	20160	17920	19670	17210
		IPM	35	35	29	29	29	22	22	34	34	34	34	27	27	27	21	34	35
		Ap	.0039	.0035	.0031	.0031	.0028	.0028	.0024	.0049	.0059	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079
	9	SFM	710	710	640	640	640	570	570	710	695	695	695	625	625	625	555	710	710
		IPT	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0006	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0009	.0010
		RPM	34430	34430	30980	30980	30980	27540	27540	27600	22400	22400	22400	20160	20160	20160	17920	19670	17210
		IPM	35	35	29	29	29	22	22	34	34	34	34	27	27	27	21	34	35
		Ap	.0039	.0035	.0031	.0031	.0028	.0028	.0024	.0049	.0059	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079
	11.1	SFM	710	710	640	640	640	570	570	710	695	695	695	625	625	625	555	710	710
		IPT	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0006	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0009	.0010
		RPM	34430	34430	30980	30980	30980	27540	27540	27600	22400	22400	22400	20160	20160	20160	17920	19670	17210
		IPM	35	35	29	29	29	22	22	34	34	34	34	27	27	27	21	34	35
		Ap	.0039	.0035	.0031	.0031	.0028	.0028	.0024	.0049	.0059	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079
	11.2	SFM	560	560	500	500	500	445	445	555	555	555	555	500	500	500	445	560	555
		IPT	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0006	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0009	.0011
		RPM	27050	27050	24340	24340	24340	21640	21640	21630	18030	18030	18030	16230	16230	16230	14430	15500	13520
		IPM	28	28	23	23	23	17	17	28	28	28	28	23	23	23	18	28	29
		Ap	.0033	.0030	.0027	.0027	.0023	.0023	.0020	.0042	.0050	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067
H	38.1	SFM	560	560	500	500	500	445	445	555	555	555	555	500	500	500	445	560	555
		IPT	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0006	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0009	.0011
		RPM	27050	27050	24340	24340	24340	21640	21640	21630	18030	18030	18030	16230	16230	16230	14430	15500	13520
		IPM	28	28	23	23	23	17	17	28	28	28	28	23	23	23	18	28	29
		Ap	.0033	.0030	.0027	.0027	.0023	.0023	.0020	.0042	.0050	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067
	38.2	SFM	370	370	335	335	335	295	295	370	370	370	370	335	335	335	295	370	370
		IPT	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0006	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0008	.0010
		RPM	18030	18030	16230	16230	16230	14430	14430	14420	12020	12020	12020	10820	10820	10820	9620	10320	9020
		IPM	17	17	14	14	14	11	11	17	17	17	17	14	14	14	11	17	18
		Ap	.0033	.0030	.0027	.0027	.0023	.0023	.0020	.0042	.0050	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067
	39.1	SFM	305	305	275	275	275	245	245	305	305	305	305	275	275	275	245	305	305
		IPT	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0004	.0006	.0006	.0006	.0005	.0005	.0005	.0004	.0006	.0007
		RPM	14750	14750	13280	13280	13280	11800	11800	11850	9840	9840	9840	8850	8850	8850	7870	8450	7380
		IPM	10	10	8	8	8	6	6	11	11	11	11	9	9	9	7	11	11
		Ap	.0031	.0028	.0025	.0025	.0022	.0022	.0019	.0039	.0047	.0047	.0043	.0038	.0038	.0033	.0033	.0055	.0063
	39.2	SFM	235	235	215	215	215	190	190	235	235	235	235	215	215	215	190	240	235
		IPT	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0005	.0006
		RPM	11480	11480	10330	10330	10330	9180	9180	9170	7650	7650	7650	6890	6890	6890	6120	6590	5740
		IPM	6	6	5	5	5	4	4	6	7	7	7	5	5	5	4	7	7
		Ap	.0031	.0028	.0025	.0025	.0022	.0022	.0019	.0039	.0047	.0047	.0043	.0038	.0038	.0033	.0033	.0055	.0063
	39.3	SFM	205	205	180	180	180	160	160	205	205	205	205	180	180	180	160	200	205
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0004	.0005
		RPM	9840	9840	8850	8850	8850	7870	7870	7930	6560	6560	6560	5900	5900	5900	5250	5610	4920
		IPM	5	5	4	4	4	3	3	5	5	5	5	4	4	4	3	5	5
		Ap	.0026	.0023	.0020	.0020	.0018	.0018	.0015	.0032	.0038	.0038	.0035	.0031	.0031	.0027	.0027	.0045	.0051
	40	SFM	560	560	500	500	500	445	445	555	555	555	555	500	500	500	445	560	555
		IPT	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0006	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0009	.0011
		RPM	27050	27050	24340	24340	24340	21640	21640	21630	18030	18030	18030	16230	16230	16230	14430	15500	13520
		IPM	28	28	23	23	23	17	17	28	28	28	28	23	23	23	18	28	29
		Ap	.0033	.0030	.0027	.0027	.0023	.0023	.0020	.0042	.0050	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067
	41	SFM	370	370	335	335	335	295	295	370	370	370	370	335	335	335	295	370	370
		IPT	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0006	.0007	.0007	.0007	.0006	.0006	.0006	.0006	.0008	.0010
		RPM	18030	18030	16230	16230	16230	14430	14430	14420	12020	12020	12020	10820	10820	10820	9620	10320	9020
		IPM	17	17	14	14	14	11	11	17	17	17	17	14	14	14	11	17	18
		Ap	.0033	.0030	.0027	.0027	.0023	.0023	.0020	.0042	.0050	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067

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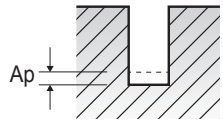
2 FLUTE CORNER RADIUS - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)												
			4	4	4	4	4	4	4	4.5	5	5	5	6	6
		LBS	9	12	16	20	30	35	45	10	11	20	40	12	14
P	5	SFM	710	710	710	710	640	640	570	780	830	830	745	830	830
		IPT	.0010	.0010	.0010	.0010	.0009	.0009	.0008	.0011	.0013	.0013	.0011	.0014	.0014
		RPM	17210	17210	17210	17210	15490	15490	13770	16790	16070	16070	14460	13390	13390
		IPM	35	35	35	35	28	28	23	38	40	40	33	38	38
		Ap	.0079	.0079	.0071	.0071	.0063	.0055	.0055	.0089	.0098	.0089	.0079	.0118	.0118
	8	SFM	710	710	710	710	640	640	570	780	830	830	745	830	830
		IPT	.0010	.0010	.0010	.0010	.0009	.0009	.0008	.0011	.0013	.0013	.0011	.0014	.0014
		RPM	17210	17210	17210	17210	15490	15490	13770	16790	16070	16070	14460	13390	13390
		IPM	35	35	35	35	28	28	23	38	40	40	33	38	38
		Ap	.0079	.0079	.0071	.0071	.0063	.0055	.0055	.0089	.0098	.0089	.0079	.0118	.0118
	9	SFM	710	710	710	710	640	640	570	780	830	830	745	830	830
		IPT	.0010	.0010	.0010	.0010	.0009	.0009	.0008	.0011	.0013	.0013	.0011	.0014	.0014
		RPM	17210	17210	17210	17210	15490	15490	13770	16790	16070	16070	14460	13390	13390
		IPM	35	35	35	35	28	28	23	38	40	40	33	38	38
		Ap	.0079	.0079	.0071	.0071	.0063	.0055	.0055	.0089	.0098	.0089	.0079	.0118	.0118
	11.1	SFM	710	710	710	710	640	640	570	780	830	830	745	830	830
		IPT	.0010	.0010	.0010	.0010	.0009	.0009	.0008	.0011	.0013	.0013	.0011	.0014	.0014
		RPM	17210	17210	17210	17210	15490	15490	13770	16790	16070	16070	14460	13390	13390
		IPM	35	35	35	35	28	28	23	38	40	40	33	38	38
		Ap	.0079	.0079	.0071	.0071	.0063	.0055	.0055	.0089	.0098	.0089	.0079	.0118	.0118
	11.2	SFM	555	555	555	555	500	500	445	595	660	660	595	660	660
		IPT	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0012	.0013	.0013	.0011	.0015	.0015
		RPM	13520	13520	13520	13520	12170	12170	10820	12790	12790	12790	11510	10660	10660
		IPM	29	29	29	29	23	23	19	30	32	32	26	31	31
		Ap	.0067	.0067	.0060	.0060	.0054	.0047	.0047	.0075	.0084	.0075	.0067	.0100	.0100
H	38.1	SFM	555	555	555	555	500	500	445	595	660	660	595	660	660
		IPT	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0012	.0013	.0013	.0011	.0015	.0015
		RPM	13520	13520	13520	13520	12170	12170	10820	12790	12790	12790	11510	10660	10660
		IPM	29	29	29	29	23	23	19	30	32	32	26	31	31
		Ap	.0067	.0067	.0060	.0060	.0054	.0047	.0047	.0075	.0084	.0075	.0067	.0100	.0100
	38.2	SFM	370	370	370	370	335	335	295	405	440	440	395	440	440
		IPT	.0010	.0010	.0010	.0010	.0009	.0009	.0008	.0011	.0012	.0012	.0011	.0014	.0014
		RPM	9020	9020	9020	9020	8120	8120	7210	8770	8520	8520	7670	7100	7100
		IPM	18	18	18	18	15	15	11	19	20	20	16	20	20
		Ap	.0067	.0067	.0060	.0060	.0054	.0047	.0047	.0075	.0084	.0075	.0067	.0100	.0100
	39.1	SFM	305	305	305	305	275	275	245	320	340	340	305	340	340
		IPT	.0007	.0007	.0007	.0007	.0007	.0007	.0006	.0008	.0009	.0009	.0008	.0010	.0010
		RPM	7380	7380	7380	7380	6640	6640	5900	6950	6560	6560	5900	5460	5460
		IPM	11	11	11	11	9	9	7	11	11	11	9	11	11
		Ap	.0063	.0063	.0057	.0057	.0050	.0044	.0044	.0071	.0079	.0071	.0063	.0094	.0094
	39.2	SFM	235	235	235	235	215	215	190	255	270	270	245	270	270
		IPT	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0006	.0007	.0007	.0006	.0008	.0008
		RPM	5740	5740	5740	5740	5160	5160	4590	5490	5250	5250	4720	4370	4370
		IPM	7	7	7	7	6	6	4	7	7	7	6	7	7
		Ap	.0063	.0063	.0057	.0057	.0050	.0044	.0044	.0071	.0079	.0071	.0063	.0094	.0094
	39.3	SFM	205	205	205	205	185	185	160	220	235	235	215	235	235
		IPT	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0005	.0006	.0006	.0005	.0007	.0007
		RPM	4920	4920	4920	4920	4430	4430	3930	4750	4590	4590	4130	3830	3830
		IPM	5	5	5	5	4	4	3	5	5	5	4	5	5
		Ap	.0051	.0051	.0046	.0046	.0041	.0036	.0036	.0058	.0064	.0058	.0051	.0077	.0077
	40	SFM	555	555	555	555	500	500	445	595	660	660	595	660	660
		IPT	.0011	.0011	.0011	.0011	.0009	.0009	.0009	.0012	.0013	.0013	.0011	.0015	.0015
		RPM	13520	13520	13520	13520	12170	12170	10820	12790	12790	12790	11510	10660	10660
		IPM	29	29	29	29	23	23	19	30	32	32	26	31	31
		Ap	.0067	.0067	.0060	.0060	.0054	.0047	.0047	.0075	.0084	.0075	.0067	.0100	.0100
	41	SFM	370	370	370	370	335	335	295	405	440	440	395	440	440
		IPT	.0010	.0010	.0010	.0010	.0009	.0009	.0008	.0011	.0012	.0012	.0011	.0014	.0014
		RPM	9020	9020	9020	9020	8120	8120	7210	8770	8520	8520	7670	7100	7100
		IPM	18	18	18	18	15	15	11	19	20	20	16	20	20
		Ap	.0067	.0067	.0060	.0060	.0054	.0047	.0047	.0075	.0084	.0075	.0067	.0100	.0100

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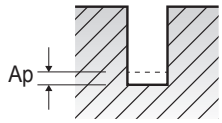
2 FLUTE CORNER RADIUS - SLOTTING

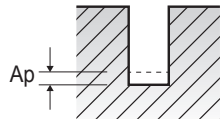


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)											
			6	6	6	6	8	8	10	10	12	12	16	20
		LBS	18	24	35	55	18	25	25	32	30	38	38	45
P	5	SFM	830	830	745	745	845	845	830	830	845	845	830	830
		IPT	.0014	.0014	.0013	.0013	.0018	.0018	.0021	.0021	.0025	.0025	.0029	.0033
		RPM	13390	13390	12050	12050	10250	10250	8030	8030	6830	6830	5020	4020
		IPM	38	38	30	30	38	38	34	34	34	34	29	27
		Ap	.0118	.0106	.0094	.0083	.0157	.0142	.0197	.0177	.0236	.0213	.0315	.0394
	8	SFM	830	830	745	745	845	845	830	830	845	845	830	830
		IPT	.0014	.0014	.0013	.0013	.0018	.0018	.0021	.0021	.0025	.0025	.0029	.0033
		RPM	13390	13390	12050	12050	10250	10250	8030	8030	6830	6830	5020	4020
		IPM	38	38	30	30	38	38	34	34	34	34	29	27
		Ap	.0118	.0106	.0094	.0083	.0157	.0142	.0197	.0177	.0236	.0213	.0315	.0394
	9	SFM	830	830	745	745	845	845	830	830	845	845	830	830
		IPT	.0014	.0014	.0013	.0013	.0018	.0018	.0021	.0021	.0025	.0025	.0029	.0033
		RPM	13390	13390	12050	12050	10250	10250	8030	8030	6830	6830	5020	4020
		IPM	38	38	30	30	38	38	34	34	34	34	29	27
		Ap	.0118	.0106	.0094	.0083	.0157	.0142	.0197	.0177	.0236	.0213	.0315	.0394
	11.1	SFM	830	830	745	745	845	845	830	830	845	845	830	830
		IPT	.0014	.0014	.0013	.0013	.0018	.0018	.0021	.0021	.0025	.0025	.0029	.0033
		RPM	13390	13390	12050	12050	10250	10250	8030	8030	6830	6830	5020	4020
		IPM	38	38	30	30	38	38	34	34	34	34	29	27
		Ap	.0118	.0106	.0094	.0083	.0157	.0142	.0197	.0177	.0236	.0213	.0315	.0394
	11.2	SFM	660	660	595	595	660	660	660	660	675	675	660	660
		IPT	.0015	.0015	.0013	.0013	.0018	.0018	.0022	.0022	.0026	.0026	.0029	.0033
		RPM	10660	10660	9590	9590	7990	7990	6390	6390	5460	5460	4000	3200
		IPM	31	31	25	25	29	29	28	28	28	28	23	21
		Ap	.0100	.0090	.0080	.0070	.0134	.0120	.0167	.0151	.0201	.0181	.0268	.0335
H	38.1	SFM	660	660	595	595	660	660	660	660	675	675	660	660
		IPT	.0015	.0015	.0013	.0013	.0018	.0018	.0022	.0022	.0026	.0026	.0029	.0033
		RPM	10660	10660	9590	9590	7990	7990	6390	6390	5460	5460	4000	3200
		IPM	31	31	25	25	29	29	28	28	28	28	23	21
		Ap	.0100	.0090	.0080	.0070	.0134	.0120	.0167	.0151	.0201	.0181	.0268	.0335
	38.2	SFM	440	440	395	395	440	440	440	440	440	440	440	440
		IPT	.0014	.0014	.0013	.0013	.0017	.0017	.0020	.0020	.0023	.0023	.0028	.0032
		RPM	7100	7100	6390	6390	5330	5330	4260	4260	3550	3550	2660	2130
		IPM	20	20	16	16	18	18	17	17	16	16	15	14
		Ap	.0100	.0090	.0080	.0070	.0134	.0120	.0167	.0151	.0201	.0181	.0268	.0335
	39.1	SFM	340	340	305	305	340	340	340	340	340	340	340	340
		IPT	.0010	.0010	.0009	.0009	.0013	.0013	.0015	.0015	.0018	.0018	.0021	.0024
		RPM	5460	5460	4920	4920	4100	4100	3280	3280	2730	2730	2050	1640
		IPM	11	11	9	9	10	10	10	10	10	10	9	8
		Ap	.0094	.0085	.0076	.0066	.0126	.0113	.0157	.0142	.0189	.0170	.0252	.0315
	39.2	SFM	270	270	245	245	270	270	270	270	270	270	270	270
		IPT	.0008	.0008	.0007	.0007	.0010	.0010	.0012	.0012	.0015	.0015	.0017	.0019
		RPM	4370	4370	3930	3930	3280	3280	2620	2620	2190	2190	1640	1310
		IPM	7	7	6	6	7	7	6	6	6	6	5	5
		Ap	.0094	.0085	.0076	.0066	.0126	.0113	.0157	.0142	.0189	.0170	.0252	.0315
	39.3	SFM	235	235	215	215	235	235	235	235	235	235	235	235
		IPT	.0007	.0007	.0006	.0006	.0008	.0008	.0010	.0010	.0012	.0012	.0013	.0015
		RPM	3830	3830	3440	3440	2870	2870	2300	2300	1910	1910	1440	1150
		IPM	5	5	4	4	5	5	5	5	5	5	4	4
		Ap	.0077	.0069	.0061	.0054	.0102	.0092	.0128	.0115	.0154	.0138	.0205	.0256
	40	SFM	660	660	595	595	660	660	660	660	675	675	660	660
		IPT	.0015	.0015	.0013	.0013	.0018	.0018	.0022	.0022	.0026	.0026	.0029	.0033
		RPM	10660	10660	9590	9590	7990	7990	6390	6390	5460	5460	4000	3200
		IPM	31	31	25	25	29	29	28	28	28	28	23	21
		Ap	.0100	.0090	.0080	.0070	.0134	.0120	.0167	.0151	.0201	.0181	.0268	.0335
	41	SFM	440	440	395	395	440	440	440	440	440	440	440	440
		IPT	.0014	.0014	.0013	.0013	.0017	.0017	.0020	.0020	.0023	.0023	.0028	.0032
		RPM	7100	7100	6390	6390	5330	5330	4260	4260	3550	3550	2660	2130
		IPM	20	20	16	16	18	18	17	17	16	16	15	14
		Ap	.0100	.0090	.0080	.0070	.0134	.0120	.0167	.0151	.0201	.0181	.0268	.0335

HPK14 SERIES

2 FLUTE MINIATURE CORNER RADIUS - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Slotting Ae	Slotting Ap	Para-meter	Diameter (Ø) 0.3	0.4	0.5	0.6	0.8	1	1.2	1.5	2
P	5	Non-alloy steel	1D	0.05D	SFM	150	220	270	320	420	505	575	645	710
					IPT	.0001	.0001	.0002	.0002	.0002	.0004	.0004	.0004	.0005
					RPM	49180	53280	52460	51910	51230	49180	46350	41580	34430
					IPM	8	8	16	20	24	39	38	37	35
	8	Low alloy steel	1D	0.05D	SFM	150	220	270	320	420	505	575	645	710
					IPT	.0001	.0001	.0002	.0002	.0002	.0004	.0004	.0004	.0005
					RPM	49180	53280	52460	51910	51230	49180	46350	41580	34430
					IPM	8	8	16	20	24	39	38	37	35
	9		1D	0.05D	SFM	150	220	270	320	420	505	575	645	710
					IPT	.0001	.0001	.0002	.0002	.0002	.0004	.0004	.0004	.0005
					RPM	49180	53280	52460	51910	51230	49180	46350	41580	34430
					IPM	8	8	16	20	24	39	38	37	35
	11.1	High alloyed steel, and tool steel	1D	0.05D	SFM	150	220	270	320	420	505	575	645	710
					IPT	.0001	.0001	.0002	.0002	.0002	.0004	.0004	.0004	.0005
					RPM	49180	53280	52460	51910	51230	49180	46350	41580	34430
					IPM	8	8	16	20	24	39	38	37	35
	11.2		1D	0.05D	SFM	150	220	270	320	420	505	575	645	710
					IPT	.0001	.0001	.0002	.0002	.0002	.0004	.0004	.0004	.0005
					RPM	49180	53280	52460	51910	51230	49180	46350	41580	34430
					IPM	8	8	16	20	24	39	38	37	35
H	38.1	Hardened steel	1D	0.05D	SFM	135	185	235	285	340	405	455	505	560
					IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005
					RPM	43710	45080	45900	46450	40980	39340	36870	32750	27050
					IPM	7	7	11	15	19	25	25	26	28
	38.2		1D	0.05D	SFM	135	170	220	255	255	270	305	340	370
					IPT	.00004	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005
					RPM	43710	40980	42620	40980	30740	26230	24510	21940	18030
					IPM	3	6	10	13	12	14	15	16	17
	39.1		1D	0.02D	SFM	100	135	170	185	220	220	235	270	305
					IPT	.00004	.00004	.0001	.0001	.0002	.0002	.0002	.0003	.0004
					RPM	32790	32790	32790	30050	26640	21310	19060	17510	14750
					IPM	3	3	5	7	8	8	9	9	10
	39.2		1D	0.02D	SFM	85	100	135	150	170	170	185	205	235
					IPT	.00004	.00004	.0001	.0001	.0001	.0002	.0002	.0002	.0003
					RPM	27320	24590	26230	24590	20490	16390	14940	13180	11480
					IPM	2	2	4	4	5	5	5	6	6
	39.3		1D	0.02D	SFM	70	85	100	135	135	135	155	170	205
					IPT	.00004	.00004	.0001	.0001	.0001	.0001	.0002	.0002	.0002
					RPM	21860	20490	19670	21860	16390	13110	12360	11020	9840
					IPM	2	2	2	3	3	4	4	4	5
	40	Chilled Cast Iron	1D	0.05D	SFM	135	185	235	285	340	405	455	505	560
					IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005
					RPM	43710	45080	45900	46450	40980	39340	36870	32750	27050
					IPM	7	7	11	15	19	25	25	26	28
	41	Hardened Cast Iron	1D	0.05D	SFM	135	170	220	255	255	270	305	340	370
					IPT	.00004	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005
					RPM	43710	40980	42620	40980	30740	26230	24510	21940	18030
					IPM	3	6	10	13	12	14	15	16	17

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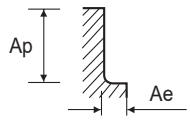
HPK16, HPK17 SERIES

4 FLUTE CORNER RADIUS - SIDE CUTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute

RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)

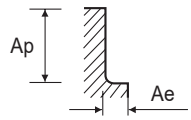
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting		Para-meter	Diameter (Ø)									
			Ae	Ap		0.5	0.6	0.7	0.8	1	1.2	1.5	1.8	2	2.5
P	5	Non-alloy steel	0.03D	0.8D	SFM	270	385	520	675	505	575	645	675	710	710
					IPT	.0002	.0002	.0002	.0003	.0003	.0003	.0004	.0005	.0005	.0006
					RPM	52460	62290	72130	81960	49180	46560	41610	36460	34430	27600
					IPM	41	54	68	90	62	63	66	68	70	71
	8	Low alloy steel	0.03D	0.8D	SFM	270	385	520	675	505	575	645	675	710	710
					IPT	.0002	.0002	.0002	.0003	.0003	.0003	.0004	.0005	.0005	.0006
					RPM	52460	62290	72130	81960	49180	46560	41610	36460	34430	27600
					IPM	41	54	68	90	62	63	66	68	70	71
	9		0.03D	0.8D	SFM	270	385	520	675	505	575	645	675	710	710
					IPT	.0002	.0002	.0002	.0003	.0003	.0003	.0004	.0005	.0005	.0006
					RPM	52460	62290	72130	81960	49180	46560	41610	36460	34430	27600
					IPM	41	54	68	90	62	63	66	68	70	71
	11.1	High alloyed steel, and tool steel	0.03D	0.8D	SFM	270	385	520	675	505	575	645	675	710	710
					IPT	.0002	.0002	.0002	.0003	.0003	.0003	.0004	.0005	.0005	.0006
					RPM	52460	62290	72130	81960	49180	46560	41610	36460	34430	27600
					IPM	41	54	68	90	62	63	66	68	70	71
	11.2		0.03D	0.8D	SFM	235	345	425	540	405	455	505	540	560	555
					IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0004	.0005	.0006
					RPM	45900	55740	59020	65570	39340	36980	32750	29150	27050	21630
					IPM	29	39	46	62	43	43	43	45	51	51
H	38.1	Hardened steel	0.03D	0.8D	SFM	235	345	425	540	405	455	505	540	560	555
					IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0004	.0005	.0006
					RPM	45900	55740	59020	65570	39340	36980	32750	29150	27050	21630
					IPM	29	39	46	62	43	43	43	45	51	51
	38.2		0.03D	0.8D	SFM	220	305	355	405	270	305	340	355	370	370
					IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0006
					RPM	42620	49180	49180	49180	26230	24720	21940	19060	18030	14420
					IPM	27	35	39	46	29	30	31	32	34	34
	39.1		0.03D	0.8D	SFM	170	225	285	350	220	235	270	285	305	305
					IPT	.0001	.0001	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0004
					RPM	32790	36060	39340	42620	21310	19060	17410	15450	14750	11850
					IPM	15	20	25	30	17	17	19	19	21	21
	39.2		0.03D	0.8D	SFM	135	180	215	270	170	185	205	220	235	235
					IPT	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0004
					RPM	26230	29510	29510	32790	16390	14940	13180	11850	11480	9170
					IPM	12	16	19	21	10	11	12	12	13	13
	39.3		0.03D	0.8D	SFM	100	160	190	215	135	150	170	185	205	200
					IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0003	.0003
					RPM	19670	26230	26230	26230	13110	12260	10920	10090	9840	7830
					IPM	6	10	12	14	8	9	10	10	11	10
	40	Chilled Cast Iron	0.03D	0.8D	SFM	235	345	425	540	405	455	505	540	560	555
					IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0004	.0005	.0006
					RPM	45900	55740	59020	65570	39340	36980	32750	29150	27050	21630
					IPM	29	39	46	62	43	43	43	45	51	51
	41	Hardened Cast Iron	0.03D	0.8D	SFM	220	305	355	405	270	305	340	355	370	370
					IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0004	.0005	.0006
					RPM	42620	49180	49180	49180	26230	24720	21940	19060	18030	14420
					IPM	27	35	39	46	29	30	31	32	34	34

NEXT PAGE ▶

HPK16, HPK17 SERIES

4 FLUTE CORNER RADIUS - SIDE CUTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)										
			3	3.5	4	4.5	5	6	8	10	12	16	20
P	5	SFM	695	710	710	780	830	830	845	830	845	830	830
		IPT	.0008	.0009	.0011	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
		RPM	22400	19670	17210	16790	16070	13390	10250	8030	6830	5020	4020
		IPM	71	72	73	77	81	78	77	71	71	61	52
	8	SFM	695	710	710	780	830	830	845	830	845	830	830
		IPT	.0008	.0009	.0011	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
		RPM	22400	19670	17210	16790	16070	13390	10250	8030	6830	5020	4020
		IPM	71	72	73	77	81	78	77	71	71	61	52
	9	SFM	695	710	710	780	830	830	845	830	845	830	830
		IPT	.0008	.0009	.0011	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
		RPM	22400	19670	17210	16790	16070	13390	10250	8030	6830	5020	4020
		IPM	71	72	73	77	81	78	77	71	71	61	52
	11.1	SFM	695	710	710	780	830	830	845	830	845	830	830
		IPT	.0008	.0009	.0011	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
		RPM	22400	19670	17210	16790	16070	13390	10250	8030	6830	5020	4020
		IPM	71	72	73	77	81	78	77	71	71	61	52
	11.2	SFM	555	555	555	595	660	660	660	660	675	660	660
		IPT	.0007	.0008	.0010	.0011	.0012	.0013	.0017	.0020	.0024	.0028	.0031
		RPM	18030	15450	13520	12790	12790	10660	7990	6390	5460	4000	3200
		IPM	51	52	53	57	60	57	54	51	52	45	39
H	38.1	SFM	555	555	555	595	660	660	660	660	675	660	660
		IPT	.0007	.0008	.0010	.0011	.0012	.0013	.0017	.0020	.0024	.0028	.0031
		RPM	18030	15450	13520	12790	12790	10660	7990	6390	5460	4000	3200
		IPM	51	52	53	57	60	57	54	51	52	45	39
	38.2	SFM	370	370	370	405	440	440	440	440	440	440	440
		IPT	.0007	.0008	.0010	.0011	.0012	.0013	.0017	.0020	.0024	.0028	.0031
		RPM	12020	10300	9020	8780	8520	7100	5330	4260	3550	2660	2130
		IPM	34	35	35	38	40	38	36	34	34	29	27
	39.1	SFM	305	305	305	320	340	340	340	340	340	340	340
		IPT	.0006	.0006	.0007	.0008	.0009	.0010	.0013	.0015	.0018	.0021	.0023
		RPM	9840	8450	7380	6950	6560	5460	4100	3280	2730	2050	1640
		IPM	22	22	22	23	24	22	21	20	19	17	15
	39.2	SFM	235	240	235	255	270	270	270	270	270	270	270
		IPT	.0004	.0005	.0006	.0007	.0007	.0008	.0010	.0012	.0014	.0017	.0019
		RPM	7650	6590	5740	5460	5250	4370	3280	2620	2190	1640	1310
		IPM	13	13	14	14	15	14	13	12	12	11	10
	39.3	SFM	205	205	205	220	235	235	235	235	235	235	235
		IPT	.0004	.0004	.0005	.0006	.0006	.0007	.0009	.0010	.0012	.0014	.0016
		RPM	6560	5670	4920	4740	4590	3830	2870	2300	1910	1440	1150
		IPM	9	10	10	11	12	11	10	9	9	8	7
	40	SFM	555	555	555	595	660	660	660	660	675	660	660
		IPT	.0007	.0008	.0010	.0011	.0012	.0013	.0017	.0020	.0024	.0028	.0031
		RPM	18030	15450	13520	12790	12790	10660	7990	6390	5460	4000	3200
		IPM	51	52	53	57	60	57	54	51	52	45	39
	41	SFM	370	370	370	405	440	440	440	440	440	440	440
		IPT	.0007	.0008	.0010	.0011	.0012	.0013	.0017	.0020	.0024	.0028	.0031
		RPM	12020	10300	9020	8780	8520	7100	5330	4260	3550	2660	2130
		IPM	34	35	35	38	40	38	36	34	34	29	27

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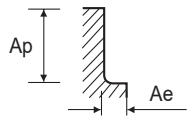
HPK26 SERIES

4 FLUTE CORNER RADIUS - SIDE CUTTING

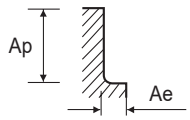


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting		Para-meter	Diameter (Ø)								
			Ae	Ap		1/16	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4
P	5	Non-alloy steel	0.03D	0.8D	SFM	705	695	835	835	840	830	850	835	830
					IPT	.0004	.0006	.0010	.0012	.0015	.0018	.0021	.0024	.0026
					RPM	43210	21220	17000	12770	10250	8450	6490	5100	4220
					IPM	71	54	68	60	62	60	54	49	44
	8	Low alloy steel	0.03D	0.8D	SFM	705	695	835	835	840	830	850	835	830
					IPT	.0004	.0006	.0010	.0012	.0015	.0018	.0021	.0024	.0026
					RPM	43210	21220	17000	12770	10250	8450	6490	5100	4220
					IPM	71	54	68	60	62	60	54	49	44
	9		0.03D	0.8D	SFM	705	695	835	835	840	830	850	835	830
					IPT	.0004	.0006	.0010	.0012	.0015	.0018	.0021	.0024	.0026
					RPM	43210	21220	17000	12770	10250	8450	6490	5100	4220
					IPM	71	54	68	60	62	60	54	49	44
	11.1	High alloyed steel, and tool steel	0.03D	0.8D	SFM	705	695	835	835	840	830	850	835	830
					IPT	.0004	.0006	.0010	.0012	.0015	.0018	.0021	.0024	.0026
					RPM	43210	21220	17000	12770	10250	8450	6490	5100	4220
					IPM	71	54	68	60	62	60	54	49	44
	11.2		0.03D	0.8D	SFM	550	550	660	660	660	650	670	665	660
					IPT	.0004	.0006	.0010	.0011	.0014	.0016	.0019	.0022	.0025
					RPM	33730	16840	13490	10090	8090	6640	5100	4070	3350
					IPM	52	38	52	43	44	43	38	36	33
H	38.1	Hardened steel	0.03D	0.8D	SFM	550	550	660	660	660	650	670	665	660
					IPT	.0004	.0006	.0010	.0011	.0014	.0016	.0019	.0022	.0025
					RPM	33730	16840	13490	10090	8090	6640	5100	4070	3350
					IPM	52	38	52	43	44	43	38	36	33
	38.2		0.03D	0.8D	SFM	370	365	440	440	445	435	445	440	435
					IPT	.0004	.0006	.0009	.0011	.0014	.0016	.0019	.0022	.0026
					RPM	22710	11180	8960	6700	5410	4430	3400	2680	2210
					IPM	34	26	34	29	30	29	26	24	23
	39.1		0.03D	0.8D	SFM	310	305	340	335	340	340	340	335	345
					IPT	.0003	.0004	.0007	.0009	.0010	.0012	.0014	.0016	.0019
					RPM	18800	9270	6900	5150	4170	3450	2580	2060	1750
					IPM	22	16	20	18	18	16	14	13	13
	39.2		0.03D	0.8D	SFM	235	240	270	265	275	275	270	270	275
					IPT	.0002	.0004	.0006	.0006	.0008	.0009	.0011	.0014	.0015
					RPM	14270	7310	5510	4070	3350	2780	2060	1650	1390
					IPM	13	10	12	10	11	10	9	9	8
	39.3		0.03D	0.8D	SFM	200	205	235	235	235	235	235	235	230
					IPT	.0002	.0003	.0005	.0006	.0007	.0008	.0010	.0011	.0013
					RPM	12310	6230	4790	3610	2880	2370	1800	1440	1180
					IPM	9	7	9	8	8	7	7	6	6
	40	Chilled Cast Iron	0.03D	0.8D	SFM	550	550	660	660	660	650	670	665	660
					IPT	.0004	.0006	.0010	.0011	.0014	.0016	.0019	.0022	.0025
					RPM	33730	16840	13490	10090	8090	6640	5100	4070	3350
					IPM	52	38	52	43	44	43	38	36	33
	41	Hardened Cast Iron	0.03D	0.8D	SFM	370	365	440	440	445	435	445	440	435
					IPT	.0004	.0006	.0009	.0011	.0014	.0016	.0019	.0022	.0026
					RPM	22710	11180	8960	6700	5410	4430	3400	2680	2210
					IPM	34	26	34	29	30	29	26	24	23

HPK27 SERIES

6&8 FLUTE CORNER RADIUS - SIDE CUTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting		Para-meter	Diameter (Ø)						
			Ae	Ap		1/4	5/16	3/8	1/2	5/8	3/4	1
P	5	Non-alloy steel	0.05D	1.0D	SFM	1580	1740	1810	1660	1700	1790	1700
					IPT	.0014	.0015	.0017	.0023	.0026	.0020	.0021
					RPM	24150	21270	18440	12670	10400	9120	6490
					IPM	205	197	188	173	164	145	107
	8	Low alloy steel	0.05D	1.0D	SFM	1580	1740	1810	1660	1700	1790	1700
					IPT	.0014	.0015	.0017	.0023	.0026	.0020	.0021
					RPM	24150	21270	18440	12670	10400	9120	6490
					IPM	205	197	188	173	164	145	107
	9		0.05D	1.0D	SFM	1580	1740	1810	1660	1700	1790	1700
					IPT	.0014	.0015	.0017	.0023	.0026	.0020	.0021
					RPM	24150	21270	18440	12670	10400	9120	6490
					IPM	205	197	188	173	164	145	107
	11.1	High alloyed steel, and tool steel	0.05D	1.0D	SFM	1580	1740	1810	1660	1700	1790	1700
					IPT	.0014	.0015	.0017	.0023	.0026	.0020	.0021
					RPM	24150	21270	18440	12670	10400	9120	6490
					IPM	205	197	188	173	164	145	107
	11.2		0.05D	1.0D	SFM	1495	1650	1720	1590	1650	1740	1655
					IPT	.0014	.0015	.0016	.0021	.0025	.0019	.0022
					RPM	22870	20190	17510	12150	10090	8860	6330
					IPM	187	180	172	157	151	137	109
H	38.1	Hardened steel	0.05D	1.0D	SFM	1495	1650	1720	1590	1650	1740	1655
					IPT	.0014	.0015	.0016	.0021	.0025	.0019	.0022
					RPM	22870	20190	17510	12150	10090	8860	6330
					IPM	187	180	172	157	151	137	109
	38.2		0.05D	1.0D	SFM	1020	1115	1150	1020	1020	1070	1025
					IPT	.0020	.0022	.0024	.0031	.0037	.0029	.0033
					RPM	15550	13600	11690	7780	6230	5460	3910
					IPM	187	177	167	145	139	127	103
	39.1		0.03D	1.0D	SFM	860	940	960	845	850	890	850
					IPT	.0016	.0017	.0019	.0025	.0030	.0024	.0026
					RPM	13130	11480	9790	6440	5200	4530	3240
					IPM	127	118	111	96	95	85	67
	39.2		0.03D	1.0D	SFM	670	735	755	675	680	720	675
					IPT	.0013	.0014	.0015	.0020	.0021	.0015	.0015
					RPM	10200	8960	7670	5150	4170	3660	2580
					IPM	80	75	71	61	52	45	32
	39.3		0.03D	1.0D	SFM	510	555	575	510	505	535	515
					IPT	.0012	.0013	.0014	.0019	.0019	.0014	.0014
					RPM	7780	6800	5870	3910	3090	2730	1960
					IPM	56	53	50	44	35	31	23
	40	Chilled Cast Iron	0.05D	1.0D	SFM	1495	1650	1720	1590	1650	1740	1655
					IPT	.0014	.0015	.0016	.0021	.0025	.0019	.0022
					RPM	22870	20190	17510	12150	10090	8860	6330
					IPM	187	180	172	157	151	137	109
	41	Hardened Cast Iron	0.05D	1.0D	SFM	1020	1115	1150	1020	1020	1070	1025
					IPT	.0020	.0022	.0024	.0031	.0037	.0029	.0033
					RPM	15550	13600	11690	7780	6230	5460	3910
					IPM	187	177	167	145	139	127	103

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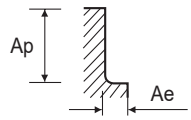
HPK18 SERIES

6 FLUTE CORNER RADIUS - SIDE CUTTING

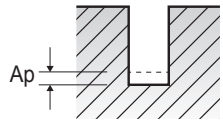


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting		Para-meter	Diameter (Ø)					
			Ae	Ap		6	8	10	12	16	20
P	5	Non-alloy steel	0.05D	1.0D	SFM	405	410	410	410	410	410
					IPT	.0015	.0020	.0025	.0028	.0035	.0031
					RPM	6560	4960	3970	3330	2480	1980
					IPM	60	61	59	55	53	37
	8	Low alloy steel	0.05D	1.0D	SFM	405	410	410	410	410	410
					IPT	.0015	.0020	.0025	.0028	.0035	.0031
					RPM	6560	4960	3970	3330	2480	1980
					IPM	60	61	59	55	53	37
	9		0.05D	1.0D	SFM	405	410	410	410	410	410
					IPT	.0015	.0020	.0025	.0028	.0035	.0031
					RPM	6560	4960	3970	3330	2480	1980
					IPM	60	61	59	55	53	37
	11.1	High alloyed steel, and tool steel	0.05D	1.0D	SFM	405	410	410	410	410	410
					IPT	.0015	.0020	.0025	.0028	.0035	.0031
					RPM	6560	4960	3970	3330	2480	1980
					IPM	60	61	59	55	53	37
	11.2		0.05D	1.0D	SFM	360	365	360	360	365	370
					IPT	.0014	.0019	.0023	.0026	.0033	.0037
					RPM	5790	4430	3480	2900	2210	1800
					IPM	49	51	48	44	43	40
H	38.1	Hardened steel	0.05D	1.0D	SFM	360	365	360	360	365	370
					IPT	.0014	.0019	.0023	.0026	.0033	.0037
					RPM	5790	4430	3480	2900	2210	1800
					IPM	49	51	48	44	43	40
	38.2		0.05D	1.0D	SFM	320	330	315	320	330	330
					IPT	.0014	.0018	.0022	.0024	.0031	.0036
					RPM	5190	3980	3080	2600	1990	1610
					IPM	43	43	40	38	37	35
	39.1		0.03D	1.0D	SFM	280	280	275	280	280	295
					IPT	.0013	.0017	.0021	.0023	.0030	.0028
					RPM	4540	3400	2690	2270	1700	1430
					IPM	35	35	34	32	31	24
	39.2		0.03D	1.0D	SFM	245	245	245	245	245	255
					IPT	.0012	.0017	.0020	.0022	.0028	.0027
					RPM	3940	2950	2360	1970	1480	1230
					IPM	29	29	28	26	25	20
	39.3		0.03D	1.0D	SFM	160	160	165	170	160	155
					IPT	.0011	.0015	.0018	.0020	.0025	.0028
					RPM	2620	1970	1610	1370	980	740
					IPM	17	17	17	16	15	12
	40	Chilled Cast Iron	0.05D	1.0D	SFM	360	365	360	360	365	370
					IPT	.0014	.0019	.0023	.0026	.0033	.0037
					RPM	5790	4430	3480	2900	2210	1800
					IPM	49	51	48	44	43	40
	41	Hardened Cast Iron	0.05D	1.0D	SFM	320	330	315	320	330	330
					IPT	.0014	.0018	.0022	.0024	.0031	.0036
					RPM	5190	3980	3080	2600	1990	1610
					IPM	43	43	40	38	37	35

HPI88, HPK19 SERIES

2 FLUTE SQUARE - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Slotting	Para-meter	Diameter (Ø)																
					0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
			Ae	LBS	0.5	0.75	1	1.5	2	2.5	3	1	1.5	2	2.5	3	1	1.5	2	2.5	3
P	5	Non-alloy steel	1.0D	SFM	100	100	100	90	90	80	80	150	150	135	135	135	220	220	220	200	200
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	49180	44260	44260	39340	39340	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950
				IPM	4	4	4	4	4	3	3	8	8	7	7	7	8	8	8	8	8
				Ap	.0004	.0004	.0004	.0003	.0003	.0003	.0002	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006
	8	Low alloy steel	1.0D	SFM	100	100	100	90	90	80	80	150	150	135	135	135	220	220	220	200	200
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	49180	44260	44260	39340	39340	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950
				IPM	4	4	4	4	4	3	3	8	8	7	7	7	8	8	8	8	8
				Ap	.0004	.0004	.0004	.0003	.0003	.0003	.0002	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006
	9		1.0D	SFM	100	100	100	90	90	80	80	150	150	135	135	135	220	220	220	200	200
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	49180	44260	44260	39340	39340	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950
				IPM	4	4	4	4	4	3	3	8	8	7	7	7	8	8	8	8	8
				Ap	.0004	.0004	.0004	.0003	.0003	.0003	.0002	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006
	11.1	High alloyed steel, and tool steel	1.0D	SFM	100	100	100	90	90	80	80	150	150	135	135	135	220	220	220	200	200
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	49180	44260	44260	39340	39340	49180	49180	44260	44260	44260	53280	53280	53280	47950	47950
				IPM	4	4	4	4	4	3	3	8	8	7	7	7	8	8	8	8	8
				Ap	.0004	.0004	.0004	.0003	.0003	.0003	.0002	.0005	.0005	.0005	.0004	.0004	.0008	.0007	.0007	.0006	.0006
	11.2		1.0D	SFM	100	100	100	90	90	80	80	135	135	120	120	120	185	185	185	165	165
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	49180	44260	44260	39340	39340	43710	43710	39340	39340	39340	45080	45080	45080	40570	40570
				IPM	4	4	4	4	4	3	3	7	7	6	6	6	7	7	7	6	6
				Ap	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005
H	38.1	Hardened steel	1.0D	SFM	100	100	100	90	90	80	80	135	135	120	120	120	185	185	185	165	165
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	49180	44260	44260	39340	39340	43710	43710	39340	39340	39340	45080	45080	45080	40570	40570
				IPM	4	4	4	4	4	3	3	7	7	6	6	6	7	7	7	6	6
				Ap	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005
	38.2		1.0D	SFM	85	85	85	75	75	70	70	135	135	120	120	120	170	170	170	150	150
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001
				RPM	40980	40980	40980	36890	36890	32790	32790	43710	43710	39340	39340	39340	40980	40980	40980	36890	36890
				IPM	3	3	3	3	3	3	3	3	3	3	3	3	6	6	6	6	6
				Ap	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005
	39.1		1.0D	SFM	70	70	70	60	60	55	55	100	100	90	90	90	135	135	135	120	120
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004
				RPM	32790	32790	32790	29510	29510	26230	26230	32790	32790	29510	29510	29510	32790	32790	32790	29510	29510
				IPM	3	3	3	2	2	2	2	3	3	2	2	2	3	3	3	2	2
				Ap	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0003	.0003	.0006	.0006	.0006	.0005	.0005
	39.2		1.0D	SFM	70	70	70	60	60	55	55	85	85	75	75	75	100	100	100	90	90
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004
				RPM	32790	32790	32790	29510	29510	26230	26230	27320	27320	24590	24590	24590	24590	24590	24590	22130	22130
				IPM	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
				Ap	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0003	.0003	.0006	.0006	.0006	.0005	.0005
	39.3		1.0D	SFM	50	50	50	45	45	40	40	70	70	60	60	60	85	85	85	75	75
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004
				RPM	24590	24590	24590	22130	22130	19100	19100	21860	21860	19670	19670	19670	20490	20490	20490	18440	18440
				IPM	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	1	1
				Ap	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0003	.0003	.0005	.0005	.0005	.0004	.0004
	40	Chilled Cast Iron	1.0D	SFM	100	100	100	90	90	80	80	135	135	120	120	120	185	185	185	165	165
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
				RPM	49180	49180	49180	44260	44260	39340	39340	43710	43710	39340	39340	39340	45080	45080	45080	40570	40570
				IPM	4	4	4	4	4	3	3	7	7	6	6	6	7	7	7	6	6
				Ap	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005
	41	Hardened Cast Iron	1.0D	SFM	85	85	85	75	75	70	70	135	135	120	120	120	170	170	170	150	150
				IPT	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001
				RPM	40980	40980	40980	36890	36890	32790	32790	43710	43710	39340	39340	39340	40980	40980	40980	36890	36890
				IPM	3	3	3	3	3	3	3	3	3	3	3	3	6	6	6	6	6
				Ap	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0005	.0005	.0004	.0004	.0004	.0007	.0006	.0006	.0005	.0005

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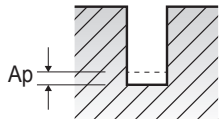
2 FLUTE SQUARE - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																			
			0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		LBS	3.5	4	5	6	8	10	1	1.5	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10
P	5	SFM	200	200	175	175	130	65	270	270	270	270	245	245	245	245	245	215	215	160	160	160
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0001	.0001
		RPM	47950	47950	42620	42620	31970	15980	52460	52460	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	31480
		IPM	8	8	7	7	3	1	17	17	17	17	15	15	15	15	15	10	10	7	7	7
		Ap	.0006	.0006	.0006	.0005	.0004	.0003	.0010	.0010	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0005	.0005
	8	SFM	200	200	175	175	130	65	270	270	270	270	245	245	245	245	245	215	215	160	160	160
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0001	.0001
		RPM	47950	47950	42620	42620	31970	15980	52460	52460	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	31480
		IPM	8	8	7	7	3	1	17	17	17	17	15	15	15	15	15	10	10	7	7	7
		Ap	.0006	.0006	.0006	.0005	.0004	.0003	.0010	.0010	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0005	.0005
	9	SFM	200	200	175	175	130	65	270	270	270	270	245	245	245	245	245	215	215	160	160	160
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0001	.0001
		RPM	47950	47950	42620	42620	31970	15980	52460	52460	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	31480
		IPM	8	8	7	7	3	1	17	17	17	17	15	15	15	15	15	10	10	7	7	7
		Ap	.0006	.0006	.0006	.0005	.0004	.0003	.0010	.0010	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0005	.0005
	11.1	SFM	200	200	175	175	130	65	270	270	270	270	245	245	245	245	245	215	215	160	160	160
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0001	.0001
		RPM	47950	47950	42620	42620	31970	15980	52460	52460	52460	52460	47210	47210	47210	47210	47210	41970	41970	31480	31480	31480
		IPM	8	8	7	7	3	1	17	17	17	17	15	15	15	15	15	10	10	7	7	7
		Ap	.0006	.0006	.0006	.0005	.0004	.0003	.0010	.0010	.0009	.0009	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0005	.0005
	11.2	SFM	165	165	150	150	110	55	235	235	235	235	215	215	215	215	215	190	190	140	140	140
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	40570	40570	36070	36070	27050	13520	45900	45900	45900	45900	41310	41310	41310	41310	41310	36720	36720	27540	27540	27540
		IPM	6	6	6	6	2	1	11	11	11	11	10	10	10	10	10	6	6	4	4	4
		Ap	.0005	.0005	.0005	.0004	.0003	.0003	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0004	.0004
H	38.1	SFM	165	165	150	150	110	55	235	235	235	235	215	215	215	215	215	190	190	140	140	140
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	40570	40570	36070	36070	27050	13520	45900	45900	45900	45900	41310	41310	41310	41310	41310	36720	36720	27540	27540	27540
		IPM	6	6	6	6	2	1	11	11	11	11	10	10	10	10	10	6	6	4	4	4
		Ap	.0005	.0005	.0005	.0004	.0003	.0003	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0004	.0004
	38.2	SFM	150	150	135	135	100	50	220	220	220	220	200	200	200	200	200	175	175	130	130	130
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	36890	36890	32790	32790	24590	12300	42620	42620	42620	42620	38360	38360	38360	38360	38360	34100	34100	25570	25570	25570
		IPM	6	6	5	5	2	1	10	10	10	10	9	9	9	9	9	5	5	4	4	4
		Ap	.0005	.0005	.0005	.0004	.0003	.0003	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0004	.0004
	39.1	SFM	120	120	110	110	80	40	170	170	170	170	150	150	150	150	150	135	135	100	100	100
		IPT	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0000	.0000
		RPM	29510	29510	26230	26230	19670	9840	32790	32790	32790	32790	29510	29510	29510	29510	29510	26230	26230	19670	19670	19670
		IPM	2	2	2	2	2	1	5	5	5	5	5	5	5	5	5	4	4	2	2	2
		Ap	.0004	.0004	.0004	.0004	.0003	.0003	.0008	.0008	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0004	.0004
	39.2	SFM	90	90	80	80	60	30	135	135	135	135	120	120	120	120	120	110	110	80	80	80
		IPT	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000	.0000	.0000	.0000	.0000
		RPM	22130	22130	19670	19670	14750	7380	26230	26230	26230	26230	23610	23610	23610	23610	23610	20980	20980	15740	15740	15740
		IPM	2	2	2	2	1	1	4	4	4	4	4	4	4	4	4	2	2	1	1	1
		Ap	.0004	.0004	.0004	.0004	.0003	.0003	.0008	.0008	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0004	.0004
	39.3	SFM	75	75	70	70	50	25	100	100	100	100	90	90	90	90	90	80	80	60	60	60
		IPT	.00004	.00004	.00004	.00004	.00004	.00004	.0001	.0001	.0001	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
		RPM	18440	18440	16390	16390	12300	6150	19670	19670	19670	19670	17710	17710	17710	17710	17710	15740	15740	11800	11800	11800
		IPM	1	1	1	1	1	0	3	3	3	3	1	1	1	1	1	1	1	1	1	1
		Ap	.0004	.0004	.0004	.0003	.0003	.0002	.0006	.0006	.0006	.0006	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0003	.0003
	40	SFM	165	165	150	150	110	55	235	235	235	235	215	215	215	215	215	190	190	140	140	140
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	40570	40570	36070	36070	27050	13520	45900	45900	45900	45900	41310	41310	41310	41310	41310	36720	36720	27540	27540	27540
		IPM	6	6	6	6	2	1	11	11	11	11	10	10	10	10	10	6	6	4	4	4
		Ap	.0005	.0005	.0005	.0004	.0003	.0003	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0004	.0004
	41	SFM	150	150	135	135	100	50	220	220	220	220	200	200	200	200	200	175	175	130	130	130
		IPT	.0001	.0001	.0001	.0001	.0000	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	36890	36890	32790	32790	24590	12300	42620	42620	42620	42620	38360	38360	38360	38360	38360	34100	34100	25570	25570	25570
		IPM	6	6	5	5	2	1	10	10	10	10	9	9	9	9	9	5	5	4	4	4
		Ap	.0005	.0005	.0005	.0004	.0003	.0003	.0008	.0008	.0008	.0008	.0007	.0007	.0007	.0006	.0006	.0006	.0005	.0005	.0004	.0004

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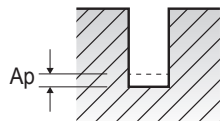
2 FLUTE SQUARE - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																			
			0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1	1
			1.5	2	3	4	5	6	2	4	6	8	10	3	4	5	6	8	10	12	2	3
P	5	SFM	320	320	320	290	290	290	370	335	335	300	300	420	420	380	380	380	340	340	505	505
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004
		RPM	51910	51910	51910	46720	46720	46720	51570	46410	46410	41260	41260	51230	51230	46110	46110	46110	40980	40980	49180	49180
		IPM	20	20	20	18	18	18	24	18	18	13	13	24	24	18	18	18	16	16	39	39
		Ap	.0012	.0011	.0011	.0009	.0008	.0008	.0014	.0011	.0010	.0010	.0008	.0014	.0014	.0013	.0013	.0011	.0011	.0009	.0020	.0020
	8	SFM	320	320	320	290	290	290	370	335	335	300	300	420	420	380	380	380	340	340	505	505
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004
		RPM	51910	51910	51910	46720	46720	46720	51570	46410	46410	41260	41260	51230	51230	46110	46110	46110	40980	40980	49180	49180
		IPM	20	20	20	18	18	18	24	18	18	13	13	24	24	18	18	18	16	16	39	39
		Ap	.0012	.0011	.0011	.0009	.0008	.0008	.0014	.0011	.0010	.0010	.0008	.0014	.0014	.0013	.0013	.0011	.0011	.0009	.0020	.0020
	9	SFM	320	320	320	290	290	290	370	335	335	300	300	420	420	380	380	380	340	340	505	505
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004
		RPM	51910	51910	51910	46720	46720	46720	51570	46410	46410	41260	41260	51230	51230	46110	46110	46110	40980	40980	49180	49180
		IPM	20	20	20	18	18	18	24	18	18	13	13	24	24	18	18	18	16	16	39	39
		Ap	.0012	.0011	.0011	.0009	.0008	.0008	.0014	.0011	.0010	.0010	.0008	.0014	.0014	.0013	.0013	.0011	.0011	.0009	.0020	.0020
	11.1	SFM	320	320	320	290	290	290	370	335	335	300	300	420	420	380	380	380	340	340	505	505
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004
		RPM	51910	51910	51910	46720	46720	46720	51570	46410	46410	41260	41260	51230	51230	46110	46110	46110	40980	40980	49180	49180
		IPM	20	20	20	18	18	18	24	18	18	13	13	24	24	18	18	18	16	16	39	39
		Ap	.0012	.0011	.0011	.0009	.0008	.0008	.0014	.0011	.0010	.0010	.0008	.0014	.0014	.0013	.0013	.0011	.0011	.0009	.0020	.0020
	11.2	SFM	285	285	285	260	260	260	305	275	275	245	245	340	340	305	305	305	270	270	405	405
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003
		RPM	46450	46450	46450	41800	41800	41800	42230	38010	38010	33780	33780	40980	40980	36890	36890	36890	32790	32790	39340	39340
		IPM	15	15	15	13	13	13	17	15	15	11	11	19	19	15	15	15	13	13	25	25
		Ap	.0010	.0009	.0009	.0008	.0007	.0007	.0012	.0009	.0008	.0008	.0007	.0012	.0012	.0011	.0011	.0009	.0009	.0008	.0017	.0017
H	38.1	SFM	285	285	285	260	260	260	305	275	275	245	245	340	340	305	305	305	270	270	405	405
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003
		RPM	46450	46450	46450	41800	41800	41800	42230	38010	38010	33780	33780	40980	40980	36890	36890	36890	32790	32790	39340	39340
		IPM	15	15	15	13	13	13	17	15	15	11	11	19	19	15	15	15	13	13	25	25
		Ap	.0010	.0009	.0009	.0008	.0007	.0007	.0012	.0009	.0008	.0008	.0007	.0012	.0012	.0011	.0011	.0009	.0009	.0008	.0017	.0017
	38.2	SFM	255	255	255	230	230	230	255	225	225	200	200	255	255	230	230	230	205	205	270	270
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003
		RPM	40980	40980	40980	36890	36890	36890	35020	31520	31520	28020	28020	30740	30740	27660	27660	27660	24590	24590	26230	26230
		IPM	13	13	13	12	12	12	14	10	10	9	9	12	12	11	11	11	8	8	14	14
		Ap	.0010	.0009	.0009	.0008	.0007	.0007	.0012	.0009	.0008	.0008	.0007	.0012	.0012	.0011	.0011	.0009	.0009	.0008	.0017	.0017
	39.1	SFM	185	185	185	165	165	165	205	185	185	165	165	220	220	200	200	200	175	175	220	220
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0002	.0002
		RPM	30050	30050	30050	27050	27050	27050	28340	25500	25500	22670	22670	26640	26640	23980	23980	23980	21310	21310	21310	21310
		IPM	7	7	7	6	6	6	9	6	6	5	5	8	8	8	8	8	5	5	8	8
		Ap	.0009	.0009	.0009	.0008	.0007	.0007	.0011	.0009	.0008	.0008	.0007	.0011	.0011	.0010	.0010	.0009	.0009	.0008	.0016	.0016
	39.2	SFM	150	150	150	135	135	135	150	135	135	120	120	170	170	150	150	150	135	135	170	170
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002
		RPM	24590	24590	24590	22130	22130	22130	21120	19000	19000	16890	16890	20490	20490	18440	18440	18440	16390	16390	16390	16390
		IPM	4	4	4	4	4	4	5	3	3	3	3	5	5	4	4	4	3	3	5	5
		Ap	.0009	.0009	.0009	.0008	.0007	.0007	.0011	.0009	.0008	.0008	.0007	.0011	.0011	.0010	.0010	.0009	.0009	.0008	.0016	.0016
	39.3	SFM	135	135	135	120	120	120	135	125	125	110	110	135	135	120	120	120	110	110	135	135
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
		RPM	21860	21860	21860	19670	19670	19670	18950	17060	17060	15160	15160	16390	16390	14750	14750	14750	13110	13110	13110	13110
		IPM	3	3	3	3	3	3	3	3	3	2	2	4	4	2	2	2	2	2	3	3
		Ap	.0008	.0007	.0007	.0006	.0005	.0005	.0009	.0007	.0006	.0006	.0005	.0009	.0009	.0008	.0008	.0007	.0007	.0006	.0013	.0013
	40	SFM	285	285	285	260	260	260	305	275	275	245	245	340	340	305	305	305	270	270	405	405
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003
		RPM	46450	46450	46450	41800	41800	41800	42230	38010	38010	33780	33780	40980	40980	36890	36890	36890	32790	32790	39340	39340
		IPM	15	15	15	13	13	13	17	15	15	11	11	19	19	15	15	15	13	13	25	25
		Ap	.0010	.0009	.0009	.0008	.0007	.0007	.0012	.0009	.0008	.0008	.0007	.0012	.0012	.0011	.0011	.0009	.0009	.0008	.0017	.0017
	41	SFM	255	255	255	230	230	230	255	225	225	200	200	255	255	230	230	230	205	205	270	270
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003
		RPM	40980	40980	40980	36890	36890	36890	35020	31520	31520	28020	28020	30740	30740	27660	27660	27660	24590	24590	26230	26230
		IPM	13	13	13	12	12	12	14	10	10	9	9	12	12	11	11	11	8	8	14	14
		Ap	.0010	.0009	.0009	.0008	.0007	.0007	.0012	.0009	.0008	.0008	.0007	.0012	.0012	.0011	.0011	.0009	.0009	.0008	.0017	.0017

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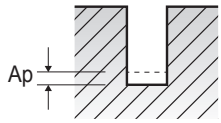
2 FLUTE SQUARE - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																		
			1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1.2	1.2	1.2	1.2	1.4	1.4
		LBS	4	5	6	7	8	9	10	12	14	16	18	20	22	6	8	10	12	16	6	12
P	5	SFM	505	505	455	455	455	455	455	405	405	305	305	305	150	560	500	500	500	445	610	545
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0003	.0004	.0004
		RPM	49180	49180	44260	44260	44260	44260	44260	39340	39340	29510	29510	29510	14750	45080	40570	40570	40570	36070	42150	37940
		IPM	39	39	31	31	31	31	31	25	25	16	16	16	7	39	29	29	29	23	36	30
		Ap	.0018	.0018	.0016	.0016	.0016	.0014	.0014	.0014	.0012	.0012	.0010	.0010	.0008	.0021	.0019	.0017	.0017	.0014	.0025	.0019
	8	SFM	505	505	455	455	455	455	455	405	405	305	305	305	150	560	500	500	500	445	610	545
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0003	.0004	.0004
		RPM	49180	49180	44260	44260	44260	44260	44260	39340	39340	29510	29510	29510	14750	45080	40570	40570	40570	36070	42150	37940
		IPM	39	39	31	31	31	31	31	25	25	16	16	16	7	39	29	29	29	23	36	30
		Ap	.0018	.0018	.0016	.0016	.0016	.0014	.0014	.0014	.0012	.0012	.0010	.0010	.0008	.0021	.0019	.0017	.0017	.0014	.0025	.0019
	9	SFM	505	505	455	455	455	455	455	405	405	305	305	305	150	560	500	500	500	445	610	545
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0003	.0004	.0004
		RPM	49180	49180	44260	44260	44260	44260	44260	39340	39340	29510	29510	29510	14750	45080	40570	40570	40570	36070	42150	37940
		IPM	39	39	31	31	31	31	31	25	25	16	16	16	7	39	29	29	29	23	36	30
		Ap	.0018	.0018	.0016	.0016	.0016	.0014	.0014	.0014	.0012	.0012	.0010	.0010	.0008	.0021	.0019	.0017	.0017	.0014	.0025	.0019
	11.1	SFM	505	505	455	455	455	455	455	405	405	305	305	305	150	560	500	500	500	445	610	545
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0003	.0004	.0004
		RPM	49180	49180	44260	44260	44260	44260	44260	39340	39340	29510	29510	29510	14750	45080	40570	40570	40570	36070	42150	37940
		IPM	39	39	31	31	31	31	31	25	25	16	16	16	7	39	29	29	29	23	36	30
		Ap	.0018	.0018	.0016	.0016	.0016	.0014	.0014	.0014	.0012	.0012	.0010	.0010	.0008	.0021	.0019	.0017	.0017	.0014	.0025	.0019
	11.2	SFM	405	405	365	365	365	365	365	325	325	245	245	245	120	455	410	410	410	365	475	425
		IPT	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0003	.0003	.0003	.0003	.0004	.0004
		RPM	39340	39340	35410	35410	35410	35410	35410	31470	31470	23610	23610	23610	11800	36880	33200	33200	33200	29510	32790	29510
		IPM	25	25	20	20	20	20	20	15	15	11	11	11	5	26	21	21	21	17	26	21
		Ap	.0015	.0015	.0013	.0013	.0013	.0012	.0012	.0012	.0010	.0010	.0008	.0008	.0007	.0018	.0016	.0014	.0014	.0012	.0021	.0016
H	38.1	SFM	405	405	365	365	365	365	365	325	325	245	245	245	120	455	410	410	410	365	475	425
		IPT	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0003	.0003	.0003	.0003	.0004	.0004
		RPM	39340	39340	35410	35410	35410	35410	35410	31470	31470	23610	23610	23610	11800	36880	33200	33200	33200	29510	32790	29510
		IPM	25	25	20	20	20	20	20	15	15	11	11	11	5	26	21	21	21	17	26	21
		Ap	.0015	.0015	.0013	.0013	.0013	.0012	.0012	.0012	.0010	.0010	.0008	.0008	.0007	.0018	.0016	.0014	.0014	.0012	.0021	.0016
	38.2	SFM	270	270	245	245	245	245	245	215	215	160	160	160	80	305	275	275	275	245	320	290
		IPT	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0003	.0002	.0004	.0003
		RPM	26230	26230	23610	23610	23610	23610	23610	20980	20980	15740	15740	15740	7870	24590	22130	22130	22130	19670	22250	20020
		IPM	14	14	11	11	11	11	11	10	10	6	6	6	2	15	12	12	12	9	16	13
		Ap	.0015	.0015	.0013	.0013	.0013	.0012	.0012	.0012	.0010	.0010	.0008	.0008	.0007	.0018	.0016	.0014	.0014	.0012	.0021	.0016
	39.1	SFM	220	220	200	200	200	200	200	175	175	130	130	130	65	245	220	220	220	195	255	230
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0002	.0002	.0002	.0002	.0002	.0003	.0002
		RPM	21310	21310	19180	19180	19180	19180	19180	17050	17050	12790	12790	12790	6390	19950	17950	17950	17950	15960	17560	15810
		IPM	8	8	8	8	8	8	8	5	5	4	4	4	1	9	7	7	7	6	10	7
		Ap	.0014	.0014	.0013	.0013	.0013	.0011	.0011	.0011	.0009	.0009	.0008	.0008	.0006	.0017	.0015	.0013	.0013	.0011	.0020	.0015
	39.2	SFM	170	170	150	150	150	150	150	135	135	100	100	100	50	185	165	165	165	150	195	175
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	16390	16390	14750	14750	14750	14750	14750	13110	13110	9840	9840	9840	4920	15030	13520	13520	13520	12020	13580	12230
		IPM	5	5	5	5	5	5	5	3	3	2	2	2	1	6	5	5	5	4	5	5
		Ap	.0014	.0014	.0013	.0013	.0013	.0011	.0011	.0011	.0009	.0009	.0008	.0008	.0006	.0017	.0015	.0013	.0013	.0011	.0020	.0015
	39.3	SFM	135	135	120	120	120	120	120	110	110	80	80	80	40	150	135	135	135	120	160	145
		IPT	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0001	.0002	.0002
		RPM	13110	13110	11800	11800	11800	11800	11800	10490	10490	7870	7870	7870	3930	12300	11070	11070	11070	9840	11240	10120
		IPM	3	3	3	3	3	3	3	2	2	1	1	1	1	4	4	4	4	2	4	3
		Ap	.0012	.0012	.0010	.0010	.0010	.0009	.0009	.0009	.0008	.0008	.0006	.0006	.0005	.0014	.0012	.0011	.0011	.0009	.0016	.0013
	40	SFM	405	405	365	365	365	365	365	325	325	245	245	245	120	455	410	410	410	365	475	425
		IPT	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0003	.0003	.0003	.0003	.0004	.0004
		RPM	39340	39340	35410	35410	35410	35410	35410	31470	31470	23610	23610	23610	11800	36880	33200	33200	33200	29510	32790	29510
		IPM	25	25	20	20	20	20	20	15	15	11	11	11	5	26	21	21	21	17	26	21
		Ap	.0015	.0015	.0013	.0013	.0013	.0012	.0012	.0012	.0010	.0010	.0008	.0008	.0007	.0018	.0016	.0014	.0014	.0012	.0021	.0016
	41	SFM	270	270	245	245	245	245	245	215	215	160	160	160	80	305	275	275	275	245	320	290
		IPT	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0003	.0002	.0004	.0003
		RPM	26230	26230	23610	23610	23610	23610	23610	20980	20980	15740	15740	15740	7870	24590	22130	22130	22130	19670	22250	20020
		IPM	14	14	11	11	11	11	11	10	10	6	6	6	2	15	12	12	12	9	16	13
		Ap	.0015	.0015	.0013	.0013	.0013	.0012	.0012	.0012	.0010	.0010	.0008	.0008	.0007	.0018	.0016	.0014	.0014	.0012	.0021	.0016

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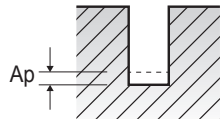
2 FLUTE SQUARE - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																			
			1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.8	1.8	1.8	1.8	1.8	1.8
		LBS	4	6	8	10	12	14	16	18	20	25	30	35	6	8	6	8	10	12	14	16
P	5	SFM	645	645	580	580	580	580	515	515	515	385	385	195	660	660	740	740	665	665	665	665
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004
		RPM	41580	41580	37420	37420	37420	37420	33270	33270	33270	24950	24950	12470	39960	39960	39960	39960	35960	35960	35960	35960
		IPM	36	36	29	29	29	29	24	24	24	16	16	7	38	38	38	38	28	28	28	28
		Ap	.0030	.0027	.0024	.0024	.0024	.0021	.0021	.0021	.0018	.0015	.0015	.0012	.0028	.0028	.0032	.0032	.0028	.0028	.0028	.0025
	8	SFM	645	645	580	580	580	580	515	515	515	385	385	195	660	660	740	740	665	665	665	665
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004
		RPM	41580	41580	37420	37420	37420	37420	33270	33270	33270	24950	24950	12470	39960	39960	39960	39960	35960	35960	35960	35960
		IPM	36	36	29	29	29	29	24	24	24	16	16	7	38	38	38	38	28	28	28	28
		Ap	.0030	.0027	.0024	.0024	.0024	.0021	.0021	.0021	.0018	.0015	.0015	.0012	.0028	.0028	.0032	.0032	.0028	.0028	.0028	.0025
	9	SFM	645	645	580	580	580	580	515	515	515	385	385	195	660	660	740	740	665	665	665	665
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004
		RPM	41580	41580	37420	37420	37420	37420	33270	33270	33270	24950	24950	12470	39960	39960	39960	39960	35960	35960	35960	35960
		IPM	36	36	29	29	29	29	24	24	24	16	16	7	38	38	38	38	28	28	28	28
		Ap	.0030	.0027	.0024	.0024	.0024	.0021	.0021	.0021	.0018	.0015	.0015	.0012	.0028	.0028	.0032	.0032	.0028	.0028	.0028	.0025
	11.1	SFM	645	645	580	580	580	580	515	515	515	385	385	195	660	660	740	740	665	665	665	665
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004
		RPM	41580	41580	37420	37420	37420	37420	33270	33270	33270	24950	24950	12470	39960	39960	39960	39960	35960	35960	35960	35960
		IPM	36	36	29	29	29	29	24	24	24	16	16	7	38	38	38	38	28	28	28	28
		Ap	.0030	.0027	.0024	.0024	.0024	.0021	.0021	.0021	.0018	.0015	.0015	.0012	.0028	.0028	.0032	.0032	.0028	.0028	.0028	.0025
	11.2	SFM	505	505	455	455	455	455	405	405	405	305	305	150	525	525	595	595	535	535	535	535
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
		RPM	32750	32750	29480	29480	29480	29480	26200	26200	26200	19650	19650	9830	31970	31970	31970	31970	28770	28770	28770	28770
		IPM	26	26	21	21	21	21	16	16	16	11	11	5	25	25	25	25	20	20	20	20
		Ap	.0025	.0023	.0020	.0020	.0020	.0018	.0018	.0018	.0015	.0013	.0013	.0010	.0024	.0024	.0027	.0027	.0024	.0024	.0024	.0021
H	38.1	SFM	505	505	455	455	455	455	405	405	405	305	305	150	525	525	595	595	535	535	535	535
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
		RPM	32750	32750	29480	29480	29480	29480	26200	26200	26200	19650	19650	9830	31970	31970	31970	31970	28770	28770	28770	28770
		IPM	26	26	21	21	21	21	16	16	16	11	11	5	25	25	25	25	20	20	20	20
		Ap	.0025	.0023	.0020	.0020	.0020	.0018	.0018	.0018	.0015	.0013	.0013	.0010	.0024	.0024	.0027	.0027	.0024	.0024	.0024	.0021
	38.2	SFM	340	340	305	305	305	305	270	270	270	205	205	100	350	350	390	390	350	350	350	350
		IPT	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
		RPM	21940	21940	19750	19750	19750	19750	17550	17550	17550	13160	13160	6580	21110	21110	21110	21110	19000	19000	19000	19000
		IPM	16	16	12	12	12	12	10	10	10	6	6	3	17	17	17	17	13	13	13	13
		Ap	.0025	.0023	.0020	.0020	.0020	.0018	.0018	.0018	.0015	.0013	.0013	.0010	.0024	.0024	.0027	.0027	.0024	.0024	.0024	.0021
	39.1	SFM	270	270	245	245	245	245	215	215	215	160	160	80	280	280	315	315	285	285	285	285
		IPT	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002
		RPM	17510	17510	15760	15760	15760	15760	14010	14010	14010	10510	10510	5250	17010	17010	17010	17010	15310	15310	15310	15310
		IPM	10	10	7	7	7	7	6	6	6	4	4	2	9	9	9	9	7	7	7	7
		Ap	.0024	.0021	.0019	.0019	.0019	.0017	.0017	.0017	.0014	.0012	.0012	.0009	.0023	.0023	.0026	.0026	.0023	.0023	.0023	.0020
	39.2	SFM	205	205	185	185	185	185	165	165	165	120	120	60	215	215	240	240	215	215	215	215
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	13180	13180	11870	11870	11870	11870	10550	10550	10550	7910	7910	3960	12910	12910	12910	12910	11620	11620	11620	11620
		IPM	6	6	5	5	5	5	3	3	3	2	2	1	6	6	6	6	5	5	5	5
		Ap	.0024	.0021	.0019	.0019	.0019	.0017	.0017	.0017	.0014	.0012	.0012	.0009	.0023	.0023	.0026	.0026	.0023	.0023	.0023	.0020
	39.3	SFM	170	170	155	155	155	155	135	135	135	100	100	50	180	180	200	200	180	180	180	180
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001	.0001	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
		RPM	11020	11020	9920	9920	9920	9920	8820	8820	8820	6610	6610	3310	10860	10860	10860	10860	9770	9770	9770	9770
		IPM	4	4	3	3	3	3	3	3	3	2	2	1	4	4	4	4	3	3	3	3
		Ap	.0019	.0017	.0015	.0015	.0015	.0013	.0013	.0013	.0012	.0010	.0010	.0008	.0018	.0018	.0021	.0021	.0018	.0018	.0018	.0016
	40	SFM	505	505	455	455	455	455	405	405	405	305	305	150	525	525	595	595	535	535	535	535
		IPT	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
		RPM	32750	32750	29480	29480	29480	29480	26200	26200	26200	19650	19650	9830	31970	31970	31970	31970	28770	28770	28770	28770
		IPM	26	26	21	21	21	21	16	16	16	11	11	5	25	25	25	25	20	20	20	20
		Ap	.0025	.0023	.0020	.0020	.0020	.0018	.0018	.0018	.0015	.0013	.0013	.0010	.0024	.0024	.0027	.0027	.0024	.0024	.0024	.0021
	41	SFM	340	340	305	305	305	305	270	270	270	205	205	100	350	350	390	390	350	350	350	350
		IPT	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
		RPM	21940	21940	19750	19750	19750	19750	17550	17550	17550	13160	13160	6580	21110	21110	21110	21110	19000	19000	19000	19000
		IPM	16	16	12	12	12	12	10	10	10	6	6	3	17	17	17	17	13	13	13	13
		Ap	.0025	.0023	.0020	.0020	.0020	.0018	.0018	.0018	.0015	.0013	.0013	.0010	.0024	.0024	.0027	.0027	.0024	.0024	.0024	.0021

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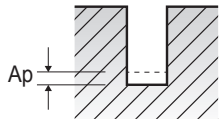
2 FLUTE SQUARE - SLOTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)																			
			1.8	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.5	2.5	2.5	2.5	2.5
		LBS	18	4	6	8	10	12	14	16	18	20	25	30	35	40	50	8	12	16	20	30
P	5	SFM	665	710	710	710	710	640	640	640	640	640	570	570	425	425	215	710	710	640	640	570
		IPT	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0005
		RPM	35960	34430	34430	34430	34430	30980	30980	30980	30980	30980	27540	27540	20660	20660	10330	27600	27600	24840	24840	22080
		IPM	28	35	35	35	35	29	29	29	29	29	22	22	15	15	6	35	35	27	27	23
		Ap	.0025	.0039	.0039	.0035	.0035	.0031	.0031	.0031	.0028	.0028	.0028	.0024	.0020	.0020	.0016	.0044	.0044	.0039	.0039	.0034
	8	SFM	665	710	710	710	710	640	640	640	640	640	570	570	425	425	215	710	710	640	640	570
		IPT	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0005
		RPM	35960	34430	34430	34430	34430	30980	30980	30980	30980	30980	27540	27540	20660	20660	10330	27600	27600	24840	24840	22080
		IPM	28	35	35	35	35	29	29	29	29	29	22	22	15	15	6	35	35	27	27	23
		Ap	.0025	.0039	.0039	.0035	.0035	.0031	.0031	.0031	.0028	.0028	.0028	.0024	.0020	.0020	.0016	.0044	.0044	.0039	.0039	.0034
	9	SFM	665	710	710	710	710	640	640	640	640	640	570	570	425	425	215	710	710	640	640	570
		IPT	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0005
		RPM	35960	34430	34430	34430	34430	30980	30980	30980	30980	30980	27540	27540	20660	20660	10330	27600	27600	24840	24840	22080
		IPM	28	35	35	35	35	29	29	29	29	29	22	22	15	15	6	35	35	27	27	23
		Ap	.0025	.0039	.0039	.0035	.0035	.0031	.0031	.0031	.0028	.0028	.0028	.0024	.0020	.0020	.0016	.0044	.0044	.0039	.0039	.0034
	11.1	SFM	665	710	710	710	710	640	640	640	640	640	570	570	425	425	215	710	710	640	640	570
		IPT	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0003	.0006	.0006	.0006	.0006	.0005
		RPM	35960	34430	34430	34430	34430	30980	30980	30980	30980	30980	27540	27540	20660	20660	10330	27600	27600	24840	24840	22080
		IPM	28	35	35	35	35	29	29	29	29	29	22	22	15	15	6	35	35	27	27	23
		Ap	.0025	.0039	.0039	.0035	.0035	.0031	.0031	.0031	.0028	.0028	.0028	.0024	.0020	.0020	.0016	.0044	.0044	.0039	.0039	.0034
	11.2	SFM	535	560	560	560	560	500	500	500	500	500	445	445	335	335	165	555	555	500	500	445
		IPT	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0003	.0007	.0007	.0006	.0006	.0005
		RPM	28770	27050	27050	27050	27050	24340	24340	24340	24340	24340	21640	21640	16230	16230	8120	21630	21630	19470	19470	17300
		IPM	20	28	28	28	28	23	23	23	23	23	17	17	11	11	5	29	29	23	23	18
		Ap	.0021	.0033	.0033	.0030	.0030	.0027	.0027	.0027	.0023	.0023	.0023	.0020	.0017	.0017	.0013	.0038	.0038	.0033	.0033	.0029
H	38.1	SFM	535	560	560	560	560	500	500	500	500	500	445	445	335	335	165	555	555	500	500	445
		IPT	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0003	.0007	.0007	.0006	.0006	.0005
		RPM	28770	27050	27050	27050	27050	24340	24340	24340	24340	24340	21640	21640	16230	16230	8120	21630	21630	19470	19470	17300
		IPM	20	28	28	28	28	23	23	23	23	23	17	17	11	11	5	29	29	23	23	18
		Ap	.0021	.0033	.0033	.0030	.0030	.0027	.0027	.0027	.0023	.0023	.0023	.0020	.0017	.0017	.0013	.0038	.0038	.0033	.0033	.0029
	38.2	SFM	350	370	370	370	370	335	335	335	335	335	295	295	225	225	110	370	370	335	335	295
		IPT	.0004	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0006	.0006	.0006	.0006	.0005
		RPM	19000	18030	18030	18030	18030	16230	16230	16230	16230	16230	14430	14430	10820	10820	5410	14420	14420	12980	12980	11540
		IPM	13	17	17	17	17	14	14	14	14	14	11	11	7	7	3	17	17	14	14	11
		Ap	.0021	.0033	.0033	.0030	.0030	.0027	.0027	.0027	.0023	.0023	.0023	.0020	.0017	.0017	.0013	.0038	.0038	.0033	.0033	.0029
	39.1	SFM	285	305	305	305	305	275	275	275	275	275	245	245	180	180	90	305	305	275	275	245
		IPT	.0002	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0004	.0004	.0004	.0004	.0004
		RPM	15310	14750	14750	14750	14750	13280	13280	13280	13280	13280	11800	11800	8850	8850	4430	11850	11850	10660	10660	9480
		IPM	7	10	10	10	10	8	8	8	8	8	6	6	4	4	2	10	10	8	8	7
		Ap	.0020	.0031	.0031	.0028	.0028	.0025	.0025	.0025	.0022	.0022	.0022	.0019	.0016	.0016	.0013	.0035	.0035	.0031	.0031	.0028
	39.2	SFM	215	235	235	235	235	215	215	215	215	215	190	190	140	140	70	235	235	215	215	190
		IPT	.0002	.0003	.0003	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0004	.0004	.0003	.0003	.0003
		RPM	11620	11480	11480	11480	11480	10330	10330	10330	10330	10330	9180	9180	6890	6890	3440	9170	9170	8250	8250	7330
		IPM	5	6	6	6	6	5	5	5	5	5	4	4	3	3	1	6	6	5	5	4
		Ap	.0020	.0031	.0031	.0028	.0028	.0025	.0025	.0025	.0022	.0022	.0022	.0019	.0016	.0016	.0013	.0035	.0035	.0031	.0031	.0028
	39.3	SFM	180	205	205	205	205	180	180	180	180	180	160	160	120	120	60	205	205	185	185	165
		IPT	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0003	.0003	.0003	.0003	.0002
		RPM	9770	9840	9840	9840	9840	8850	8850	8850	8850	8850	7870	7870	5900	5900	2950	7930	7930	7140	7140	6350
		IPM	3	5	5	5	5	4	4	4	4	4	3	3	2	2	1	5	5	4	4	3
		Ap	.0016	.0026	.0026	.0023	.0023	.0020	.0020	.0020	.0018	.0018	.0018	.0015	.0013	.0013	.0010	.0029	.0029	.0026	.0026	.0022
	40	SFM	535	560	560	560	560	500	500	500	500	500	445	445	335	335	165	555	555	500	500	445
		IPT	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0003	.0007	.0007	.0006	.0006	.0005
		RPM	28770	27050	27050	27050	27050	24340	24340	24340	24340	24340	21640	21640	16230	16230	8120	21630	21630	19470	19470	17300
		IPM	20	28	28	28	28	23	23	23	23	23	17	17	11	11	5	29	29	23	23	18
		Ap	.0021	.0033	.0033	.0030	.0030	.0027	.0027	.0027	.0023	.0023	.0023	.0020	.0017	.0017	.0013	.0038	.0038	.0033	.0033	.0029
	41	SFM	350	370	370	370	370	335	335	335	335	335	295	295	225	225	110	370	370	335	335	295
		IPT	.0004	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0003	.0003	.0003	.0006	.0006	.0006	.0006	.0005
		RPM	19000	18030	18030	18030	18030	16230	16230	16230	16230	16230	14430	14430	10820	10820	5410	14420	14420	12980	12980	11540
		IPM	13	17	17	17	17	14	14	14	14	14	11	11	7	7	3	17	17	14	14	11
		Ap	.0021	.0033	.0033	.0030	.0030	.0027	.0027	.0027	.0023	.0023	.0023	.0020	.0017	.0017	.0013	.0038	.0038	.0033	.0033	.0029

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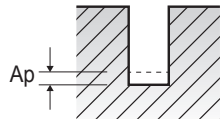
2 FLUTE SQUARE - SLOTTING



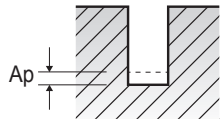
SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)															
			2.5	2.5	3	3	3	3	3	3	3.5	4	4	4	4	4	4	4
			LBS	40	50	8	12	16	20	25	30	9	10	12	16	20	30	40	50
P	5	SFM	425	425	695	695	625	625	625	625	710	710	710	710	710	640	640	570
		IPT	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0009	.0010	.0010	.0010	.0010	.0009	.0009	.0008
		RPM	16560	16560	22400	22400	20160	20160	20160	20160	19670	17210	17210	17210	17210	15490	15490	13770
		IPM	14	14	34	34	27	27	27	27	34	35	35	35	35	28	28	23
		Ap	.0030	.0025	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079	.0079	.0071	.0071	.0063	.0055	.0055
	8	SFM	425	425	695	695	625	625	625	625	710	710	710	710	710	640	640	570
		IPT	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0009	.0010	.0010	.0010	.0010	.0009	.0009	.0008
		RPM	16560	16560	22400	22400	20160	20160	20160	20160	19670	17210	17210	17210	17210	15490	15490	13770
		IPM	14	14	34	34	27	27	27	27	34	35	35	35	35	28	28	23
		Ap	.0030	.0025	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079	.0079	.0071	.0071	.0063	.0055	.0055
	9	SFM	425	425	695	695	625	625	625	625	710	710	710	710	710	640	640	570
		IPT	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0009	.0010	.0010	.0010	.0010	.0009	.0009	.0008
		RPM	16560	16560	22400	22400	20160	20160	20160	20160	19670	17210	17210	17210	17210	15490	15490	13770
		IPM	14	14	34	34	27	27	27	27	34	35	35	35	35	28	28	23
		Ap	.0030	.0025	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079	.0079	.0071	.0071	.0063	.0055	.0055
	11.1	SFM	425	425	695	695	625	625	625	625	710	710	710	710	710	640	640	570
		IPT	.0004	.0004	.0007	.0007	.0007	.0007	.0007	.0007	.0009	.0010	.0010	.0010	.0010	.0009	.0009	.0008
		RPM	16560	16560	22400	22400	20160	20160	20160	20160	19670	17210	17210	17210	17210	15490	15490	13770
		IPM	14	14	34	34	27	27	27	27	34	35	35	35	35	28	28	23
		Ap	.0030	.0025	.0059	.0053	.0047	.0047	.0041	.0041	.0069	.0079	.0079	.0071	.0071	.0063	.0055	.0055
	11.2	SFM	335	335	555	555	500	500	500	500	560	555	555	555	555	500	500	445
		IPT	.0005	.0005	.0008	.0008	.0007	.0007	.0007	.0007	.0009	.0011	.0011	.0011	.0011	.0009	.0009	.0009
		RPM	12980	12980	18030	18030	16230	16230	16230	16230	15500	13520	13520	13520	13520	12170	12170	10820
		IPM	12	12	28	28	23	23	23	23	29	29	29	29	29	23	23	19
		Ap	.0025	.0021	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067	.0067	.0060	.0060	.0054	.0047	.0047
H	38.1	SFM	335	335	555	555	500	500	500	500	560	555	555	555	555	500	500	445
		IPT	.0005	.0005	.0008	.0008	.0007	.0007	.0007	.0007	.0009	.0011	.0011	.0011	.0011	.0009	.0009	.0009
		RPM	12980	12980	18030	18030	16230	16230	16230	16230	15500	13520	13520	13520	13520	12170	12170	10820
		IPM	12	12	28	28	23	23	23	23	29	29	29	29	29	23	23	19
		Ap	.0025	.0021	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067	.0067	.0060	.0060	.0054	.0047	.0047
	38.2	SFM	225	225	370	370	335	335	335	335	370	370	370	370	370	335	335	295
		IPT	.0004	.0004	.0007	.0007	.0006	.0006	.0006	.0006	.0008	.0010	.0010	.0010	.0010	.0009	.0009	.0008
		RPM	8650	8650	12020	12020	10820	10820	10820	10820	10320	9020	9020	9020	9020	8120	8120	7210
		IPM	7	7	17	17	14	14	14	14	17	18	18	18	18	15	15	11
		Ap	.0025	.0021	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067	.0067	.0060	.0060	.0054	.0047	.0047
	39.1	SFM	185	185	305	305	275	275	275	275	305	305	305	305	305	275	275	245
		IPT	.0003	.0003	.0006	.0006	.0005	.0005	.0005	.0005	.0006	.0007	.0007	.0007	.0007	.0007	.0007	.0006
		RPM	7110	7110	9840	9840	8850	8850	8850	8850	8450	7380	7380	7380	7380	6640	6640	5900
		IPM	4	4	11	11	9	9	9	9	11	11	11	11	11	9	9	7
		Ap	.0024	.0020	.0047	.0043	.0038	.0038	.0033	.0033	.0055	.0063	.0063	.0057	.0057	.0050	.0044	.0044
	39.2	SFM	140	140	235	235	215	215	215	215	240	235	235	235	235	215	215	190
		IPT	.0002	.0002	.0004	.0004	.0004	.0004	.0004	.0004	.0005	.0006	.0006	.0006	.0006	.0006	.0006	.0005
		RPM	5500	5500	7650	7650	6890	6890	6890	6890	6590	5740	5740	5740	5740	5160	5160	4590
		IPM	3	3	7	7	5	5	5	5	7	7	7	7	7	6	6	4
		Ap	.0024	.0020	.0047	.0043	.0038	.0038	.0033	.0033	.0055	.0063	.0063	.0057	.0057	.0050	.0044	.0044
	39.3	SFM	125	125	205	205	180	180	180	180	200	205	205	205	205	185	185	160
		IPT	.0002	.0002	.0004	.0004	.0003	.0003	.0003	.0003	.0004	.0005	.0005	.0005	.0005	.0004	.0004	.0004
		RPM	4760	4760	6560	6560	5900	5900	5900	5900	5610	4920	4920	4920	4920	4430	4430	3930
		IPM	2	2	5	5	4	4	4	4	5	5	5	5	5	4	4	3
		Ap	.0019	.0016	.0038	.0035	.0031	.0031	.0027	.0027	.0045	.0051	.0051	.0046	.0046	.0041	.0036	.0036
	40	SFM	335	335	555	555	500	500	500	500	560	555	555	555	555	500	500	445
		IPT	.0005	.0005	.0008	.0008	.0007	.0007	.0007	.0007	.0009	.0011	.0011	.0011	.0011	.0009	.0009	.0009
		RPM	12980	12980	18030	18030	16230	16230	16230	16230	15500	13520	13520	13520	13520	12170	12170	10820
		IPM	12	12	28	28	23	23	23	23	29	29	29	29	29	23	23	19
		Ap	.0025	.0021	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067	.0067	.0060	.0060	.0054	.0047	.0047
	41	SFM	225	225	370	370	335	335	335	335	370	370	370	370	370	335	335	295
		IPT	.0004	.0004	.0007	.0007	.0006	.0006	.0006	.0006	.0008	.0010	.0010	.0010	.0010	.0009	.0009	.0008
		RPM	8650	8650	12020	12020	10820	10820	10820	10820	10320	9020	9020	9020	9020	8120	8120	7210
		IPM	7	7	17	17	14	14	14	14	17	18	18	18	18	15	15	11
		Ap	.0025	.0021	.0050	.0045	.0040	.0040	.0035	.0035	.0059	.0067	.0067	.0060	.0060	.0054	.0047	.0047

NEXT PAGE ▶

HPI88, HPK19 SERIES

2 FLUTE SQUARE - SLOTTING

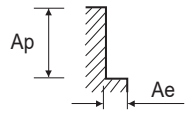


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Para-meter	Diameter (Ø)														
			5	5	5	5	5	6	6	6	6	6	8	10	12	16	20
		LBS	13	20	30	40	50	15	20	30	40	50	20	25	28	32	40
P	5	SFM	830	830	745	745	745	830	830	830	745	745	845	830	845	830	830
		IPT	.0013	.0013	.0011	.0011	.0011	.0014	.0014	.0014	.0013	.0013	.0018	.0021	.0025	.0029	.0033
		RPM	16070	16070	14460	14460	14460	13390	13390	13390	12050	12050	10250	8030	6830	5020	4020
		IPM	40	40	33	33	33	38	38	38	30	30	38	34	34	29	27
		Ap	.0098	.0089	.0079	.0079	.0069	.0118	.0106	.0106	.0094	.0083	.0157	.0197	.0236	.0315	.0394
	8	SFM	830	830	745	745	745	830	830	830	745	745	845	830	845	830	830
		IPT	.0013	.0013	.0011	.0011	.0011	.0014	.0014	.0014	.0013	.0013	.0018	.0021	.0025	.0029	.0033
		RPM	16070	16070	14460	14460	14460	13390	13390	13390	12050	12050	10250	8030	6830	5020	4020
		IPM	40	40	33	33	33	38	38	38	30	30	38	34	34	29	27
		Ap	.0098	.0089	.0079	.0079	.0069	.0118	.0106	.0106	.0094	.0083	.0157	.0197	.0236	.0315	.0394
	9	SFM	830	830	745	745	745	830	830	830	745	745	845	830	845	830	830
		IPT	.0013	.0013	.0011	.0011	.0011	.0014	.0014	.0014	.0013	.0013	.0018	.0021	.0025	.0029	.0033
		RPM	16070	16070	14460	14460	14460	13390	13390	13390	12050	12050	10250	8030	6830	5020	4020
		IPM	40	40	33	33	33	38	38	38	30	30	38	34	34	29	27
		Ap	.0098	.0089	.0079	.0079	.0069	.0118	.0106	.0106	.0094	.0083	.0157	.0197	.0236	.0315	.0394
	11.1	SFM	830	830	745	745	745	830	830	830	745	745	845	830	845	830	830
		IPT	.0013	.0013	.0011	.0011	.0011	.0014	.0014	.0014	.0013	.0013	.0018	.0021	.0025	.0029	.0033
		RPM	16070	16070	14460	14460	14460	13390	13390	13390	12050	12050	10250	8030	6830	5020	4020
		IPM	40	40	33	33	33	38	38	38	30	30	38	34	34	29	27
		Ap	.0098	.0089	.0079	.0079	.0069	.0118	.0106	.0106	.0094	.0083	.0157	.0197	.0236	.0315	.0394
	11.2	SFM	660	660	595	595	595	660	660	660	595	595	660	660	675	660	660
		IPT	.0013	.0013	.0011	.0011	.0011	.0015	.0015	.0015	.0013	.0013	.0018	.0022	.0026	.0029	.0033
		RPM	12790	12790	11510	11510	11510	10660	10660	10660	9590	9590	7990	6390	5460	4000	3200
		IPM	32	32	26	26	26	31	31	31	25	25	29	28	28	23	21
		Ap	.0084	.0075	.0067	.0067	.0059	.0100	.0090	.0090	.0080	.0070	.0134	.0167	.0201	.0268	.0335
H	38.1	SFM	660	660	595	595	595	660	660	660	595	595	660	660	675	660	660
		IPT	.0013	.0013	.0011	.0011	.0011	.0015	.0015	.0015	.0013	.0013	.0018	.0022	.0026	.0029	.0033
		RPM	12790	12790	11510	11510	11510	10660	10660	10660	9590	9590	7990	6390	5460	4000	3200
		IPM	32	32	26	26	26	31	31	31	25	25	29	28	28	23	21
		Ap	.0084	.0075	.0067	.0067	.0059	.0100	.0090	.0090	.0080	.0070	.0134	.0167	.0201	.0268	.0335
	38.2	SFM	440	440	395	395	395	440	440	440	395	395	440	440	440	440	440
		IPT	.0012	.0012	.0011	.0011	.0011	.0014	.0014	.0014	.0013	.0013	.0017	.0020	.0023	.0028	.0032
		RPM	8520	8520	7670	7670	7670	7100	7100	7100	6390	6390	5330	4260	3550	2660	2130
		IPM	20	20	16	16	16	20	20	20	16	16	18	17	16	15	14
		Ap	.0084	.0075	.0067	.0067	.0059	.0100	.0090	.0090	.0080	.0070	.0134	.0167	.0201	.0268	.0335
	39.1	SFM	340	340	305	305	305	340	340	340	305	305	340	340	340	340	340
		IPT	.0009	.0009	.0008	.0008	.0008	.0010	.0010	.0010	.0009	.0009	.0013	.0015	.0018	.0021	.0024
		RPM	6560	6560	5900	5900	5900	5460	5460	5460	4920	4920	4100	3280	2730	2050	1640
		IPM	11	11	9	9	9	11	11	11	9	9	10	10	10	9	8
		Ap	.0079	.0071	.0063	.0063	.0055	.0094	.0085	.0085	.0076	.0066	.0126	.0157	.0189	.0252	.0315
	39.2	SFM	270	270	245	245	245	270	270	270	245	245	270	270	270	270	270
		IPT	.0007	.0007	.0006	.0006	.0006	.0008	.0008	.0008	.0007	.0007	.0010	.0012	.0015	.0017	.0019
		RPM	5250	5250	4720	4720	4720	4370	4370	4370	3930	3930	3280	2620	2190	1640	1310
		IPM	7	7	6	6	6	7	7	7	6	6	7	6	6	5	5
		Ap	.0079	.0071	.0063	.0063	.0055	.0094	.0085	.0085	.0076	.0066	.0126	.0157	.0189	.0252	.0315
	39.3	SFM	235	235	215	215	215	235	235	235	215	215	235	235	235	235	235
		IPT	.0006	.0006	.0005	.0005	.0005	.0007	.0007	.0007	.0006	.0006	.0008	.0010	.0012	.0013	.0015
		RPM	4590	4590	4130	4130	4130	3830	3830	3830	3440	3440	2870	2300	1910	1440	1150
		IPM	5	5	4	4	4	5	5	5	4	4	5	5	5	4	4
		Ap	.0064	.0058	.0051	.0051	.0045	.0077	.0069	.0069	.0061	.0054	.0102	.0128	.0154	.0205	.0256
	40	SFM	660	660	595	595	595	660	660	660	595	595	660	660	675	660	660
		IPT	.0013	.0013	.0011	.0011	.0011	.0015	.0015	.0015	.0013	.0013	.0018	.0022	.0026	.0029	.0033
		RPM	12790	12790	11510	11510	11510	10660	10660	10660	9590	9590	7990	6390	5460	4000	3200
		IPM	32	32	26	26	26	31	31	31	25	25	29	28	28	23	21
		Ap	.0084	.0075	.0067	.0067	.0059	.0100	.0090	.0090	.0080	.0070	.0134	.0167	.0201	.0268	.0335
	41	SFM	440	440	395	395	395	440	440	440	395	395	440	440	440	440	440
		IPT	.0012	.0012	.0011	.0011	.0011	.0014	.0014	.0014	.0013	.0013	.0017	.0020	.0023	.0028	.0032
		RPM	8520	8520	7670	7670	7670	7100	7100	7100	6390	6390	5330	4260	3550	2660	2130
		IPM	20	20	16	16	16	20	20	20	16	16	18	17	16	15	14
		Ap	.0084	.0075	.0067	.0067	.0059	.0100	.0090	.0090	.0080	.0070	.0134	.0167	.0201	.0268	.0335

HPK20, HPK21 SERIES

4 FLUTE SQUARE - SIDE CUTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting Ae	Side Cutting Ap	Parameter	Diameter (Ø) 1	1.2	1.5	1.8	2	2.5	3	4	5	6	8	10	12	16	20
P	5	Non-alloy steel	0.03D	0.8D	SFM	505	575	645	675	710	710	695	710	830	830	845	830	845	830	830
					IPT	.0003	.0003	.0004	.0005	.0005	.0006	.0008	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
					RPM	49180	46560	41610	36460	34430	27600	22400	17210	16070	13390	10250	8030	6830	5020	4020
					IPM	62	63	66	68	70	71	71	73	81	78	77	71	71	61	52
	8	Low alloy steel	0.03D	0.8D	SFM	505	575	645	675	710	710	695	710	830	830	845	830	845	830	830
					IPT	.0003	.0003	.0004	.0005	.0005	.0006	.0008	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
					RPM	49180	46560	41610	36460	34430	27600	22400	17210	16070	13390	10250	8030	6830	5020	4020
					IPM	62	63	66	68	70	71	71	73	81	78	77	71	71	61	52
	9		0.03D	0.8D	SFM	505	575	645	675	710	710	695	710	830	830	845	830	845	830	830
					IPT	.0003	.0003	.0004	.0005	.0005	.0006	.0008	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
					RPM	49180	46560	41610	36460	34430	27600	22400	17210	16070	13390	10250	8030	6830	5020	4020
					IPM	62	63	66	68	70	71	71	73	81	78	77	71	71	61	52
	11.1	High alloyed steel, and tool steel	0.03D	0.8D	SFM	505	575	645	675	710	710	695	710	830	830	845	830	845	830	830
					IPT	.0003	.0003	.0004	.0005	.0005	.0006	.0008	.0011	.0013	.0015	.0019	.0022	.0026	.0030	.0033
					RPM	49180	46560	41610	36460	34430	27600	22400	17210	16070	13390	10250	8030	6830	5020	4020
					IPM	62	63	66	68	70	71	71	73	81	78	77	71	71	61	52
	11.2		0.03D	0.8D	SFM	405	455	505	540	560	555	555	555	660	660	660	660	675	660	660
					IPT	.0003	.0003	.0003	.0004	.0005	.0006	.0007	.0010	.0012	.0013	.0017	.0020	.0024	.0028	.0031
					RPM	39340	36980	32750	29150	27050	21630	18030	13520	12790	10660	7990	6390	5460	4000	3200
					IPM	43	43	43	45	51	51	51	53	60	57	54	51	52	45	39
H	38.1	Hardened steel	0.03D	0.8D	SFM	405	455	505	540	560	555	555	555	660	660	660	660	675	660	660
					IPT	.0003	.0003	.0003	.0004	.0005	.0006	.0007	.0010	.0012	.0013	.0017	.0020	.0024	.0028	.0031
					RPM	39340	36980	32750	29150	27050	21630	18030	13520	12790	10660	7990	6390	5460	4000	3200
					IPM	43	43	43	45	51	51	51	53	60	57	54	51	52	45	39
	38.2		0.03D	0.8D	SFM	270	305	340	355	370	370	370	370	440	440	440	440	440	440	440
					IPT	.0003	.0003	.0004	.0004	.0005	.0006	.0007	.0010	.0012	.0013	.0017	.0020	.0024	.0028	.0031
					RPM	26230	24720	21940	19060	18030	14420	12020	9020	8520	7100	5330	4260	3550	2660	2130
					IPM	29	30	31	32	34	34	34	35	40	38	36	34	34	29	27
	39.1		0.03D	0.8D	SFM	220	235	270	285	305	305	305	305	340	340	340	340	340	340	340
					IPT	.0002	.0002	.0003	.0003	.0004	.0004	.0006	.0007	.0009	.0010	.0013	.0015	.0018	.0021	.0023
					RPM	21310	19060	17410	15450	14750	11850	9840	7380	6560	5460	4100	3280	2730	2050	1640
					IPM	17	17	19	19	21	21	22	22	24	22	21	20	19	17	15
	39.2		0.03D	0.8D	SFM	170	185	205	220	235	235	235	235	270	270	270	270	270	270	270
					IPT	.0002	.0002	.0002	.0002	.0003	.0004	.0004	.0006	.0007	.0008	.0010	.0012	.0014	.0017	.0019
					RPM	16390	14940	13180	11850	11480	9170	7650	5740	5250	4370	3280	2620	2190	1640	1310
					IPM	10	11	12	12	13	13	13	14	15	14	13	12	12	11	10
	39.3		0.03D	0.8D	SFM	135	150	170	185	205	200	205	205	235	235	235	235	235	235	235
					IPT	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0005	.0006	.0007	.0009	.0010	.0012	.0014	.0016
					RPM	13110	12260	10920	10090	9840	7830	6560	4920	4590	3830	2870	2300	1910	1440	1150
					IPM	8	9	10	10	11	10	9	10	12	11	10	9	9	8	7
	40	Chilled Cast Iron	0.03D	0.8D	SFM	405	455	505	540	560	555	555	555	660	660	660	660	675	660	660
					IPT	.0003	.0003	.0003	.0004	.0005	.0006	.0007	.0010	.0012	.0013	.0017	.0020	.0024	.0028	.0031
					RPM	39340	36980	32750	29150	27050	21630	18030	13520	12790	10660	7990	6390	5460	4000	3200
					IPM	43	43	43	45	51	51	51	53	60	57	54	51	52	45	39
	41	Hardened Cast Iron	0.03D	0.8D	SFM	270	305	340	355	370	370	370	370	440	440	440	440	440	440	440
					IPT	.0003	.0003	.0004	.0004	.0005	.0006	.0007	.0010	.0012	.0013	.0017	.0020	.0024	.0028	.0031
					RPM	26230	24720	21940	19060	18030	14420	12020	9020	8520	7100	5330	4260	3550	2660	2130
					IPM	29	30	31	32	34	34	34	35	40	38	36	34	34	29	27

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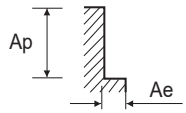
HPK23 SERIES

4&6&8 FLUTE SQUARE - SIDE CUTTING

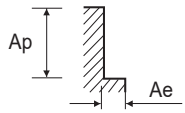


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting		Para-meter	Diameter (Ø)													
			Ae	Ap		1	2	3	4	5	6	8	10	12	14	16	18	20	25
P	5	Non-alloy steel	0.04D	1.5D	SFM	405	405	405	405	405	405	405	405	405	405	405	405	405	425
					IPT	.0002	.0003	.0005	.0007	.0008	.0015	.0020	.0025	.0028	.0032	.0035	.0050	.0042	.0058
					RPM	39340	19670	13110	9840	7870	6560	4920	3940	3280	2810	2460	2190	1970	1640
					IPM	50	40	41	42	40	60	60	59	54	54	52	65	50	57
	8	Low alloy steel	0.04D	1.5D	SFM	405	405	405	405	405	405	405	405	405	405	405	405	405	425
					IPT	.0002	.0003	.0005	.0007	.0008	.0015	.0020	.0025	.0028	.0032	.0035	.0050	.0042	.0058
					RPM	39340	19670	13110	9840	7870	6560	4920	3940	3280	2810	2460	2190	1970	1640
					IPM	50	40	41	42	40	60	60	59	54	54	52	65	50	57
	9		0.04D	1.5D	SFM	405	405	405	405	405	405	405	405	405	405	405	405	405	425
					IPT	.0002	.0003	.0005	.0007	.0008	.0015	.0020	.0025	.0028	.0032	.0035	.0050	.0042	.0058
					RPM	39340	19670	13110	9840	7870	6560	4920	3940	3280	2810	2460	2190	1970	1640
					IPM	50	40	41	42	40	60	60	59	54	54	52	65	50	57
	11.1	High alloyed steel, and tool steel	0.04D	1.5D	SFM	405	405	405	405	405	405	405	405	405	405	405	405	405	425
					IPT	.0002	.0003	.0005	.0007	.0008	.0015	.0020	.0025	.0028	.0032	.0035	.0050	.0042	.0058
					RPM	39340	19670	13110	9840	7870	6560	4920	3940	3280	2810	2460	2190	1970	1640
					IPM	50	40	41	42	40	60	60	59	54	54	52	65	50	57
	11.2		0.04D	1.5D	SFM	320	320	320	320	320	320	320	320	320	320	320	320	340	320
					IPT	.0002	.0003	.0005	.0007	.0008	.0014	.0018	.0022	.0024	.0027	.0031	.0042	.0048	.0050
					RPM	31150	15570	10380	7790	6230	5190	3890	3120	2600	2230	1950	1730	1640	1250
					IPM	34	29	29	31	29	43	42	40	38	37	36	44	47	38
H	38.1	Hardened steel	0.04D	1.5D	SFM	320	320	320	320	320	320	320	320	320	320	320	320	340	320
					IPT	.0002	.0003	.0005	.0007	.0008	.0014	.0018	.0022	.0024	.0027	.0031	.0042	.0048	.0050
					RPM	31150	15570	10380	7790	6230	5190	3890	3120	2600	2230	1950	1730	1640	1250
					IPM	34	29	29	31	29	43	42	40	38	37	36	44	47	38
	38.2		0.04D	1.5D	SFM	320	320	320	320	320	320	320	320	320	320	320	320	340	320
					IPT	.0002	.0003	.0005	.0007	.0008	.0014	.0018	.0022	.0024	.0027	.0031	.0042	.0048	.0050
					RPM	31150	15570	10380	7790	6230	5190	3890	3120	2600	2230	1950	1730	1640	1250
					IPM	34	29	29	31	29	43	42	40	38	37	36	44	47	38
	39.1		0.04D	1.5D	SFM	230	230	230	230	230	230	230	230	230	230	230	230	245	245
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0017	.0020	.0022	.0026	.0028	.0038	.0036	.0045
					RPM	22280	11140	7430	5570	4460	3710	2790	2230	1860	1590	1390	1240	1190	960
					IPM	25	21	21	22	21	27	28	26	25	25	24	28	26	26
	39.2		0.04D	1.5D	SFM	230	230	230	230	230	230	230	230	230	230	230	230	245	245
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0017	.0020	.0022	.0026	.0028	.0038	.0036	.0045
					RPM	22280	11140	7430	5570	4460	3710	2790	2230	1860	1590	1390	1240	1190	960
					IPM	25	21	21	22	21	27	28	26	25	25	24	28	26	26
	39.3		0.04D	1.5D	SFM	165	165	165	165	165	165	165	165	165	145	165	165	150	165
					IPT	.0001	.0002	.0004	.0005	.0006	.0011	.0015	.0018	.0020	.0020	.0025	.0035	.0037	.0041
					RPM	15920	7960	5310	3980	3180	2650	1990	1590	1330	1020	1000	880	720	640
					IPM	13	11	12	12	12	18	17	17	16	12	15	18	16	16
	40	Chilled Cast Iron	0.04D	1.5D	SFM	320	320	320	320	320	320	320	320	320	320	320	320	340	320
					IPT	.0002	.0003	.0005	.0007	.0008	.0014	.0018	.0022	.0024	.0027	.0031	.0042	.0048	.0050
					RPM	31150	15570	10380	7790	6230	5190	3890	3120	2600	2230	1950	1730	1640	1250
					IPM	34	29	29	31	29	43	42	40	38	37	36	44	47	38
	41	Hardened Cast Iron	0.04D	1.5D	SFM	320	320	320	320	320	320	320	320	320	320	320	320	340	320
					IPT	.0002	.0003	.0005	.0007	.0008	.0014	.0018	.0022	.0024	.0027	.0031	.0042	.0048	.0050
					RPM	31150	15570	10380	7790	6230	5190	3890	3120	2600	2230	1950	1730	1640	1250
					IPM	34	29	29	31	29	43	42	40	38	37	36	44	47	38

HPK23 SERIES

4&6&8 FLUTE SQUARE LONG - SIDE CUTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting Ae	Side Cutting Ap	Para-meter	Diameter (Ø) 1	2	3	4	5	6	8	10	12	14	16	18	20	25
P	5	Non-alloy steel	0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0016	.0020	.0024	.0028	.0029	.0032	.0045	.0045	.0047
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	25	20	21	21	20	31	29	28	27	25	24	29	27	22
	8	Low alloy steel	0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0016	.0020	.0024	.0028	.0029	.0032	.0045	.0045	.0047
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	25	20	21	21	20	31	29	28	27	25	24	29	27	22
	9		0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0016	.0020	.0024	.0028	.0029	.0032	.0045	.0045	.0047
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	25	20	21	21	20	31	29	28	27	25	24	29	27	22
	11.1	High alloyed steel, and tool steel	0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0016	.0020	.0024	.0028	.0029	.0032	.0045	.0045	.0047
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	25	20	21	21	20	31	29	28	27	25	24	29	27	22
	11.2		0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0016	.0020	.0024	.0026	.0028	.0042	.0047	.0042
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	22	19	19	19	19	23	23	23	24	22	21	28	28	20
H	38.1	Hardened steel	0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0016	.0020	.0024	.0026	.0028	.0042	.0047	.0042
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	22	19	19	19	19	23	23	23	24	22	21	28	28	20
	38.2		0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0016	.0020	.0024	.0026	.0028	.0042	.0047	.0042
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	22	19	19	19	19	23	23	23	24	22	21	28	28	20
	39.1		0.01D	3.0D	SFM	170	170	170	170	170	170	170	170	170	170	170	170	170	170
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0016	.0020	.0024	.0026	.0028	.0043	.0048	.0042
					RPM	16390	8200	5460	4100	3280	2730	2050	1640	1370	1170	1030	910	820	660
					IPM	18	15	15	16	15	19	19	19	19	18	17	23	23	17
	39.2		0.01D	3.0D	SFM	170	170	170	170	170	170	170	170	170	170	170	170	170	170
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0016	.0020	.0024	.0026	.0028	.0043	.0048	.0042
					RPM	16390	8200	5460	4100	3280	2730	2050	1640	1370	1170	1030	910	820	660
					IPM	18	15	15	16	15	19	19	19	19	18	17	23	23	17
	40	Chilled Cast Iron	0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0016	.0020	.0024	.0026	.0028	.0042	.0047	.0042
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	22	19	19	19	19	23	23	23	24	22	21	28	28	20
	41	Hardened Cast Iron	0.01D	3.0D	SFM	205	205	205	205	205	205	205	205	205	205	205	200	200	205
					IPT	.0002	.0003	.0005	.0007	.0008	.0012	.0016	.0020	.0024	.0026	.0028	.0042	.0047	.0042
					RPM	19670	9840	6560	4920	3940	3280	2460	1970	1640	1410	1230	1090	980	790
					IPM	22	19	19	19	19	23	23	23	24	22	21	28	28	20

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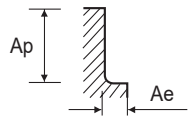
HPK25 SERIES

4 FLUTE CORNER RADIUS HIGH SPEED - SIDE CUTTING

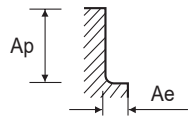


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting		Para-meter	Diameter (Ø)					
			Ae	Ap		1/8	3/16	1/4	5/16	3/8	1/2
P	5	Non-alloy steel	0.3D	0.1R	SFM	710	835	845	845	860	875
					IPT	.0071	.0109	.0144	.0180	.0212	.0277
					RPM	21630	17000	12880	10300	8760	6700
					IPM	618	742	742	742	742	742
	8	Low alloy steel	0.3D	0.1R	SFM	710	835	845	845	860	875
					IPT	.0071	.0109	.0144	.0180	.0212	.0277
					RPM	21630	17000	12880	10300	8760	6700
					IPM	618	742	742	742	742	742
	9		0.3D	0.1R	SFM	710	835	845	845	860	875
					IPT	.0071	.0109	.0144	.0180	.0212	.0277
					RPM	21630	17000	12880	10300	8760	6700
					IPM	618	742	742	742	742	742
	11.1	High alloyed steel, and tool steel	0.3D	0.1R	SFM	710	835	845	845	860	875
					IPT	.0071	.0109	.0144	.0180	.0212	.0277
					RPM	21630	17000	12880	10300	8760	6700
					IPM	618	742	742	742	742	742
	11.2		0.3D	0.1R	SFM	540	685	675	675	675	675
					IPT	.0059	.0102	.0138	.0172	.0205	.0275
					RPM	16480	13910	10300	8240	6900	5150
					IPM	391	567	567	567	567	567
H	38.1	Hardened steel	0.3D	0.1R	SFM	540	685	675	675	675	675
					IPT	.0059	.0102	.0138	.0172	.0205	.0275
					RPM	16480	13910	10300	8240	6900	5150
					IPM	391	567	567	567	567	567
	38.2		0.3D	0.1R	SFM	405	580	575	575	575	580
					IPT	.0063	.0091	.0123	.0155	.0184	.0244
					RPM	12360	11850	8760	7000	5870	4430
					IPM	309	433	433	433	433	433
	39.1		0.3D	0.05R	SFM	305	405	405	405	405	405
					IPT	.0047	.0078	.0104	.0130	.0156	.0208
					RPM	9270	8240	6180	4940	4120	3090
					IPM	175	258	258	258	258	258
	39.2		0.3D	0.05R	SFM	220	290	290	285	290	290
					IPT	.0035	.0066	.0087	.0110	.0131	.0175
					RPM	6700	5870	4430	3500	2940	2210
					IPM	95	155	155	155	155	155
	39.3		0.3D	0.05R	SFM	220	290	290	285	290	290
					IPT	.0035	.0066	.0087	.0110	.0131	.0175
					RPM	6700	5870	4430	3500	2940	2210
					IPM	95	155	155	155	155	155
	40	Chilled Cast Iron	0.3D	0.1R	SFM	540	685	675	675	675	675
					IPT	.0059	.0102	.0138	.0172	.0205	.0275
					RPM	16480	13910	10300	8240	6900	5150
					IPM	391	567	567	567	567	567
	41	Hardened Cast Iron	0.3D	0.1R	SFM	405	580	575	575	575	580
					IPT	.0063	.0091	.0123	.0155	.0184	.0244
					RPM	12360	11850	8760	7000	5870	4430
					IPM	309	433	433	433	433	433

HPK25 SERIES

4 FLUTE CORNER RADIUS NOMAL SPEED - SIDE CUTTING

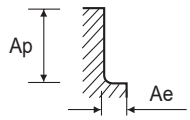


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting Ae	Side Cutting Ap	Para-meter	Diameter (Ø) 1/8	3/16	1/4	5/16	3/8	1/2
P	5	Non-alloy steel	0.3D	0.1R	SFM	305	380	370	380	385	375
					IPT	.0068	.0103	.0141	.0172	.0204	.0277
					RPM	9270	7730	5670	4640	3910	2880
					IPM	252	319	319	319	319	319
	8	Low alloy steel	0.3D	0.1R	SFM	305	380	370	380	385	375
					IPT	.0068	.0103	.0141	.0172	.0204	.0277
					RPM	9270	7730	5670	4640	3910	2880
					IPM	252	319	319	319	319	319
	9		0.3D	0.1R	SFM	305	380	370	380	385	375
					IPT	.0068	.0103	.0141	.0172	.0204	.0277
					RPM	9270	7730	5670	4640	3910	2880
					IPM	252	319	319	319	319	319
	11.1	High alloyed steel, and tool steel	0.3D	0.1R	SFM	305	380	370	380	385	375
					IPT	.0068	.0103	.0141	.0172	.0204	.0277
					RPM	9270	7730	5670	4640	3910	2880
					IPM	252	319	319	319	319	319
	11.2		0.3D	0.1R	SFM	220	260	265	260	265	265
					IPT	.0060	.0098	.0128	.0161	.0192	.0256
					RPM	6700	5250	4020	3190	2680	2010
					IPM	160	206	206	206	206	206
H	38.1	Hardened steel	0.3D	0.1R	SFM	220	260	265	260	265	265
					IPT	.0060	.0098	.0128	.0161	.0192	.0256
					RPM	6700	5250	4020	3190	2680	2010
					IPM	160	206	206	206	206	206
	38.2		0.3D	0.1R	SFM	145	190	190	185	190	190
					IPT	.0058	.0092	.0125	.0159	.0189	.0250
					RPM	4430	3910	2880	2270	1910	1440
					IPM	103	144	144	144	144	144
	39.1		0.3D	0.05R	SFM	90	120	120	120	120	120
					IPT	.0040	.0074	.0100	.0125	.0149	.0198
					RPM	2780	2420	1800	1440	1210	910
					IPM	44	72	72	72	72	72
	39.2		0.3D	0.05R	SFM	60	85	85	85	85	85
					IPT	.0032	.0045	.0060	.0075	.0089	.0119
					RPM	1850	1700	1290	1030	870	650
					IPM	24	31	31	31	31	31
	39.3		0.3D	0.05R	SFM	60	85	85	85	85	85
					IPT	.0032	.0045	.0060	.0075	.0089	.0119
					RPM	1850	1700	1290	1030	870	650
					IPM	24	31	31	31	31	31
	40	Chilled Cast Iron	0.3D	0.1R	SFM	220	260	265	260	265	265
					IPT	.0060	.0098	.0128	.0161	.0192	.0256
					RPM	6700	5250	4020	3190	2680	2010
					IPM	160	206	206	206	206	206
	41	Hardened Cast Iron	0.3D	0.1R	SFM	145	190	190	185	190	190
					IPT	.0058	.0092	.0125	.0159	.0189	.0250
					RPM	4430	3910	2880	2270	1910	1440
					IPM	103	144	144	144	144	144

HPK22 SERIES

4 FLUTE CORNER RADIUS HIGH SPEED - SIDE CUTTING

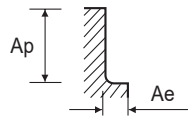


SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting		Para-meter	Diameter (Ø)								
			Ae	Ap		2	3	4	5	6	8	10	12	16
P	5	Non-alloy steel	0.3D	0.1R	SFM	610	695	725	795	860	845	845	845	845
					IPT	.0051	.0072	.0101	.0118	.0135	.0182	.0227	.0276	.0364
					RPM	29510	22400	17620	15410	13930	10250	8200	6830	5120
					IPM	599	642	713	728	753	747	746	754	746
	8	Low alloy steel	0.3D	0.1R	SFM	610	695	725	795	860	845	845	845	845
					IPT	.0051	.0072	.0101	.0118	.0135	.0182	.0227	.0276	.0364
					RPM	29510	22400	17620	15410	13930	10250	8200	6830	5120
					IPM	599	642	713	728	753	747	746	754	746
	9		0.3D	0.1R	SFM	610	695	725	795	860	845	845	845	845
					IPT	.0051	.0072	.0101	.0118	.0135	.0182	.0227	.0276	.0364
					RPM	29510	22400	17620	15410	13930	10250	8200	6830	5120
					IPM	599	642	713	728	753	747	746	754	746
	11.1	High alloyed steel, and tool steel	0.3D	0.1R	SFM	610	695	725	795	860	845	845	845	845
					IPT	.0051	.0072	.0101	.0118	.0135	.0182	.0227	.0276	.0364
					RPM	29510	22400	17620	15410	13930	10250	8200	6830	5120
					IPM	599	642	713	728	753	747	746	754	746
	11.2		0.3D	0.1R	SFM	475	540	555	590	675	675	675	675	660
					IPT	.0044	.0058	.0091	.0112	.0130	.0172	.0215	.0260	.0353
					RPM	22950	17490	13520	11480	10930	8200	6560	5460	4000
					IPM	401	405	492	513	566	565	565	568	564
H	38.1	Hardened steel	0.3D	0.1R	SFM	475	540	555	590	675	675	675	675	660
					IPT	.0044	.0058	.0091	.0112	.0130	.0172	.0215	.0260	.0353
					RPM	22950	17490	13520	11480	10930	8200	6560	5460	4000
					IPM	401	405	492	513	566	565	565	568	564
	38.2		0.3D	0.1R	SFM	320	675	475	525	575	575	575	575	555
					IPT	.0052	.0063	.0082	.0098	.0120	.0159	.0201	.0241	.0328
					RPM	15570	21860	11480	10160	9290	6970	5570	4640	3380
					IPM	321	551	378	400	448	443	447	447	444
	39.1		0.3D	0.05R	SFM	235	305	340	370	405	405	405	405	405
					IPT	.0040	.0048	.0068	.0084	.0098	.0137	.0176	.0215	.0287
					RPM	11480	9840	8200	7210	6560	4920	3940	3280	2460
					IPM	183	187	222	243	258	270	277	282	282
	39.2		0.3D	0.05R	SFM	185	220	235	255	285	285	290	285	285
					IPT	.0028	.0036	.0051	.0062	.0079	.0119	.0138	.0158	.0197
					RPM	9020	7100	5740	4920	4640	3480	2790	2320	1740
					IPM	99	102	117	122	146	165	154	146	137
	39.3		0.3D	0.05R	SFM	185	220	235	255	285	285	290	285	285
					IPT	.0028	.0036	.0051	.0062	.0079	.0119	.0138	.0158	.0197
					RPM	9020	7100	5740	4920	4640	3480	2790	2320	1740
					IPM	99	102	117	122	146	165	154	146	137
	40	Chilled Cast Iron	0.3D	0.1R	SFM	475	540	555	590	675	675	675	675	660
					IPT	.0044	.0058	.0091	.0112	.0130	.0172	.0215	.0260	.0353
					RPM	22950	17490	13520	11480	10930	8200	6560	5460	4000
					IPM	401	405	492	513	566	565	565	568	564
	41	Hardened Cast Iron	0.3D	0.1R	SFM	320	675	475	525	575	575	575	575	555
					IPT	.0052	.0063	.0082	.0098	.0120	.0159	.0201	.0241	.0328
					RPM	15570	21860	11480	10160	9290	6970	5570	4640	3380
					IPM	321	551	378	400	448	443	447	447	444

HPK22 SERIES

4 FLUTE CORNER RADIUS NOMAL SPEED - SIDE CUTTING



SFM = Surface Feet per Minute
IPM = Inches Per Minute
RPM = Revolutions Per Minute
Ap : Inch (Axial Depth of Cut)
IPT = Inches Per Tooth
Ae : Inch (Radial Depth of Cut)

ISO	VDI 3323	Material Description	Side Cutting Ae	Side Cutting Ap	Para-meter	Diameter (Ø) 2	3	4	5	6	8	10	12	16
P	5	Non-alloy steel	0.3D	0.2R	SFM	285	305	340	340	370	370	370	370	370
					IPT	.0047	.0067	.0087	.0111	.0130	.0173	.0215	.0259	.0343
					RPM	13930	9840	8200	6560	6010	4510	3610	3010	2250
					IPM	263	263	284	290	312	312	310	312	308
	8	Low alloy steel	0.3D	0.2R	SFM	285	305	340	340	370	370	370	370	370
					IPT	.0047	.0067	.0087	.0111	.0130	.0173	.0215	.0259	.0343
					RPM	13930	9840	8200	6560	6010	4510	3610	3010	2250
					IPM	263	263	284	290	312	312	310	312	308
	9		0.3D	0.2R	SFM	285	305	340	340	370	370	370	370	370
					IPT	.0047	.0067	.0087	.0111	.0130	.0173	.0215	.0259	.0343
					RPM	13930	9840	8200	6560	6010	4510	3610	3010	2250
					IPM	263	263	284	290	312	312	310	312	308
	11.1	High alloyed steel, and tool steel	0.3D	0.2R	SFM	285	305	340	340	370	370	370	370	370
					IPT	.0047	.0067	.0087	.0111	.0130	.0173	.0215	.0259	.0343
					RPM	13930	9840	8200	6560	6010	4510	3610	3010	2250
					IPM	263	263	284	290	312	312	310	312	308
	11.2		0.3D	0.2R	SFM	205	220	235	255	255	255	255	255	270
					IPT	.0039	.0059	.0079	.0098	.0118	.0158	.0197	.0235	.0311
					RPM	9840	7100	5740	4920	4100	3070	2460	2050	1640
					IPM	153	168	181	194	193	195	194	193	204
H	38.1	Hardened steel	0.3D	0.2R	SFM	205	220	235	255	255	255	255	255	270
					IPT	.0039	.0059	.0079	.0098	.0118	.0158	.0197	.0235	.0311
					RPM	9840	7100	5740	4920	4100	3070	2460	2050	1640
					IPM	153	168	181	194	193	195	194	193	204
	38.2		0.3D	0.2R	SFM	120	150	170	185	185	185	185	185	185
					IPT	.0039	.0059	.0079	.0092	.0119	.0157	.0197	.0238	.0312
					RPM	5740	4920	4100	3610	3010	2250	1800	1500	1130
					IPM	90	117	129	133	143	141	142	143	141
	39.1		0.3D	0.1R	SFM	70	85	100	120	120	120	120	120	120
					IPT	.0031	.0040	.0052	.0072	.0099	.0129	.0165	.0196	.0259
					RPM	3280	2730	2460	2300	1910	1440	1150	960	720
					IPM	40	43	51	66	75	75	76	75	75
	39.2		0.3D	0.1R	SFM	50	70	70	85	85	85	85	85	85
					IPT	.0025	.0031	.0039	.0046	.0058	.0078	.0098	.0118	.0157
					RPM	2460	2190	1640	1640	1370	1030	820	680	510
					IPM	24	28	26	30	32	32	32	32	32
	39.3		0.3D	0.1R	SFM	50	70	70	85	85	85	85	85	85
					IPT	.0025	.0031	.0039	.0046	.0058	.0078	.0098	.0118	.0157
					RPM	2460	2190	1640	1640	1370	1030	820	680	510
					IPM	24	28	26	30	32	32	32	32	32
	40	Chilled Cast Iron	0.3D	0.2R	SFM	205	220	235	255	255	255	255	255	270
					IPT	.0039	.0059	.0079	.0098	.0118	.0158	.0197	.0235	.0311
					RPM	9840	7100	5740	4920	4100	3070	2460	2050	1640
					IPM	153	168	181	194	193	195	194	193	204
	41	Hardened Cast Iron	0.3D	0.2R	SFM	120	150	170	185	185	185	185	185	185
					IPT	.0039	.0059	.0079	.0092	.0119	.0157	.0197	.0238	.0312
					RPM	5740	4920	4100	3610	3010	2250	1800	1500	1130
					IPM	90	117	129	133	143	141	142	143	141

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*** For the more information on sales network, please contact the head office as below;**

YG-1 HEAD OFFICE

13-40, Songdogwahak-ro 16beon-gil, Yeonsu-gu, Incheon 21984, South Korea

Phone: +82-32-526-0909
E-mail: yg1@yg1.solutions www.yg1.solutions

X1-EH

YG-1 CO., LTD.

YG-1 USA
730 Corporate Woods Parkway,
Vernon Hills, IL 60061 U.S.A.
Phone: +1 800-765-8665
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YG-1 CANADA INC.
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Querétaro, México CP 76260
Phone: +52 442-348-12-70
E-mail: ventas@yg1mexico.com
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HEAD OFFICE
13-40, Songdogwahak-ro 16beon-gil,
Yeonsu-gu, Incheon 21984, South Korea
Phone: +82-32-526-0909
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